



MINISTERUL EDUCAȚIEI
ȘI CERCETĂRII
AL REPUBLICII MOLDOVA



”DEVELOPMENT THROUGH RESEARCH AND INNOVATION” IDSC-2025

INTERNATIONAL SCIENTIFIC CONFERENCE

The 6th Edition

May 16th, 2025

Collection of scientific articles

CHISINAU, REPUBLIC OF MOLDOVA

Chișinău, 2025

CZU 3(082)
D 35

Proceedings International Scientific Conference **"DEVELOPMENT THROUGH RESEARCH AND INNOVATION" IDSC-2025**, The 6th Edition, May 16th, 2025. All rights reserved The editors are not held responsible for the contents of the published scientific papers, nor for the researchers' opinions presented in this Volume.

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Layout and technical editing: Mihaila Svetlana, Budan Maria

DESCRIEREA CIP A CAMEREI NAȚIONALE A CĂRȚII DIN REPUBLICA MOLDOVA

"Development Through Research and Innovation" IDSC-2025, international scientific conference (6 ; 2025 ; Chișinău). Development Through Research and Innovation IDSC-2025 : International Scientific Conference : The 6th Edition : May 16th, 2025, Chisinau : Collection of scientific articles / scientific committee: Stratan Alexandru (president) [et al.]. – Chișinău : SEP ASEM, 2025. – 603 p. : fig., tab. color.

Cerințe de sistem: PDF Reader.

Antetit.: Ministerul Educației și Cercetării al Republicii Moldova, Academy of Economic Studies of Moldova [et al.]. – Referințe bibliogr. la sfârșitul art.

ISBN 978-9975-168-26-7 (PDF).

3(082)

D 35

ISBN 978-9975-168-26-7 (PDF).
DOI: <https://doi.org/10.53486/dri2025>

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PLENARY PROCEEDINGS

CENTRAL BANKING AMID SHOCKS AND UNCERTAINTY IN DEVELOPING ECONOMIES

DOI: <https://doi.org/10.53486/dri2025.01>

UDC: 336.711: 338.124.4(478)

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Abstract: *The article looks at modern policy challenges faced by typical central banks small, open, developing economies that don't rely on resource exports, integrating Republic of Moldova as a representative case. These countries often operate under a complex set of typical structural weaknesses, such as ongoing current account deficits, a high degree of currency substitution, and fiscal constraints. The study relies on a qualitative approach to analyse the role and how a central bank, operating under an inflation-targeting regime, could develop its approach to capturing and responding to external shocks and conjunctural uncertainty.*

The analysis integrates synthesis of insights from economic evolution and historic evidence, highlighting the structural amplification of uncertainty through forces such as trade hyperglobalisation, climate-related shocks, demographic shifts, and more recent - de-globalisation. The study tries to bridge theoretical observations from economic uncertainty knowledge with real-world structural issues including questioning the heavy dependence on purely quantifiable risk models and argues for a broader, more flexible, conceptualisation of uncertainty. It also assesses the limitations of traditional monetary policy in highly externally -dependent settings, underlining the growing importance of adaptive strategies.

The findings suggest that inflation-targeting regimes in developing economies in today's environments need to evolve to account for broader horizons and multidimensional vulnerabilities. A strategic, longer-term orientation, effective coherent communication under uncertainty, institutional consolidation, and coordinated deployment of monetary, macroprudential, and foreign exchange instruments, as well as interplay with other state policies, emerge as essential pillars of resilient monetary governance. The paper concludes that a pragmatic, credibility-focused, and flexible approach – grounded in context-specific realities – is necessary for monetary authorities aiming to maintain macro-economic and macro-financial stability amid XXI century uncertainty.

Keywords: *External shocks; Monetary policy; Shocks; Uncertainty; Small open economy; Moldova; Developing economies*

JEL Codes: E52; E58; O23

1. Introduction

The present paper looks at modern policy challenges faced by typical inflation-targeting central banks from small open non-resource exporting developing economies. Such economies typically exhibit a set of similar and historic macroeconomic imbalances, including a relatively high degree of currency substitution, significant current account deficits, constrained fiscal space, limited coordination between fiscal and monetary policies, significant social and demographic challenges, heightened susceptibility to external shocks, and structural reliance on external financial assistance.

The macroeconomic and macrofinancial uncertainties at both national and international levels are not analysed by their origins or nature, nor does it extend outside of monetary policy context. Rather, these uncertainties are treated as external realities encountered and to be managed by central banks functioning in such economies. A young eastern European market economy, Moldova exemplifies the complex policy dilemmas faced by those economies. Specifically, the National Bank of Moldova (NBM), guided primarily by a forward-looking inflation-targeting framework, continually adapts to balance responses to domestic risks and inflationary pressures beyond its immediate control. The energy crisis triggered by the disruptions in Russian gas supplies, alongside ongoing geopolitical

instability, climate-induced issue, and anticipated fiscal policy changes following upcoming elections, exemplifies clearly such external pressures. Even though an economic recovery is anticipated in the coming years, Moldova's GDP growth in 2024 stagnated at only 0.1%, highlighting the inherent constraints within an economic structure heavily reliant on consumption and investment. At the same time, net exports remain consistently negative, influenced by agricultural uncertainties and interruptions to established routes, notably with neighbourhood.

While external macrofinancial assistance provides a solid buffer, it cannot provide complete insulation against these external shocks, leaving to the monetary policy the role of primary stabiliser in an environment of heightened uncertainty. After a period of relative stability, price pressures re-emerged in late 2024, with annual inflation accelerating from 3.3% in May to 8.75% by March 2025 (NBM, 2025) – well above the NBM's target variation interval. Moreover, rapid expansion in real estate lending has fuelled property price inflation, demanding closer macroprudential oversight. This resurgence underlines the challenges of maintaining price stability in an economy acutely sensitive to imported inflation, exchange rate pass-through, and supply-side shocks. In these conditions, the currency stability currently is supported by robust foreign exchange reserves and international liquidity injections, providing temporary relief. In the same time the formal adoption of the euro as the official reference currency in January 2025 signals deeper structural integration with EU financial markets, this relationship simultaneously promises a stability contribution, but also exposure to eurozone various market spillovers. The country's current negative net international investment position (–5.6 billion) and elevated gross external debt of USD 10.2 billion constituting 56.1 % of GDP (NBM, 2025) highlight the underlying fragility of an economic model reliant on external financing.

The monetary policy agility has been tested under the recent economic disturbances, many of them reinforcing one the another, such as Covid-19 global sanitary crisis, energy products price volatility, episodes of exchange rate pressures, and the pro-cyclicality of remittance flows. For inflation-targeting regimes like Moldova's, macroeconomic intersecting challenges calls for raising questions about the feasibility to explore possibilities for further policy development in view of external shocks which dominate inflation dynamics. Moving forward, the central bank's credibility depends not only on its technical capacity to forecast and react to inflation but also on its ability to communicate the limits of monetary policy considering its particular features and the nature of incoming shocks. In an established regime, it necessitates a more nuanced policy framework – one that integrates inflation targeting with explicit recognition of external sector vulnerabilities, and the growing imperative of sustainable macroeconomic resilience without conflict between the policy instruments in the context of regime prescriptions. The alternative is a perpetual cycle of policy reactions, sometimes discretionary ones, addressing imbalances whose origins lie outside country's monetary jurisdiction.

Uncertainty as a Policy Parameter

Monetary authorities, by their very nature, operate in an environment where uncertainty is not an extraordinary circumstance but a permanent element in policymaking. Unlike private actors, who can diversify, insure or hedge against risks, monetary authorities issue responsible decisions in the most cases in advance, in conditions of incomplete information, structural unpredictability, and quite often also under crisis conditions. The crises in the past two decades proved that uncertainty is not a marginal concern but the core challenge of modern macroeconomics. Monetary and financial policymakers cannot rely on the "feeling" of controllability and instead try building adaptive systems – buffers unknowns and automatic stabilisers. The quality of macroeconomic may improve acknowledging uncertainty not as a flaw to be eliminated, but as the defining feature of economic life. This reality is particularly acute in developing economies, where institutional weaknesses, external vulnerabilities, transmission challenges and volatile political economies amplify uncertainty. In the past two decades monetary authorities apply data-driven policy decision making, from the perspective of uncertainty, the evolution of macroeconomic analysis and forecasting frameworks

reveals an empirical tension: the struggle between quantifiable models and unquantifiable reality. But what is uncertainty and how do central banks perceive it? A common source of uncertainty (Hansen, 2022) is risk, where risk refers to situations where outcomes are unknown but probabilities are known – a measurable uncertainty.

Macroeconomist analysts and planners attempt to “manufacture” certainty relaying on probabilistic risk models, but the latter neglect deeper structural uncertainties that drive crises and totally unpredictable shocks. Shocks (e.g. monetary, supply, or geopolitical) are realisations that reveal or exacerbate uncertainty. A shock may convert unknown unknowns into known risks – or vice versa, by amplifying ambiguity.

Fundamentals define uncertainty (Knightian) as situation where probabilities are unknown or unknowable. This is assumed to be a true uncertainty, often associated with structural shifts or rare events. Knight’s framework, assumes a static dichotomy between measurable and immeasurable uncertainty. An intuitive and subsequent conclusion here makes it clear that macroeconomic stability requires tools beyond stochastic modelling, incorporating wider multidimensional perspectives and strong expert judgement.

However, before treating a disease, one must first accurately establish the correct diagnosis. Focusing strictly on known measures of uncertainty, advanced economies, notably the United States, employ specific indexes designed to quantify economic uncertainty. One prominent example is *VIX* – the CBOE Volatility Index, commonly known as the "fear gauge," which measures market expectations regarding near-term volatility implied by Standard & Poor’s 500 index option prices. Such index would be difficult to calculate and it possibly be less relevant in developing economies or emerging market economies, especially those with limited depth of capital markets.

Another recognised measure is the *Global Economic Policy Uncertainty Index*¹, calculated as a gross domestic product-weighted average of national Economic Policy Uncertainty indices from 21 countries, has been released monthly, covering the period from January 1997 to the present. The recent evolution of this index on a global level, reveals an unprecedented surge in uncertainty. Specifically, the index, historically stable with modest fluctuations around major event, has experienced a dramatic escalation beginning in February 2020 with 281.21 and culminating in an all-time peak 548.89 points by February 2025 (EPU, 2025). This sharp spike clearly illustrates the acute intensification of policy-related uncertainty currently confronting global markets. Necessary to mention, the index capture a very limited number of developing economies. However, in the past decades it can be witnessed a better policy harmonisation coordination between countries for different reasons.

Additionally, the *Purchasing Managers Index (PMI)*, although not explicitly designed as an uncertainty measure, provides valuable indirect insight, as fluctuations in its readings can reflect or correlate with uncertainty under certain conditions and reflect the market sentiment. The PMI highlights monthly supply and demand trends within sectors such as manufacturing and services.

Nonetheless, for measuring actual uncertainty, dedicated indexes or model-based measures – for example, forecast *dispersion* or *structural vector autoregression residuals* – are preferable. Similarly, the *dispersion observed in survey-based forecasts* can serve as a more universally applicable measure of uncertainty, reflecting the range of views and disagreements among economic forecasters.

For the developing economies, however, the existing literature lacks such widely recognised and systematically calculated metrics, which apart from relevance for the type of economy, is partially supported by various issues generally concerning data availability, quality, and granularity. The next section will seek to define explicitly the processes, forces, or phenomena that exacerbate uncertainty within these economies.

¹ Economic Policy Uncertainty. (n.d.). *Economic policy uncertainty index*.

Structural Drivers of Uncertainty

Subramanian and Kessler (2013), in their influential analysis, characterise the current era of global economic integration as "hyperglobalisation," which emerged prominently in the early 1990s. This period has been distinguished by rapid acceleration in international trade agreements, trade flows and foreign direct investment. Significant drivers therefor, were policy liberalisation and substantial advancements in technology, notably in transportation and logistics sectors. Authors date the start of this phase of hyperglobalisation from the intensification of the liberalisation trends initiated in the post–World War II era, originally initiated by advanced economies under the General Agreement on Tariffs and Trade framework and subsequently adopted by developing countries through unilateral liberalisation and participation in international economic programs. The result has been a historically unprecedented deepening of global trade integration.

A notable structural characteristic of the stage, as was identified by authors, is the fragmentation of global production chains, contributing to export statistics, thereby inflating gross trade volumes in comparison to actual value-added flows. Being fuelled by multinational enterprises and cross-border capital movements, this fact triggers significant implications for economic policymakers. For instance, with relevance for the central banks, the exposure to global volatility and the transmission of monetary policy is further complicated, especially in small open developing economies, where trade is one of economy's main building blocks.

Subramanian and Kessler (2013) emphasise the idea of "democratic globalisation," based on observations about how trade growth among lower- and middle-income economies has exceeded their income growth rates, and the growth rates of higher-income countries. Increasingly, trade expansion is concentrated within the developing world itself, reorganising "traditional" global trade patterns and broadening the spectrum of interdependence. Any change needs adaptation, and such a reconfiguration adds further complexity for developing economies' central banking through exposure to more complex cross-border economic interdependencies and greater uncertainty in trade-related shocks, currency fluctuations, and capital flows shifts.

Authors stress, that the sustainability of this hyperglobalised order is also being tested by the global imperative to mitigate climate change. Indeed, the intersection between climate policy and macroeconomic stability introduces a new horizon of uncertainty for central banks, particularly those in developing world. Integrating climate risks into existing macroeconomic policy analysis and forecast frameworks and monetary strategy is a challenging task, owing to the fragmented and often uncertain nature of climate-related data and its macroeconomic implications.

Former Deutsche Bundesbank's President and chairman of the Bank of International Settlements board, the Economist, Jens Weidmann (2022) defines critical structural changes – decarbonisation, digital transformation, demographic shifts, and de-globalisation – that significantly amplify uncertainty and pose new challenges for central banks in today's settings. In 2022 Weidmann (2022) stressed that decarbonisation initiatives, primarily through climate policies, could raise annual inflation by 0.3 to 1.1 percentage points on average until 2030 due to higher transition costs and carbon pricing mechanisms. Digital transformation has a dual inflationary profile. On one hand, it can foster productivity gains and market efficiencies, with the European Central Bank estimating a 0.1 percentage point annual reduction in non-energy industrial goods inflation since 2003. On the other, it can lead to market concentration, undermining competition and trigger inflationary effects. Demographic transitions, particularly ageing populations and increased migration, further complicate inflation modelling. According to Heller (2006) and Weidmann (2022), these trends could reverse previously dominant disinflationary pressures by tightening labour markets, shifting consumption patterns, altering productivity growth, and influencing pension investment flows. These demographic impacts differ across advanced and developing economies, requiring central banks in developing regions to explicitly incorporate distinct demographic realities into policy frameworks. Finally, a more recent addition to global shifts evolution trend adding to uncertainty is de-globalisation

(Weidmann (2022)), characterised by rising protectionism and a retreat from integrated value chains – risks weakening the deflationary impact of international trade, driving up domestic prices and intensifying volatility in wage and cost structures.

Complementing the perspectives enumerated above, Daniel Dăianu (2015), presenting a Romanian view, clearly and precisely emphasises that central banks in uncertain environments confront additional systemic dilemmas. He notes that oversized financial sectors can exhibit destabilising characteristics even under sound regulatory and supervisory frameworks.

This is often the case of developing economies, which participate in various reform programs, for example Moldova's regulatory and supervisory framework transposes EU norms and keeps aligned with the best recognised international standards, for example such as Basel recommendations. Further, Dăianu (2015) stresses, that achieving price stability alone is not enough for securing broader economic stability, particularly in the presence of rising macrofinancial complexity.

In recent years it became more prominent that central banks frequently operate under multiple and at times conflicting mandates – such as controlling inflation, supporting growth, and ensuring financial stability. Additional trendy currents may include climate policy contribution engagement or socially oriented goals such as dealing with different kind of inequalities. In modern developing economies central bankers often operate within contexts of slowing potential growth due to noticeable demographic shifts, income inequality, and technological disruptions. Finally, the lack of effective international policy coordination further complicates the central bank's role in small, open economies, limiting their capacity to buffer external shocks. These factors necessitate adaptive, coherent, and transparent policy frameworks that go beyond inflation targeting to address multidimensional instability and external fragility in developing economies.

Historical precedent further reinforces the central bank's foundational role in crisis management, the Bank of England was established in XVII century during the aftermath of a sovereign debt crisis, while the Federal Reserve was created to confront recurring economic turmoil in the United States during the late XIX and early XX centuries, the European Central Bank was established alongside the euro to shield the Single Market from the risks of exchange rate instability and competitive devaluations (Draghi, 2019); thus, in its first decade, the euro area experienced a period of relative macroeconomic stability, however, followed by a decade marked by financial and sovereign debt crises.

Moldova's central bank, the NBM, was born out of a similar necessity. Established in 1991 following the dissolution of the Soviet Union, the NBM assumed the control and the responsibility for currency issuance and monetary policy, building the foundations for Moldova's monetary and financial sovereignty (NBM, 2018). With the support and guidance of the International Monetary Fund, the NBM progressively strengthened its institutional framework by implementing prudential regulation, payment systems modernisation, and steadily reserves' accumulation. For the transition economy, these actions helped to lay the groundwork for macrofinancial stability.

These historical insights underline the central bank's role in anchoring stability, confidence and assuring continuity amid systemic uncertainty, external shocks and transformation. Historical experiences show us that forceful and timely responses to financial stress were effective to stabilise the system and relatively limited the damage to the economy comparing to past crises. The excessive shortfall of inflation from targets always remained relatively contained in the long-term perspective (BIS, 2024). Talking about recent large scale events, following aggressive rounds of policy tightening, inflation trends have shown signs of converging once more toward the intervals of price stability. Meanwhile, economic activity and labour markets have displayed surprising relative resilience. This resilience is no accident. It reflects central banks' capacity as role institutions to react promptly, to deploy a diverse and right array of tools, and also to maintain credibility in the eyes of participants to the economic relations. Looking deeper, the activity of central banks serves not only to safeguard price stability, but also to support the durability of financial systems, insurance of the smooth functioning of credit intermediation, and uphold institutional trust, which are of paramount

importance for further developing of an economy and populations material wellbeing growth.

Thus, in environments increasingly defined by uncertainty, the strategic agility of monetary and financial policymakers remains a central pillar of right economic governance. This is even more important for the developing economies, where uncertainty is magnified by structural fragilities such as narrow fiscal space, external financing dependence, and high exposure to global shocks, the approach to monetary policy should focus on further evolution.

Drawing on the "multipronged strategy" articulated by Heller (2006) for fiscal policymakers, several lessons may be meaningfully extended to the domain of central banking. First, monetary authorities in developing economies should adopt a longer-term orientation, prioritising strategic objectives such as macroeconomic stability and inclusive growth over short-term fluctuations. Second, they should identify specific areas of intervention where monetary instruments can have tangible impact. Third, the development of robust, independent, and transparent institutions is essential to enhance policy credibility and implementation capacity. Finally, cross-sectoral and inter-institutional cooperation should be pursued where it delivers demonstrable national benefits, particularly in contexts characterised by fragmented governance and external dependencies.

In addition to these principles, central banks in developing economies are expected to act with both flexibility and credibility, judiciously balancing rule-based frameworks with discretionary responses to rapidly evolving conditions. In periods of heightened uncertainty, transparent and consistent communication is indispensable for managing expectations and mitigating market volatility. However, in developing economies, the effectiveness of expectations management may be more limited due to structural transmission challenges, institutional constraints, and lower responsiveness of economic agents to forward guidance and signalling. These factors weaken the overall traction of communication as a policy tool, necessitating a complementary reliance on direct instruments and institutional credibility. In any case, monetary authorities should be prepared to utilise the full spectrum of policy tools – including interest rate policy, foreign exchange market operations, macroprudential measures, and forward guidance – in a coherent and context-sensitive manner.

This holistic and adaptive posture, grounded in institutional resilience and policy coherence, is critical for developing economies in managing the persistent and evolving uncertainties of the 21st-century global economy.

Conclusions

This study concludes that central banks in developing economies face a policy environment fundamentally different from that of their advanced economy counterparts, and those differences are further accentuated by the modern major policy challenges and forces influencing the economy. Thus, persistent macroeconomic imbalances, institutional limitations, and structural reliance on external financing amplify the effects of uncertainty, making it an endogenous feature of the monetary regime and policy toolkit.

The analysis highlights that uncertainty is particularly challenging to be adequately addressed through risk-based stochastic modelling alone. An important issue is the problem of capturing uncertainty in existing models, especially in developing economies', often encountering general data availability and quality issues.

Deeper structural factors such as demographic shifts, digital transformation, and decarbonisation pose inflationary and financial stability pressures, often outside the control of domestic policymakers. Moreover, de-globalisation and fragmentation of trade relationships further erode the reliability of external anchors and are also difficult to measure and forecast.

In this context, the credibility of central banks is increasingly contingent not only on forecasting precision, but on institutional strength, policy agility, and the ability to exactly acknowledge, communicate and manage policy limitations. To manage these compounded challenges, a comprehensive and resourceful approach is necessary. From the one perspective, a starting point

could be that policymakers move beyond the narrow horizons of shorter-term price stability objectives. Drawing from Heller's (2006) multipronged policy paradigm, the findings advocate for a strategic orientation that is longer-term, institutionally grounded, and context-sensitive.

Monetary authorities in particular should continue to act with flexibility and credibility, deploying a diversified toolkit compatible with current policy settings, or reviewing the latter considering the particular characteristics of the economy and all current circumstances. These actions should continuously be supported by effective communication strategies that improve transmission, manage expectations and increase public trust, especially during times of higher uncertainty.

Looking ahead, future research should pursue three directions. First, there is a need to refine the approach and perhaps empirical measurement of uncertainty in low- and middle-income economies, potentially through the development of regionally adapted metrics that incorporate localised shocks and characteristic institutional fragility. Second, more work is required to design integrated policy frameworks that combine inflation-targeting regimes with financial stability, climate risk and possibly social considerations. Finally, cross-country comparative studies examining how institutional evolution and governance models affect monetary policy outcomes in uncertain environments, would provide evidence-based information which may positively contribute to adaptation and further development.

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Section 1:
**ECONOMY AND INTERNATIONAL ECONOMIC
RELATIONS**

ASSESSING THE LINKS BETWEEN FDI AND ECONOMIC PERFORMANCE THROUGH ECONOMETRIC MODELS

DOI: <https://doi.org/10.53486/dri2025.02>

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Abstract: *This study analyzes the relationship between economic performance and four macroeconomic indicators foreign direct investment, consumer price index, producer price index and employment in the period 2010-2024 for the countries Romania and Republic of Moldova. Three multiple regression models were obtained and differences were identified between the two economies in terms of the impact of macroeconomic indicators on economic performance. The results indicate that the economic performance of the Republic of Moldova is positively influenced by foreign direct investment, the consumer price index and employment and negatively by the producer price index. In Romania, price and employment indicators have a positive impact, while foreign direct investment has a negative impact on economic performance. The general aggregate model confirms that foreign direct investment, the consumer price index and the producer price index have a positive impact, while employment has a negative impact on economic performance. Therefore, the study highlights the structural differences between the two countries and the need to design tailored economic policies that maximize the positive impact of FDI and minimize the domestic consequences on economic performance.*

Keywords: *foreign direct investment, economic performance, multiple linear regression.*

JEL Classification: *F21, C19*

1. Introduction

In recent decades, economic globalization has changed trade dynamics, capital movements and the structure of international markets. In this respect, foreign direct investment (FDI) is the transfer of capital, technology and know-how between economies. For emerging and transition economies, FDI is not only a source of external finance, but also a tool for economic growth through infrastructure modernization and job creation. FDI requires the involvement of foreign investors through a long-term commitment leading to stability and economic and social benefits. As competition to attract foreign capital has intensified, governments have adopted proactive policies, offering government measures such as tax breaks, accessibility to infrastructure and legal stability. Thus, FDI is an indicator of investor confidence in a country's economy and institutional structure.

The relationship between FDI and economic performance is a topical issue in the context of European integration and economic convergence between Member States. At national level, governments are seeking to stimulate foreign investment through economic policies, through legislative and fiscal changes. Regional development strategies emphasize the important role of FDI in the development of disadvantaged areas by attracting investors to help diversify local economic activities, boost competitiveness and connect them to global value chains.

The main purpose of this study is to analyze the link between FDI, macro-economic indicators and

the economic performance of a national economy by applying econometric models. The study aims to analyze the influence of macroeconomic indicators: foreign direct investment, consumer price index, producer price index and employment on economic performance in Romania and the Republic of Moldova over the period 2010-2024. In order to achieve this goal, the research adopts a quantitative approach, based on the use of multiple linear regression models. The analysis is based on a set of statistical data from official sources (Eurostat, INS, INSM).

The structure of the study is organized as follows: the first part presents the theoretical framework of FDI and their implications for the economy; this is followed by a review of the literature, then by a detailed description of the dataset and the methodology applied. The central part is devoted to the exposition of the results and their interpretation, and the concluding section draws conclusions, policy recommendations and possible future research directions.

2. Literature review

The relationship between FDI and economic performance has been intensively studied in the literature. Theoretical and empirical perspectives vary, depending on the economic context, the period under analysis and the indicators considered. The literature emphasizes that the effects of FDI on economic performance are not uniform, but depend on the quality of institutions, domestic market development, human capital and the absorptive capacity of the host economy. Classical economic theories, such as the comparative advantage theory (Ricardo) or the Heckscher-Ohlin theory (Ion, 2007), argue that international capital flows should contribute to a more efficient allocation of resources and, therefore, to economic growth. Caves (1974), Blomström and Kokko (1998) emphasize that FDI can generate positive externalities on the host economy through technology transfer, local productivity growth and human capital formation. Most empirical studies confirm a positive relationship between FDI and GDP or productivity growth, especially in emerging economies (Alfaro et al., 2004; Borensztein et al., 1998). Borensztein, De Gregorio and Lee (1998) showed that FDI contributes positively to economic growth in developing economies, provided that a minimum level of human capital is present. They consider FDI as a source for advanced technologization and modernization. Alfaro et al. (2004) emphasize that the positive effect of FDI on economic growth is magnified in the presence of well-developed financial markets, suggesting that institutional infrastructure plays a critical role. Studies for Central and Eastern European countries (Campos & Kinoshita, 2002; Campos & Kinoshita, 2002; Javorcik, 2004; Mișu, 2019) show that FDI played a significant role in restructuring post-transition economies, but their impact on economic performance was conditional on political and economic stability. Mishra et al. (2001) find that FDI is disproportionately concentrated in the more developed regions of a country due to unbalanced public policies. Basile et al. (2008) study the distribution of FDI in 8 EU countries between 1991-1999 and conclude that human capital and public infrastructure influence regional attractiveness. Nunnenkamp (2004) finds that FDI contributes to poverty alleviation and economic growth under certain conditions, but not all FDI is beneficial, so those oriented towards resources or domestic markets may have limited long-term development effects compared to FDI oriented towards exports and innovation. The authors Görg and Greenaway (2004) assess various evidence (wages, exports, productivity growth) that contribute to the attraction of FDI through government policies. There are studies in the literature that investigate the risks associated with FDI, such as profit repatriation, unfair competition to local firms, or capture of the domestic market. These are mentioned by authors such as Rodrik (2001) and Chang (2002), who advocate for economic policies to regulate in attracting FDI. The European Union encourages the free movement of capital and the development of a single market, in which FDI plays an important role in reducing regional disparities and promoting economic and social cohesion. In Central and Eastern Europe, including Romania and the Republic of Moldova, FDI has been a strategic policy instrument for the transition to a market economy and integration into the European dimension, by taking on European standards of production, infrastructure, services and

corporate governance. In the context of Romania, several researches consider that FDI contributes to the modernization of industrial sectors, export growth and employment (Simionescu, 2017; Zaman & Georgescu, 2018). Munteanu (2021) studies the vulnerabilities of the local economy in case of dependence on FDI and limited impact on long-term development. In the Republic of Moldova, the literature emphasizes the importance of FDI in the development and diversification of the economy, as well as in the attraction of know-how. According to Murafa (2024), FDIs have an effect on the development of the industrial sector, but are negatively affected by political instability and infrastructure deficiencies. further emphasizes the Importance of institutional strengthening and governance reforms to increase investment attractiveness (Hîncu & Litocenco, 2022).

Analyzing the effects of FDI on economic performance is a decision-making tool in shaping sustainable development policies, attracting foreign capital and reducing territorial disparities. Assessing the relationships through econometric methods is important to identify influencing factors for adjusting public policies and amplifying the impact of economic interventions.

3. Data, methodology and econometric model

To analyze the relationship between economic performance (EP) and macroeconomic indicators: FDI, consumer price index (CPI), producer price index (PPI) and employment (EP) we consider a database containing financial information for Romania and the Republic of Moldova and apply a multiple linear regression model of the form:

$$EP = \alpha + \beta_1 \cdot RCPI + \beta_2 \cdot RPPI + \beta_3 \cdot RFDI + \beta_4 \cdot RPE + \varepsilon$$

where: EP is the dependent variable, the profitability indicators RCPI, RPPI, RFDI and RPE are the independent variables, α , β_1 , β_2 , β_3 and β_4 are the regression model parameters and ε is the random error variable.

The analysis was based on data for the Republic of Moldova and Romania for the period 2010-2024. The collected information was initially processed in Microsoft Excel, and subsequently a multiple linear regression model was built using the IBM SPSS 26 program.

4. Results and discussions

Three econometric multiple regression models were developed and tested in order to assess economic performance (EP) as a function of a number of macroeconomic indicators - return on foreign direct investment (RFDI), return on consumer price index (RCPI), return on producer price index (RPPI) and return on employment (RPE). These models were applied separately for the Republic of Moldova, Romania, as well as for a pooled sample (general model), using aggregated data and statistically processed using SPSS.

Table 1. Model Summary

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
Moldova	.961 ^a	.923	.892		.11213	1.400
Romania	.644 ^a	.414	.180		.83563	2.521
General	.858 ^a	.736	.694		.77614	1.980

a. Predictors: (Constant), RPE, RCPI, RPPI, RFDI

b. Dependent Variable: EP_{Moldova}, EP_{Romania}, EP_{general}

Source: Authors Computation with the aid of IBM SPSS Statistics, version 26

Analyzing the Model Summary, we observe a very strong correlation ratio for the Republic of Moldova, 0.961, which indicates a strong linear relationship between economic performance and the explanatory variables analyzed: the RFDI, RCPI, RPPI and RPE. This result suggests that the variations of these macroeconomic indicators explain a significant proportion of the evolution of economic performance. At the same time, the high value of the determination ratio $R^2 = 0.923$ reflects the fact that 92.3% of the variation in economic performance is explained by the model, which denotes

a very good explanatory power and a model well adjusted to the economic realities of the Republic of Moldova. For Romania, the correlation ratio $R = 0.644$ indicates a medium correlation, which points to the existence of a significant but not very strong relationship between the explanatory variables (RFDI, RCPI, RPPI, RPE) and economic performance. This average level reflects the influence of other influencing factors, but also the complexity of the Romanian economic structure, where the effects of FDI and other macroeconomic indicators are influenced by political instability and fiscal changes. Thus, in the case of Romania, the change in economic performance is 41.4% influenced by the change in RFDI, RCPI, RPPI, RPE. In the general model, which combines the data for both countries, the value of the correlation ratio is 0.858, indicating a strong correlation. This result shows that, overall, the variables analyzed are relevant in explaining economic performance. However, this result may also show structural differences between the two economies.

Table 2. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
Moldova	Regression	1.512	4	.378	30.057	.000 ^b
	Residual	.126	10	.013		
	Total	1.637	14			
Romania	Regression	4.941	4	1.235	1.769	.212 ^b
	Residual	6.983	10	.698		
	Total	11.923	14			
General	Regression	42.056	4	10.514	17.454	.000 ^b
	Residual	15.060	25	.602		
	Total	57.116	29			

a. Dependent Variable: EP_{Moldova}, EP_{Romania}, EP_{general},

b. Predictors: (Constant), RPE, RCPI, RPPI, RFDI

Source: Authors Computation with the aid of IBM SPSS Statistics, version 26

Analyzing the Anova table testing the overall significance of the models, it can be observed that in the case of the Republic of Moldova and the overall model, the models are statistically significant, which means that at least one of the variables RFDI, RCPI, RPPI, RPE contribute significantly to explain the economic performance, which supports the use of the models for predictions. On the other hand for Romania the Sig. value is 0.212 and exceeds the significance threshold, so the model is not statistically significant.

Table 3. Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
Moldova	(Constant)	1.987	.628		3.163	.010
	RCPI	4.502	2.716	.2332	1.657	.128
	RPPI	-2.897	2.878	-.1347	-1.007	.338
	RFDI	.016	.081	.029	.201	.845
	EPR	.010	.077	.016	.133	.897
Romania	(Constant)	5.664	.764		7.414	.000
	RCPI	.412	.239	.488	1.727	.115
	RPPI	.092	.210	.124	.437	.671
	RFDI	-.639	.435	-.391	-1.472	.172
	EPR	.157	.343	.124	.458	.656
General	(Constant)	3.537	.199		17.753	.000
	RCPI	.757	.193	.437	3.914	.001
	RPPI	.286	.185	.179	1.544	.135
	RFDI	.354	.169	.285	2.092	.047
	EPR	-.565	.180	-.438	-3.143	.004

a. Dependent Variable: EP_{Moldova}, EP_{Romania}, EP_{general},

Source: Authors Computation with the aid of IBM SPSS Statistics, version 26

According to the coefficients table, the three econometric models will be determined. The model for the Republic of Moldova has the form:

$$EP_{Moldova} = 1.987 + 4.502 \cdot RCPI - 2.897 \cdot RPPI + 0.016 \cdot RFDI + 0.010 \cdot RPE$$

In the case of the Republic of Moldova, from the data obtained from the multiple regression analysis we can conclude that the increase in economic performance is due to the increase in the indicators of the CPI, the RDIER and the EPR. CPI is a leading indicator in a market economy and the increase in the CPI leads to increase in economic performance. Republic of Moldova inflation is slightly high, which leads to price liberalization and economic integration. Increasing RFDI indicates the ability of FDI to boost economic performance (Alexa & Hachi, 2024) through the inflow of capital, technology and access to foreign markets. In the model for the Republic of Moldova, there is a negative relationship between EP and RPPI, decreasing RPPI is associated with an increase in economic performance, which indicates that decreasing producer prices is associated with an improvement in firms' economic performance.

The model for Romania has form:

$$EP_{România} = 5.664 + 0.412 \cdot RCPI + 0.092 \cdot RPPI - 0.639 \cdot RFDI + 0.157 \cdot RPE$$

In the case of Romania, multiple regression results indicate that EP is positively influenced by RCPI, RPPI and RPE, while the influence of RFDI is negative. The positive correlation between RCPI and EP suggests that moderate consumer price inflation leads to higher economic activity in Romania, indicating a favorable consumption climate, higher firm incomes and an active business environment. Firms are able to capitalize their output at high prices, increasing revenues and operating profit. It should be noted that Romania has a predominantly consumption-oriented economic profile, characterized by a high dependence on imports for a wide range of goods and services. The positive cost efficiency effect of employment reflects the fact that labor plays a key role in generating economic value. In the case of Romania, the relationship between RFDI and PE is paradoxical, as many studies (Nistor, 2014; Manescu, 2025; Alexa & Hachi, 2024) find that attracting FDI leads to higher economic performance. This paradoxical effect is due to the substitution effect, i.e. FDI replaces domestic capital.

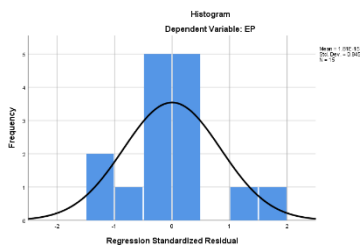
To assess the common trends of the two countries, a general aggregate model was constructed and estimated using a pooled sample integrating observations from both countries, which has the form:

$$EP_{general} = 3.537 + 0.757 \cdot RCPI + 0.286 \cdot RPPI + 0.354 \cdot RFDI - 0.565 \cdot RPE$$

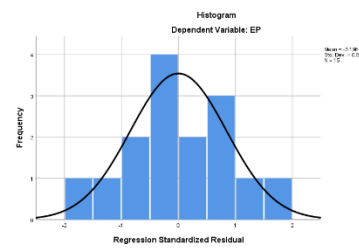
Analyzing the general model, the results of the multiple regression show a significant positive influence of the variables RCPI, RPPI and RFDI on economic performance, while RPE has a negative influence. In both countries CPI growth leads to higher economic performance, reflecting high domestic demand and a favorable economic climate. The general model emphasizes the increase in economic performance is due to the increase in RPPI. This positive relationship indicates output prices pick up cost increases. A difference is observed between the two countries with respect to PPI which indicates a difference between the two economies due to different levels of development and integration in international markets. According to the general model the attraction of FDI leads to an increase in economic performance, which is confirmed by studies (Dinu & Socol, 2006; Iordache, 2007; Tornea, 2016; Macovei et al., 2024). As in the case of PPI, there is an inverse relationship between the two countries, due to the distinct ways of leveraging foreign capital. Government policies in both countries need to be tailored to channel foreign investment towards strategic and sustainable sectors specific to each country. From the general model equation, economic performance decreases if EPR increases. There are situations where increasing the

number of employees is not enough to increase performance, technological upgrading is needed. In order to understand the structure and distribution of the variables used in the econometric models, histograms corresponding to the economic performance for the two countries and the overall aggregate model were generated

Republic of Moldova



Romania



General aggregate model

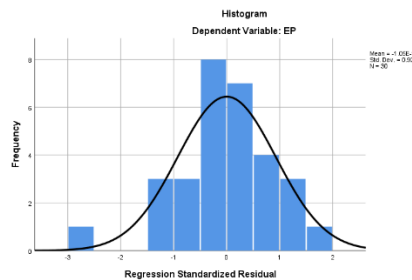


Figure 1. Histograms

Source: Authors Computation with the aid of IBM SPSS Statistics, version 26

Thus, analyzing the three models, some differences can be observed, which confirms the importance of the national context in the formulation of government policies and valorization of FDI.

5. Conclusions

The study analyzed the relationship between economic performance and four macroeconomic indicators: foreign direct investment, consumer price index, producer price index and employment for two Eastern European economies, the Republic of Moldova and Romania in the period 2010-2024. The analysis carried out using multiple regression obtained three different models, which reveal significant differences in the impact of macroeconomic indicators on the economic performance of the two countries.

For the Republic of Moldova, RFDI, RCPI and RPE have a positive effect and RPPI has a negative effect, revealing a very strong correlation between these variables. These results suggest that the economy of the Republic of Moldova is dependent on foreign capital inflows and domestic demand dynamics, and the increase in production costs have a negative impact on economic performance. In contrast, in Romania, economic performance is positively affected by the price index and employment, but negatively by RFDI. This negative relationship reflects the limited integration of foreign capital into the national production ecosystem and practices such as profit repatriation and outsourcing of services.

The general aggregate model of the collective sample confirms that RFDI, RCPI and RPPI have a positive impact on economic performance, but also indicates a negative impact of EPRs, due to structural inefficiencies in the labor market. In order to effectively use the general aggregate model for forecasting, both countries need to adopt coherent policies to increase the absorptive capacity of

foreign direct investment, stimulate the reinvestment of profits in the domestic economy and support the process of integration of domestic firms into global value chains. Reforms are also needed on the labor market to increase productivity, to qualify the workforce to the requirements of the modern economy. We can conclude that only through government policies adapted to the requirements of the global economy, both economies can transform the identified trends into sustainable growth paths.

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STOCKHOLM SYNDROME AND ENERGY DEPENDENCE: THE INTERPLAY OF NATIONAL PSYCHOLOGY AND GEOPOLITICS

DOI: <https://doi.org/10.53486/dri2025.03>

UDC: 66.4:620.91(430+520+4)

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Abstract: *This article innovatively transforms the analytical framework of Stockholm syndrome into a political context to explore the irrational behaviors similar to Stockholm syndrome that countries around the world exhibit when facing the problem of "weaponization of energy interdependence" caused by geopolitical crises, such as coercion and threats from countries with strong political energy control. By studying three major cases - Germany's dependence on Russian natural gas, Japan's dependence on Middle Eastern oil, and Europe's dependence on American shale gas, this article reveals how energy dependence issues cultivate a pathological symptom of "hostage mentality" at the national level. After analysis, we believe that energy security is not just a supply and demand relationship, or a technical or economic issue, but is closely intertwined with national identity, fear mechanisms, and diplomatic psychology. Final conclusion: Overcoming this "national hostage mentality" requires starting from three aspects: energy (especially renewable energy) technology independence, multilateral energy cooperation, and cognitive reconstruction of national decision-makers, and rebuilding the rational psychology of national energy strategy.*

Key words: *energy dependence; Stockholm Syndrome; geopolitics; national psychology; irrational behavior*

JEL: D03, F52, Q48, Q40

1. Introduction

The core contradiction in the global energy supply and demand relationship lies in the excessive concentration of traditional energy geographical distribution and the geopolitical crisis that has turned trade routes into "pipeline politics" weapons. According to data from the International Energy Agency (IEA) in its 2024 report: about 60% of the world's oil products and 40% of natural gas products are produced or transported in the Middle-East Zone and other geopolitically sensitive region (IEA, 2024). Against this backdrop, certain states—under coercion by energy-controlling actors—exhibit behaviour that runs counter to traditional rationalist theories of international relations (Directorate-General for External Policies of the European Parliament, 2018; Danish Institute for International Studies [DIIS], 2024), such as Germany's hesitation to sanction Russia in the early phase of the Russo-Ukrainian War, Japan's prolonged neutrality regarding Middle Eastern conflicts, and Europe's passive acceptance of high-priced U.S. liquefied natural gas (LNG).

This paper innovatively applies the psychological framework of Stockholm Syndrome to the study of international relations, arguing that the control–dependency dynamic in energy relationships mirrors the mechanisms found in individual hostage situations. Through case studies and theoretical synthesis, it seeks to answer two questions: Why do states opt for irrational compromise under threats to their energy security? And how are these compromises rationalized through emotional and cognitive mechanisms?

2. Stockholm Syndrome and the Logic of State Behavior

2.1 Conceptual Deepening: Psychological Transposition from the Individual to the State

Stockholm Syndrome was first introduced by Swedish criminologist Nils Bejerot to describe the emotional bond that hostages develop toward their captors, and has since been applied in broader contexts—including domestic abuse, human trafficking, and debates over gender, race politics, and international relations (Namnyak et al., 2008; Adorjan et al., 2012). Its core mechanisms are:

- Survival dependency: Hostages, with all resources under captor control, develop a fundamental dependence for survival.
- Fear adaptation: Prolonged exposure to threats leads individuals to alleviate psychological stress through emotional identification with their captor.
- Cognitive distortion: Intermittent acts of kindness by the captor are magnified into a generally benevolent image, thereby rationalizing violent or coercive behavior.

At the state level, energy dependence likewise engenders a form of “structural survival dependency” (Spencer, 2009; Caporaso, 1978), analogous to the recently articulated concept of “weaponized interdependence” (Farrell & Newman, 2019). For instance, Germany’s institutionalized reliance on Russia for 55 percent of its natural gas—embodied in infrastructure such as the Nord Stream pipelines—creates exactly this kind of dependency (Wood, 2024). When Russia leverages the threat of supply cuts, the German government typically attributes ensuing crises to “market fluctuations” rather than to political coercion, a clear manifestation of cognitive distortion.

2.2 Irrational Features of State Behavior under Energy Dependence

Energy-dependent states’ policy choices often exhibit the following paradoxes:

- Risk attenuation: After the 2014 Crimea crisis, Russia repeatedly threatened to cut gas supplies to Ukraine, yet Germany continued to advance the Nord Stream 2 project—thereby underestimating the cumulative effect of geopolitical risks (Dempsey, 2016).
- Emotional projection: Several countries, including Japan, have characterized their Middle East energy imports as “long-term cooperation based on mutual trust” (Pang, 2022), while downplaying the risks associated with the spread of religious extremism in the region (Yang et al., 2024).
- Suppression of alternative pathways: Although the European Union possesses technological advantages in renewable energy, China accounted for two-thirds of the global increase in renewable energy capacity in 2023 (International Renewable Energy Agency [IRENA], 2024).

State behavior in energy dependence closely mirrors Stockholm Syndrome’s dynamics of “refusal to escape” and “inability to escape,” highlighting the tension between emotional attachment and rational calculation in national decision-making.

2.3 Analogy Between Individual and State-Level Irrational Characteristics

The analogy between individual-level Stockholm Syndrome and state-level energy dependence reveals a pattern of psychological and strategic irrationality. Just as hostages may develop emotional bonds and cognitive distortions under coercive control, states heavily reliant on a dominant energy supplier can internalize narratives that rationalize their dependency. Fear of disruption, strategic vulnerability, and a desire for stability prompt states to downplay risks, avoid diversification, and engage in appeasement-like diplomacy. This framework helps to interpret energy policy inertia not merely as a rational calculation but as a deeper syndrome of dependence and denial (Table 1).

Table 1. Stockholm Syndrome (Individual Level) vs. Energy Dependence (State Level)

Stockholm Syndrome (Individual Level)	Energy Dependence (State Level)	Analogy Description
The hostage is under the captor’s control	The state is dependent on a single or dominant energy supplier	Energy routes, pricing, and supply rhythm are dictated by an external actor
Fear-based control and survival dependence distort cognition	Strategic vulnerability and essential energy needs lead to policy conservatism	Fear of supply disruption causes hesitation and restraint in policymaking

Emotional attachment and empathy toward the captor	A narrative of "friendly cooperation" is constructed with the energy supplier	Positive aspects of cooperation are emphasized while political risks are downplayed
Captor's actions are rationalized as "necessitated"	Energy coercion is framed as "legitimate market behavior" or "strategic necessity"	High prices, supply disruptions, and pressure are rationalized
Reluctance to escape or accept external help	Reluctance to diversify, delay in alternative investments	Hesitation toward diversifying energy sources, suppliers, or technologies
Submissiveness in exchange for a sense of safety	Diplomatic restraint and self-diminishment to ensure supply continuity	Conflict avoidance and restricted countermeasures
Denial of the dangerous situation	Denial of security risks posed by energy dependence	Officials and media minimize or obscure the actual risks

Source: Author's creation

3. The Institutional and Structural Logic of Energy Dependence

3.1 Path Dependence through Infrastructure

Massive investments in energy transport infrastructure—such as pipelines and ports—create rigid, long-term dependencies. The Nord Stream 2 pipeline, costing €11 billion, directly tied the interests of major German energy companies to Russia's Gazprom (Smith, 2023; Russell, 2021). Once such infrastructure is established, alternative routes (e.g., Norwegian gas or LNG imports) are marginalized due to significantly higher costs. This **"sunk cost effect"** limits a state's ability to abandon existing dependencies, even in the face of shifting geopolitical realities.

3.2 Contractual and Political Stickiness

Long-term energy purchase agreements—typically spanning 20 to 30 years—institutionalize supplier-consumer relationships. For instance, Japan's crude oil contracts with the United Arab Emirates include **"take-or-pay"** clauses that oblige Japan to pay the contracted price even if global oil prices drop significantly (U.S. Department of Commerce, 2025; Energy Connects, 2025). While these clauses are intended to secure stable supply, they in fact reduce bargaining power and **lock states into historical energy decisions**, rendering them financially and politically bound to past commitments.

4. Case Study: Manifestations of the "Hostage Mentality" in Nation-States

4.1 Germany's Strategic Miscalculation in Russian Gas Dependence

Germany's energy transition strategy is marked by a central contradiction between **nuclear phase-out** and **carbon reduction** targets (Federal Ministry for Economic Affairs and Climate Action, 2023). Following the Fukushima nuclear disaster in 2011, Germany shut down all nuclear power plants, leading to a 40% surge in natural gas consumption (CEIC Data, 2024). Despite Russia's repeated gas cutoffs to Ukraine in 2006, 2009, and 2014, German policymakers continued to regard Russian gas as the most viable "transition energy" due to its economic advantages (Bros et al., 2017).

It was not until the outbreak of the Russia-Ukraine war in 2022 that Germany's slow response to sanctioning Russian energy provoked internal tensions within the EU (Reuters, 2024). The Scholz administration initially **only suspended** the approval of Nord Stream 2, but stopped short of implementing a comprehensive ban on Russian gas imports. This strategy of **"incremental decoupling"** drew sharp criticism (Amelang et al., 2023), highlighting a cognitive dissonance between Germany's long-standing emotional alignment with the narrative of "pragmatic cooperation" with Russia and the emerging security threat.

4.2 Japan and the Middle East: The Cost of Silent Diplomacy

Japan's energy policy is characterized by a **"double vulnerability"**: as an island nation with scarce natural resources, it imports nearly all of its oil and natural gas, with more than 90% of oil imports originating from the Middle East (U.S. Energy Information Administration [EIA], 2023). In response, Japan has long pursued a strategy of **"neutral diversification diplomacy,"** seeking to maintain stable energy supplies while avoiding entanglement in regional political controversies (Kim, 2006; Yu, 1999). This strategy manifests in several ways:

- Avoiding criticism of Saudi Arabia's human rights record (Ministry of Foreign Affairs of Japan, 2015; United Nations Security Council, 2016);
- Refusing to support either side in the Yemeni civil war (Ministry of Foreign Affairs of Japan, 2022).

While this approach has helped secure short-term energy stability, it has resulted in Japan's marginalization in Middle Eastern geopolitics. During the 2019 tanker attacks in the Strait of Hormuz, Japan was compelled to negotiate escort measures with the U.S. independently, exposing its lack of strategic autonomy.

4.3 Europe's "Grateful Compliance" with U.S. Shale Gas

Following the Russia-Ukraine war, European imports of liquefied natural gas (LNG) surged, with the U.S. share rising from 21% in 2021 to 48% in 2023 (EIA, 2024). However, the cost of U.S. LNG reached as high as \$40 per million British thermal units—**three to six times** the pre-war price of Russian gas. The European Commission framed this as a "justifiable premium" and used the rhetoric of **"energy solidarity"** to garner support among member states for accepting elevated prices (Letta, 2024).

This narrative, however, obscures underlying **structural asymmetries**: U.S. companies benefited from generous subsidies under the Inflation Reduction Act, while European firms—lacking comparable bargaining power—were left to shoulder inflated costs. Josep Borrell, the EU's High Representative for Foreign Affairs and Security Policy, emphasized the necessity of **diversifying energy sources** to reduce dependency on any single supplier (European External Action Service [EEAS], 2022).

4.4 China's Lessons from Coal Dependence on Australia

Prior to 2020, over 50% of China's coking coal imports originated from Australia. However, when Australia adopted a more confrontational stance toward China in alignment with the United States, Beijing responded by imposing a coal import ban on Australian shipments. This move catalyzed a rapid domestic adjustment, including accelerated coal production expansion and diversification of import sources from Mongolia and Russia. By 2022, China had reduced its dependence on Australian coal to just 8% (Nordberg, 2025).

This case illustrates that **proactively breaking path dependence** can reshape national energy security. However, such success requires **strong policy enforcement** and **adequate reserves of alternative resources**, underscoring the critical role of state capacity in managing strategic vulnerabilities.

5. Conclusion: National Cognitive Biases and Emotional Mechanisms in Foreign Policy

5.1 Narrative Construction and Emotional Bonding

Energy-dependent states frequently deploy specific narratives to alleviate cognitive dissonance:

- Romanticizing History: Germany framed the Nord Stream project as a continuation of Willy Brandt's Ostpolitik, symbolizing a "bridge of peace" with the East.
- Depoliticizing through Technology: Japan justified its Middle East oil imports by emphasizing "refining compatibility," thereby sidestepping discussions of political risk.

- Moral Elevation: Europe recast the high cost of LNG imports as “the price of defending freedom,” transforming a market-based compromise into an alliance of values.

These narratives, diffused through media and academic discourse, become embedded in national strategic culture, shaping long-term policy orientations.

5.2 Fear-Driven Policy Paralysis

The psychological concept of loss aversion helps explain inertia in energy transition policies (Kahneman & Tversky, 1979): policymakers tend to prefer the “certain loss” of maintaining dependence (e.g., high-priced energy) over the uncertain risks of transformation (e.g., technological failure or geopolitical backlash). For instance, although the EU proposed an “Energy Union” as early as 2014 (European Commission, 2015), internal divergences among member states delayed its realization. It was only after the 2022 crisis that the plan gained significant momentum (European Commission, 2022).

6. How to overcome the “National Hostage Psychology”

6.1 Technological Autonomy: Moving Beyond “Energy Nationalism”

To promote autonomous technology, it is necessary to break through the narrow understanding of “energy ethnic nationalism” by the leadership of each country, to achieve progress in clean energy technology and infrastructure construction, the following cases provide us with reference:

- The German plan for 2030, the wind power plant capacity target will be increased from 80 GW to 150 GW, and the construction of the corresponding hydrogen storage and energy storage system, in order to cope with the energy crisis.
- Japan is rethinking the nuclear safety system, borrowing from France's small modular reactor (SMR) technology to ease public concerns and reduce nuclear energy risks.
- China's breakthrough in ultra high voltage transmission technology provides the basis for energy interconnection in Asia, renewable energy can be transported on the large scale, and reduce dependence on maritime energy transportation channels, it can reduce strategic risks.

6.2 Regional Cooperation:

Under the trend of global energy structure reshaping, multilateral cooperation is becoming a key way to achieve energy security and low-carbon transformation goals. The European Union and its member states have effectively suppressed natural gas prices within the EU to cope with the energy crisis by establishing a natural gas procurement cooperation mechanism, thereby reducing overall import costs and enhancing collective bargaining power (European Commission, 2023). Similarly, in Asia, China, Japan and South Korea are expected to jointly develop the Northeast Asian Super Grid, Mongolia will make full use of wind energy and Russia will form complementary cooperation in the use of hydropower resources, promote regional energy interconnection and coordinated use of clean energy, and ensure energy security (IRENA, 2024). At the same time, countries around the world are also exploring new forms of mutually beneficial cooperation, which can not only reduce dependence on developed economies in technology and equipment, but also help to achieve diversification and fairness in the global clean energy supply pattern.

6.3 Cognitive Reframing

In the context of energy transformation and geopolitical reconstruction, the transition from "mutual dependence" to "mutual equality" requires a deep reconstruction of thinking. First, governments and international organizations should strengthen risk education mechanisms, regularly publish energy security reports, quantify the costs and risks of energy dependence, and evaluate the feasibility of diversified energy construction to enhance the strategic awareness of the whole society. Secondly, when shaping the relationship between energy and national security, the state's official media should

go beyond moral and idealistic statements and turn to a rational discourse framework dominated by national interests to promote the whole society's understanding of the nature of cooperation rather than coercive relations. More importantly, national leaders and policymakers themselves also need strategic vision, and by participating in crisis strategic dialogues led by third-party organizations, they can enhance their ability to make rational judgments and respond in high-risk environments and avoid irrational policy implementation driven by fear.

7. Conclusion

From the theoretical perspective of Stockholm syndrome, energy dependence is not only a external geopolitical tool, but also a manifestation of a country's collective psychological structure, reflecting the "emotional surrender" formed by the country in the long-term imbalance of power relations. In this framework, countries may be developing unreasonable dependence on energy suppliers and find it difficult to quickly get rid of this dependence when facing strategic risks.

When German Chancellor Olaf Scholz publicly stated that Russian natural energy will eventually damage the EU industry and economy, his remarks were not only based on economic assessments, but also reflected deep concerns about the possible imbalance of control in energy relations. This emotional political expression reveals the "psychological capture effect" formed by the EU's long-term dependence on Russian energy, and is also a symbolic expression of the EU's attempt to get rid of dependence and rebuild strategic independence at the cognitive level.

Overcoming the "national hostage mentality" requires a multidimensional transformation: 1. Technologically: It involves breaking path dependency. 2. Institutionally, It demands reinforcing collective action; 3. Cognitively: It calls for reconstructing rational risk perception. Only through such comprehensive reforms can energy security shift from a reactive posture of survival to a proactive mode of strategic shaping—serving not just short-term needs but the long-term autonomy and interests of the nation.

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REVOLUTIONARY MULTI-LAYERED SMART LINER FOR SPILL PREVENTION

DOI: <https://doi.org/10.53486/dri2025.04>

UDC: [552.578.2:656.56]:001.895

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Abstract. The collection, transportation and storage of crude oil, petroleum products and gas ensure the supply of raw materials to refineries and petrochemical plants, as well as the supply of fuels and lubricants to consumers. Transport plays a particularly important role in this context. Onshore and submarine pipelines are the main means of transport for crude oil and gas. In addition, railways, airways, sea and/or inland waterways and railways are used. In addition, railways, airways, sea and/or inland waterways and roads are used. The transport of crude oil by tankers poses significant economic and environmental risks in the event of an oil spill. Conventional solutions, such as basic containment liners and double-hull tankers, offer limited protection against devastating punctures and leaks. Oil spills remain a serious environmental problem that calls for ongoing efforts to prevent, detect, and respond to them. Finding practical solutions is crucial when it comes to environmental issues including soil and water contamination and wildlife damage. This paper introduces an innovative multi-layered, self-healing, and expandable oil containment system designed to significantly improve the prevention of oil spills in accidents. The proposed system integrates advanced materials, real-time monitoring, and automatic response mechanisms, differentiating it from existing research and commercial solutions. By integrating puncture-resistant materials, self-sealing mechanisms, artificial intelligence-based monitoring and expandable compartments, this system offers a comprehensive and secure approach to the safety of oil transportation.

Keywords: crude oil transportation, pollution, innovative system

1. Introduction

Transportation costs have a major share in the price structure of petroleum products. The use of large-diameter pipes for the transport of large volumes of oil has significantly reduced transportation costs and thus opened the possibility of replacing solid fuels with liquid fuels to ensure the main source of energy in the modern world.

1.1. Context

In the petrochemical industry, the share of transportation in the final price of products has decreased, this was mainly due to the emergence of specialized vessels for the transport of certain types of products, the use of new technical procedures for the safety of transportation, as well as the use of pipelines intended exclusively for the transport of these types of products and other factors. Thus, water transport is substantially lower than land transport, both rail and road.

However, this type of transport comes with great risks for the environment. Pollution of the marine environment with hydrocarbons has increased significantly in the last fifty years. Numerous pollution accidents are prevented by risk factors such as the transportation of oil by sea, the exploration and exploitation of hydrocarbon reserves in marine waters, and the processing of these deposits, in addition to other anthropogenic activities. Incidents that occurred at offshore drilling and exploitation platforms or navigation accidents of large oil tankers have caused significant ecological disasters, some of which have been extremely serious.

Since the 1960s, pollution of the marine environment with hydrocarbons has become an alarming phenomenon. The rise and dissemination of risk factors, particularly throughout the 1970s and 1980s, has coincided with an increase in the sources and causes of pollution. Because oil and petroleum

products are dangerous, incidents involving drilling, extraction, transportation, transfer, loading-unloading, refining, storage, and other processes have created immediate risks. Marine life, coastal economies and global sustainability have historically been affected by oil spills. Despite advances in container design and construction and spill response methods, accidental spills continue to be a significant problem.

1.2. The claim for an revolutionary isolation solution

Fluid control and safety are essential in oil and gas operations. The solution presented in this paper for managing spill control for a wide range of fluids, including drilling mud and crude oil, ensuring accurate and precise fluid transfer even in extreme weather conditions, is an innovative one. With a focus on durability and efficiency, our solution becomes essential for fluid transfer in this dynamic industry.

Usually, the causes of hydrocarbon pollution of the marine environment are analyzed in relation to the two types of pollution: operational and accidental. During oil tanker loading and unloading; bunkering activities, which include supplying engines with heavy and light fuel; when ballast and bilge water are released from ships without proper treatment; and during port visits, when oil leaks happen while cleaning. Navigation accidents can cause accidental pollution, the most important of which are: collisions, shipwrecks, groundings, etc.

International waterways see thousands of oil spills annually, the most of which are minor and yield less than one barrel of oil. A two-acre oil slick can form from a spill of less than one litre, which is quite dangerous (Schutes, 2015). These spills have impacted not only undersea habitats but the entire planet because of their size and frequency. There were 9351 documented cases of oil pollution from 1974 to 2007 as a result of both intentional and unintentional maritime spills. With spills of less than 7 t, the majority of these occurrences (83.5%) were modest. Shipping mishaps make up 46.6% of the total, while spills weighing more than 700 t only make up 3.7%. During this time, there were 573 collisions, 580 groundings, 709 accidents due to ship breakage (e.g. water holes or ship breakage) and 133 explosions, as well as 2361 accidents that occurred for other or unknown reasons. Navigational accidents account for 46.6 percent of the 9351 accidents.

Inadequate maritime pollution management, both on board ships and at oil terminals, port operators, and bunkering companies, is mostly to blame for operational pollution, which accounts for the greatest number of occurrences. Operational pollution has not had the same obvious ecological effects as significant accidental spills, despite the fact that the annual number of hydrocarbons from operational sources worldwide is around four times higher.

Current industry solutions focus on passive protection methods, such as double-hull designs and conventional polymer liners. However, these techniques are not sufficient to address the dynamics of collisions, perforations and severe failures in tanks/containers/pipelines. To effectively mitigate oil spills, this paper presents a novel method and proposes a smart, adaptive and self-sealing containment system.

Since there haven't been any significant oil spills like the Erika and Prestige disasters, marine safety in EU waters is currently at a very high level. Nonetheless, almost 2,000 maritime mishaps and accidents are reported annually.

Transport systems are essential for safety, security and environmental sustainability and should not be compromised. It is imperative that the European Union develops preventive and proactive policies and maintains its global leadership in this area. It should constantly work with stakeholders, including civil society, and other national, international, and local agencies to achieve this.

The European Green Deal, the Zero Pollution Action Plan, and the Strategy for Sustainable and Smart Mobility establish the direction at the EU level. The ultimate goal is to guarantee decarbonised, intelligent, robust, accident-, waste-, and pollution-free maritime transportation.

The "Ready for 55" rule has significantly advanced the sector's transition to a more sustainable

course. To promote the use of sustainable fuels in maritime transportation and the expansion of the EU Emissions Trading System (ETS) to maritime transportation, the EU has enacted policies including the FuelEU Maritime Initiative Regulation. These steps will encourage investment in clean fuels and technologies and guarantee that the industry helps achieve the 1.5°C global warming target set forth in the Paris Agreement.

In addition to this strong legal framework, the European Union is dedicated to working within the International marine Organisation (IMO) to create high standards for marine transportation's safety and security, digitisation, greening, and decarbonisation. The coexistence of these European rules and EU actions in the IMO ensures fair competition in the single market and globally, preventing ships from being flagged to third countries and harming European interests.

Maritime transport is currently one of the most environmentally benign forms of transport due to the amount and percentage of commodities delivered, as well as its effects on the global economy and the European Union.

2. The design and composition of the material proposed for use

Oil spills continue to be a significant environmental challenge, requiring continued efforts to detect, respond to and mitigate them. In terms of environmental impacts such as soil contamination, water pollution and wildlife impacts, it is essential to find effective solutions.

Oil tankers have a metal construction, made of welded steel plates and profiles, but they do not have a structure to protect the cargo from hydrocarbons.

2.1 Intelligent multi-layered approach

The proposed containment system consists of an innovative architecture with three main layers, each of which plays a key role in preventing leaks and protecting the marine environment. These layers are selected and configured to maximize impact resistance, self-healing capacity and leak containment. The construction of this innovative multilayer (balloon) system is also innovative.

2.1.1. Outer layer: Puncture-resistant shield

We have developed and tested an ingenious system to contain the cargo and therefore protect the environment from accidental spills of oil cargo.

To reduce the risk of perforation and structural damage, the outer layer is designed to absorb and distribute the energy generated by the impact. This multi-layered system will be constructed with the following materials:

- **Kevlar** – An aramid material with extremely high tensile strength, also used in the ballistics industry for protection against projectile impact.
- **Ultra-high molecular weight polyethylene (UHMWPE)** – A material with high resistance to abrasion, impact and cut, used in the construction of light armor and industrial protective equipment.
- **Carbon-based nanocomposites** – They improve durability and impact force dissipation capacity.

This outer layer acts as a primary barrier against hard objects that could puncture the tank or pipe, providing significantly greater protection than traditional double-hull solutions.

2.1.2 Middle layer: Shear-thickening fluid (STF - Shear-Thickening Fluid)

This layer functions as adaptive protection against punctures by using a non-Newtonian fluid that changes its viscosity depending on the applied force.

- Under normal conditions, it remains flexible and allows controlled deformations without compromising structural integrity.
- Upon impact, the fluid instantly solidifies, forming a rigid barrier that prevents the penetration of sharp objects or fragments resulting from collisions.

The components used in this fluid include silica nanoparticles dispersed in a polymeric medium,

which rapidly change their state of aggregation when subjected to intense forces. This innovative feature gives the middle layer active protection, responding immediately to mechanical stress and preventing damage in the event of serious accidents.

2.1.3 Inner layer: Self-healing polymer coating

The inner layer is essential for sealing any minor cracks or perforations that may occur in the tank or pipe structure.

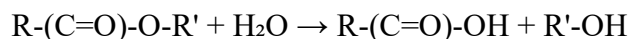
- Polymeric microcapsules – Incorporated into the polymer layer, these capsules contain liquid precursors of a sealant, which are automatically released in the event of a crack.
- Chemical crosslinking reactions – Upon contact with air or water, the materials released from the microcapsules initiate a self-healing process, sealing cracks and preventing oil leaks.
- Flexible and extensible polymers – Ensure good adhesion to the surface and allow the absorption of mechanical deformations without losing the integrity of the protective layer.

By combining these technologies, the inner layer functions as a continuous repair mechanism, extending the life of the containers and reducing the risk of accidental pollution.

An essential aspect of this isolation system is the chemical compatibility of the materials used with hydrocarbons, so that they do not alter the chemical composition of the oil.

- The outer layer (Kevlar, UHMWPE, carbon nanocomposites) is chemically inert and does not interact with hydrocarbons, being designed only to ensure mechanical resistance.
- The middle layer with STF fluid does not undergo chemical reactions with oil, since the silica nanoparticles are encapsulated in a hydrophobic polymer matrix. Thus, even in the event of a major impact, this layer does not contaminate the fuel.
- The inner layer contains polymers specially formulated to resist contact with hydrocarbons. The self-healing microcapsules contain a compound that reacts only with oxygen and water, not with oil, so that it retains its chemical properties and can be used without problems.

An example of a reaction that occurs at the level of the inner layer is the following:



This is a controlled hydrolysis reaction that leads to the formation of a sealant upon contact with water, preventing leaks but without affecting the oil.

The polymers used for sealing are also selected to be oleophobic, meaning they repel oils and do not allow chemical interaction between the sealing materials and hydrocarbons.

This property ensures that the transported oil remains in the same chemical state and can be refined or used further without modification.

2.2 Expandable, pressure-sealed liner

The innovative multilayer system that will retain the oil and other hydrocarbons being transported also includes a flexible lining, capable of adapting to the structural deformations of the container. It is made of:

- Shape Memory Alloys (SMA) – Special metals that change shape under the action of a temperature variation or mechanical stress, helping to maintain optimal tightness.
- Electroactive Polymers (EAP) – Smart materials that expand or contract under the influence of an electric field, acting as an automatic sealing mechanism.

This technology will allow the liner to remain compact under normal conditions and expand rapidly in the event of a failure, isolating the affected areas to prevent hydrocarbon leakage into the environment.

2.3 Oil-repellent and fire-resistant properties

Another innovative aspect of this insulation system is the integration of features that reduce the risks of oil adhesion and ignition:

- Superhydrophobic and oleophobic nanocoatings – Applied to the inner and outer surface of the polymer layer, these coatings significantly reduce oil adhesion, preventing the accumulation of residues that could aggravate a possible leak.
 - Fire-resistant intumescent layers – These special layers are activated at high temperatures, expanding to form an insulating barrier that limits the spread of fires and prevents the ignition of fuels.
- Through this combination of technologies, the proposed system offers complete protection against mechanical, chemical and thermal hazards, ensuring significantly improved safety compared to conventional solutions on the market.

3. Artificial intelligence-based monitoring and automated response

3.1 Embedded sensor technology

- The system integrates pressure, vibration and temperature sensors for real-time damage detection.
- AI algorithms analyze sensor data to predict failure points and trigger automatic repairs.

3.2 Autonomous leak isolation mechanism

- If a breach is detected, an automated injection system uses fast-setting polymer foam to reinforce weak points.
- Damaged sections of the liner are isolated using vacuum-sealed compartments to limit potential leaks.

3.3 Comparison with existing solutions

Characteristic	Traditional double-hull tanks	MULTI LAYER SMART LINER
Puncture resistance	Moderate	High (Strat Kevlar/UHMWPE și STF)
Self-sealing ability	None	Yes (Microcapsules and Auto-Injection)
Expandable design	No	Yes (SMA and Electroactive Polymers)
Fire resistance	Basic	Advanced (Intumescent Coatings)
AI monitoring	No	Yes (Real-time Sensor Data)
Repairability	Limited	Modular and Replaceable Sections

The proposed MULTI LAYER SMART LINER is made up of multiple layers and technologies, including protective materials (Kevlar, UHMWPE, self-healing polymers), expansion mechanisms and integrated sensors. These components may occupy some volume of the ship, but ideally will be designed to minimize the impact on usable cargo space.

- The smart liner will usually be installed on the inside of the oil tanker hull, so as to protect the fuel tanks and cargo compartments.
- The outer protective layer, such as Kevlar or UHMWPE, can be thicker, depending on the strength and impact requirements, but generally its thickness can vary between 5 cm - 10 cm on each side of the tanks.
- The middle layer (STF) could be about 3 cm - 5 cm in thickness.
- The inner layer of self-healing polymers will add another 2 cm - 4 cm, depending on the technology chosen.

3.4 Space occupied by the liner system

The smart containment system will occupy a certain volume of the oil tanks, which may lead to a decrease in the crude oil transport capacity. The calculation of this impact can be done taking into account the tank dimensions and the liner thickness:

Estimating lost space:

Assume that a typical oil tanker has a tank with dimensions of approximately:

- Tank length: 100 m
- Tank width: 20 m
- Tank height: 10 m

If the liner has a total thickness of approximately 15 cm (0.15 m) on each side of the tank (total thickness of the 3 layers), then the lost volume of each tank could be calculated as follows:

Lost volume = 2 x (Width x Height x LinerThickness) + 2 x (Length x Height x LinerThickness) + 2 x (Length x Width x LinerThickness)

Calculating the lost volume for a tank:

- Width x Height x LinerThickness: $20 \times 10 \times 0.15 = 30 \text{ m}^3$ $20 \times 10 \times 0.15 = 30 \text{ m}^3$
- Length x Height x Liner Thickness: $100 \times 10 \times 0.15 = 150 \text{ m}^3$ $100 \times 10 \times 0.15 = 150 \text{ m}^3$
- Length x Width x Liner Thickness: $100 \times 20 \times 0.15 = 300 \text{ m}^3$ $100 \times 20 \times 0.15 = 300 \text{ m}^3$

Total volume lost per tank:

$$30 + 150 + 300 = 480 \text{ m}^3 \quad 30 + 150 + 300 = 480 \text{ m}^3$$

Reduction in carrying capacity:

A typical oil tank might have a capacity of around 10,000 - 20,000 m³. Thus, the loss of 480 m³ represents a reduction of approximately:

$$480 / 10,000 \times 100 = 4.8\% \text{ of the tank capacity}$$

So, for each tank, there would be a reduction of approximately 4-5% of the total oil transport capacity.

Impact Assessment on the Amount of Oil Transported

If we consider a large ship with a total of 10,000 m³ capacity for transporting crude oil, the 4.8% redundancy will mean a loss of 480 m³ of oil per ship.

Estimate the long-term impact:

If a fleet of 50 tankers is equipped with this protection system, and each ship transports approximately 10,000 m³ of crude oil, then the total annual loss would be:

$$50 \times 480 \text{ m}^3 = 24,000 \text{ m}^3 \text{ of oil}$$

However, considering the environmental and financial benefits, this loss can be justified, as the risks of spills and clean-up costs would decrease significantly, and environmental taxes and insurance premiums would be lower.

Analyzing the space occupied by the intelligent containment system in transport vessels and its impact on the amount of oil transported involves evaluating several factors, such as the dimensions of the system, its distribution on the ship and how it would affect the overall crude oil transport capacity. In addition, it is essential to consider the effectiveness of the protection system against its environmental and financial benefits.

Implementing the smart containment system in oil tankers would result in a loss of approximately 4-5% of the carrying capacity of each tank, which is a relatively small trade-off compared to the benefits brought, such as:

- Reduced spill risks and significantly lower environmental impact.
- Large savings in spill clean-up costs and environmental taxes.
- Reduced insurance premiums due to additional protection.

Therefore, although there is a minor loss of carrying capacity, the protection system can bring considerable savings and environmental benefits that make its implementation a valuable choice in the long term.

4. Conclusion and future prospects

The Smart Oil Containment System represents a disruptive innovation in the prevention of marine oil spills. By integrating puncture-resistant materials, self-sealing mechanisms, AI-based monitoring and expandable compartments, this system offers a comprehensive and safe approach to the safety of oil transportation. Future developments may include self-healing biodegradable polymers and nanotechnology-based ultra-thin coatings, further enhancing environmental protection.

Implementing a smart containment system can bring considerable savings and significantly reduce the risks and costs associated with oil spills. This is not only an environmentally efficient solution, but also a sound long-term financial decision. It requires a detailed approach with clearly defined stages, which include research, testing, collaboration with authorities, long-term implementation and ongoing monitoring. Such a strategy ensures that the final product will be effective and meet industry and environmental regulatory requirements.

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AN ENERGETIC COMUNITY AND ITS IMPACT ON THE URBAN REGENERATION PROCESS

DOI: <https://doi.org/10.53486/dri2025.05>

UDC: 66.06:502/504(478)

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Abstract. *The European Union aims through the European Green Deal (EGD) to achieve climate neutrality by 2050 and become the champion of the global fight against climate change. The latest objectives of the new strategy to transform the European economy into a climate neutral economy are the following: economic growth to be equivalent to the use of resources and no person or place to be left behind by 2050. Investment in environmentally sustainable technologies, encouraging innovation in industry, implementing greener, cheaper and healthier public and private transport, decarbonising the energy industry and ensuring that buildings are more energy efficient.*

The energy industry is a strategic sector and of national interest, thus, increasing the production of energy from renewable sources is essential to achieve the renewable energy target for 2030, as well as to facilitate its achievement of the target of reducing greenhouse gas emissions by at least 55% by 2030, according to Regulation (EU) 2021/1.119 of the European Parliament and of the Council. By 2030, Romania should eliminate emissions of 37.9 million tCO₂ eq from other economic sectors, such as energy efficiency in buildings, agriculture and transport. The installation of photovoltaic panels for the total self-consumption of Territorial Administrative Units can allow, the optimization of processes and services must be oriented towards beneficiaries, implementing standard procedures and mechanisms to support decision-making and long-term strategic planning, and active participation in the process of urban territorial regeneration.

Keywords: *energetic comunity, carbon reduction, urban regeneration.*

1. The concept of energy community

Considering the regional geopolitical context, the Union should focus on accelerating the green transition and ensuring an energy policy that reduces emissions, in order to reduce dependence on imported fossil fuels and to promote reasonable and affordable prices for Union businesses and citizens in all sectors of the economy. accelerating the green transition and ensuring an energy policy that reduces emissions, in order to reduce dependence on imported fossil fuels and to promote reasonable and affordable prices for Union businesses and citizens in all sectors of the economy, The European Union is working towards the efficient and sustainable use of resources, which is a necessity in the modern world. A sustainable economy must focus on developing a green and competitive economy, avoiding waste, modernising industry to reduce greenhouse gas emissions, increasing the share of renewable energy in gross energy consumption, raising the level of education and other needs. Sustainable development in the territory of a local administration must be in tandem with public policies at national, European and international levels, it will improve the quality of life of citizens. Increasing the efficiency of the use of energy sources is the main goal of investments in renewable energy technologies. This will increase energy independence and economic competitiveness throughout Europe.

1.1. Challenges and objectives

The main challenges at national level associated with implementing the climate transition in the sustainable energy, mobility and transport sectors, lead to the need for an integrated approach to measures to implement new strategic approaches in terms of investment, technology and urban regeneration.

Across Europe, we are facing multiple social crises, including climate, health, economy and

democracy. Communities are already facing the initial effects of climate change, such as droughts, crop failures, floods and fires. These effects, extreme weather conditions are forcing more and more people to leave their homes. Climate injustice: those who have contributed the least to global warming are the ones who face the worst consequences. Marginalized communities around the world, who consume the least energy, are becoming the most vulnerable to climate consequences. Europe has taken on its historic responsibility to manage this crisis, trying to be a leader in the process of solving the climate crises and consequences. Usually, the lack of solidarity and democracy seems to be the cause of the climate crisis.

To promote energy efficiency among members of local public administrations, renewable energy communities can be created that, among other things, contribute to achieving the Just Transition objectives, to providing social, economic and environmental benefits to members of the renewable energy community. Energy communities support an energy democracy, which promises an economy and a society that work together, rather than in rivalry, within the limits of the Earth's natural resources.

A practical way out of many crises is to produce and own the energy needed to achieve energy independence. We can collectively address social and climate challenges by returning energy to people and communities. Energy communities can boost local economies not only by lowering costs and keeping money in the community, but also by creating jobs. This type of initiative unites communities, reduces energy poverty and allows people to reduce their energy consumption, thus reducing the pressure on new renewable energy projects at local level.

The European energy system is currently at a critical juncture. The old system of overproduction, polluting energy and giant corporations working for profit is changing. This is the time to lay the foundations for a new system that is based on renewable resources. Much of it is flexible, decentralised and owned by communities and citizens.

Creating capacities to produce electricity contributes to achieving energy security objectives, focusing on diversifying energy sources and reducing energy dependence. Installing a photovoltaic production capacity can be used to generate energy from renewable sources, reducing annual greenhouse gas emissions, which means a significant reduction in tons of CO₂ equivalent/year, for all members of the energy community.

1.2. Just Transition in Romania

The transition to a low-carbon economy, based on restructuring processes in energy-intensive industries, is underway in Romania. The restructuring of electro-intensive industrial sectors such as steel production in Galați, fertilizer production in Mureș, oil and gas extraction and refining in Prahova, coal mining and coal-based energy production in Hunedoara, Gorj and Oltenia, as well as other heavy industries that have been gradually phased out, such as fertilizer production in Dolj and steel manufacturing in Hunedoara.

The stakes of urban regeneration become important in the process of just transition, given that this process has some particularities regarding the processes of physical degradation of the built environment, but also in other aspects of a social and economic nature.

In the process of urban regeneration, development programs were promoted to help this process, it is true that at the time of their launch, the concept of just transition did not exist, but it became necessary in the context of climate change and the development vision of the European Union. In Great Britain, for example, the "ABI (Area-Based Initiatives) system was promoted and has become one of the main instruments and policies available to governments to start the regeneration process, included in approaches centered on the urban community initiative".

Practically, the programs and stakes of urban regeneration have materialized not only in revealing some particularities regarding the processes of physical degradation of the built environment, but also in other aspects of a social and economic nature.

1.3. The current situation in Prahova County

Prahova County, like many other European regions with significant potential for natural resource endowment, has grown up around the value and diversity of its output based on these resources, which include forestry, natural gas, crude oil, and others.

In order to accommodate Romanians and foreigners who came to work in the mines, refineries, and oil fields in the second half of the 19th century, villages, towns, schools, hospitals, and cultural centers were constructed. As a result, when the dominant industries of this type decline, what remains is an extraordinary challenge in terms of economic development.

The economy of Prahova County has historically been based on industry. About 53% of all economic activity is attributed to industry, with the extractive sector, crude oil processing, coal coking, etc. holding the largest shares of industrial activity.

For economic activities based on the production and use of fossil fuels, specifically coal, lignite, peat, and oil shale, these sectors are in decline, recording an irreversible reduction in economic output and employment levels. In contrast, other sectors with high levels of greenhouse gas emissions, for which technological alternatives to carbon-intensive processes can be found, will require technological transformation, re-conversion, etc., in order to maintain economic output and increase employment.

The Integrated National Plan for Energy and Climate Change (PNIESC) approved by the European Commission in 2020 provides for a 50% reduction in GHG emissions compared to 1990 levels by 2030, which translates into a 2% GHG reduction target compared to 2005 levels, the evolution of GHG emission reduction compared to 2005 is presented in the graph below

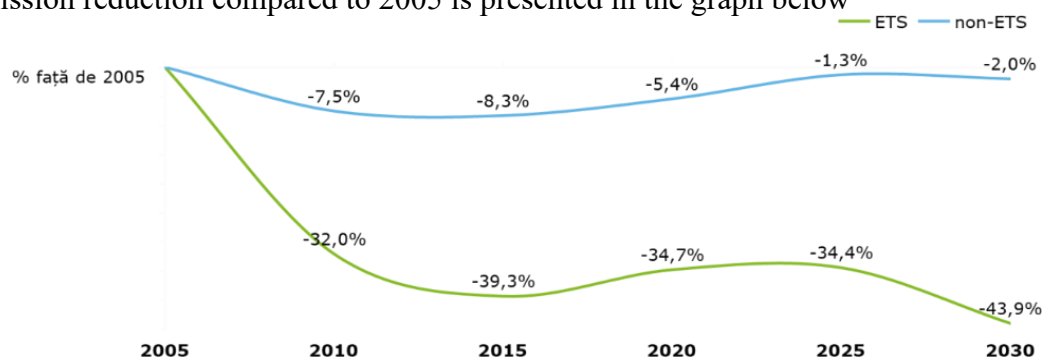


Fig. 1. Historical and projected evolution of emissions from ETS and non-ETS sectors^{2,3}

The economic structure is dominated by industrial activities. The largest share in industrial production is held by the oil processing industry, followed by the food, beverage and tobacco industry, machinery and equipment, chemical and rubber processing, mining, textiles and clothing, metallurgy, metal construction and metal products (except equipment, machinery and installations), wood processing (including furniture), pulp, paper, cardboard and printing. The EU's integrated climate change and energy policy has as its overall target to keep the increase in the global average temperature below 2°C (preferably below 1.5°C) compared to pre-industrial levels. In the event of exceeding the 2°C limit (or even the 1.5°C threshold), the risks are numerous, dangerous and unpredictable, causing an exponential increase in the costs of adaptation compared to the costs of intervention and slowing down this phenomenon. To achieve this objective, the European Union has developed the European Green Deal package, and for areas whose industry is dependent on fossil fuels, the EU has developed the Just Transition mechanism with the stated aim of supporting these areas in making the transition to a climate-neutral economy. Prahova County is included in the list of beneficiary counties of the

² The emission values correspond to the forecasts developed in December 2018, according to the PNIESC Project; it is estimated that the final value for 2030 will decrease due to the decrease in final energy consumption, as well as the decrease in energy production from coal.

³ Source: Ministry of Environment, Waters and Forests, National Greenhouse Gas Emissions Inventory, 2018, Deloitte calculations based on Romania's reporting on GHG emissions forecasts to the European Agency

Just Transition mechanism and can benefit from these funds. Historical pollution with petroleum products still makes its presence felt in the county.

Sustainability for the entire society is ensured through a sustainable urban regeneration process that is correlated with the just transition process. This is achieved by providing manageable units of information that aid in decision-making, as well as adequate indicators that measure actions that have value for the community and the evaluation of the measurement.

1.4. Just Transition and the European Green Deal in Prahova County

On 11 December 2019, the Commission adopted a Communication on the European Green Deal, setting out its roadmap for a new growth policy for Europe. This growth policy is based on ambitious climate and environmental targets and participatory processes, bringing together citizens, cities and regions in the fight against climate change and for environmental protection.

In keeping with the goal of efficiently and fairly attaining EU carbon neutrality by 2050, the European Green Deal suggested a Just Transition Mechanism, which includes a Just Transition Fund, to ensure that no one is left behind.

The negative consequences of climate change and environmental degradation are most likely to affect those who are most at risk. However, handling the shift will result in major structural changes, thus Prahova County workers and residents will be impacted differently, and not all parts of the county begin the transition at the same level and have the same ability to respond.

Under current technological conditions and without investments, the cost of extracting crude oil and underground coal is relatively expensive. These expenses are then reflected in the cost of producing energy.

Prahova County mine closures and activity restrictions are the result of this occurrence as well as the decline in the energy requirements of the Romanian economy during the past 20 years. The depopulation of the county's areas is a result of the mining, extractive industries, and petroleum product refining industries' disposessions, which have occurred without the creation of alternative work opportunities or a reconversion program. One of the main causes lowering the likelihood of internalizing the elements generating local well-being is labor migration, particularly among highly specialized workers. This also subtly lowers public, local, and federal budget revenues.

Significant changes to the local industrial paradigm will highlight the necessity of an innovative mindset, knowledge and technology transfer, spin-off creation, or, if applicable, providing the professional training needed for the shift to new specializations.

1.5. Urban regeneration in the context of just transition

By drawing in new enterprises and activities, updating urban infrastructure, enhancing the urban environment, and broadening the social structure, urban regeneration is defined as "the conversion of old areas into new functional and sustainable spatial forms."

The three primary pillars of urban regeneration are social, economic, and physical. Following an assessment of the region in question and based on the findings, interventions are suggested for each of the three pillars by developing an urban regeneration plan.

The only way to ensure the success of urban regeneration programs and promote sustainable urban growth is to take an integrated approach to economic, social, demographic, and environmental challenges for a just transition.

Finding the local community's pillars that sustain its survival and expansion is essential to achieving the goal of sustainable development through urban regeneration of a region, city, or municipality. These pillars need to guarantee the long-term continuation of sustainable development and urban renewal. Therefore, it is evident that certain local conditions simultaneously support and limit urban renewal. These challenges can be overcome by creative and well-managed solutions that can be used even in subpar circumstances.

The European Green Deal strategically supports the goal of climate neutrality. The Deal encompasses a broad range of proposals, initiatives, and legislative and non-legislative acts. They address issues like energy, industry, transportation, agriculture, digitalization, environmental protection, climate change, and the business and financial sectors. The European Green Deal lays out plans and actions to mitigate the effects of climate change quickly and to make it easier for laws that promote a fair shift to a green economy to be adopted.

The shift to climate neutrality is also aided by investments that fight energy poverty and enhance living standards. The linked environmental goals and the shift to a low-carbon economy (2050) will be facilitated by investments.

2. Methodology, Analysis/Results interpretation

To make sure that there was more material accessible to clearly convey the issue in connection to excellent practice examples and the existing relationships amongst correspondents, a number of stages of research technique were conducted.

The goal of the research technique was to integrate the analyses of European legislation and current best practices in the areas of activity that were being examined. The qualities that can ease the transition process were identified through the suggested qualitative and quantitative assessments. These analyses were carried out in the following stages:

Stage I: Thematic documentation.

The goal of this stage was to analyze technical materials in order to ascertain the present condition in the areas under study.

The primary findings focused on the necessity of operationalizing sustainable development through intersectoral cooperation in the field and the need for a European tool to support sustainability at the local level.

Stage II: Qualitative and quantitative analysis

In this step, data was analyzed to determine the possibility for just transition; existing excellent practices at pertinent national and European levels were discovered; and the difficulties of just transition vs urban regeneration were considered.

Stage III: Development of proposals

This stage involved identifying best practices in the field, attempting to provide answers regarding the specifics of the relationship between just transition and urban regeneration, and taking into account how to incorporate the findings from the qualitative and quantitative analysis into the developed proposals.

2.1. Energy Communities

Renewable energy communities should be associations with citizens, IMMs, or local government authorities as members. They prioritize social and environmental goals, make financial gains, and produce, supply, occasionally transport, and distribute renewable energy at the local level. Additionally, this structure can be used in community energy efficiency projects that are focused on or involve sustainable mobility.

At the European Union level, it is estimated that 4% of the population currently participates in energy communities, with 9,000 such entities at the bloc level. The vast majority of communities use solar energy, and biomass. Compared to identical renewable energy capacities devolved by private actors outside of communities, European energy communities generate two times as much revenue for local communities.

In Romania, it has spread over the entire country and is a very ambitious movement that aims to build energy communities. There are around twenty-one implemented energy community projects that were able to be defined and operate within the existing legal parameters.

The preferred technology among Romania's energy community initiators is photovoltaics, with only

one project using biomass to accommodate local thermal energy consumption. Despite efforts to demonstrate a strong entrepreneurial spirit and technical expertise in the energy sector, Romanian energy communities now lack the capacity to advocate and represent themselves.

Romania's tendency supports the findings of international specialized literature, according to which the goal of all identified initiatives is one of neocommercial, with profit serving as a component of the motivation of initiators. In Romania, however, more than half of initiatives use energy as the primary motivator, in contrast to European trends where leaders of energy communities have strong ecological motivation.

Future energy investments must take into account both national priorities, such as the need to diversify energy supply and reduce pollution, as outlined in national energy strategies, as well as the constructive framework of the National Energy System, primarily the Rețeaua Electrică de Transport (RET). The planning of RET development will be implemented by identifying opportunities to increase the number of people with production and development skills in the area of electricity consumption.

This entails not only increasing installed capacity to produce thermal and electrical energy from renewable sources, but also gradually switching from fossil fuels to more sustainable energy sources. As a result, efforts are being made to cut carbon emissions from the energy sector, which will greatly aid in the fight against climate change and improve environmental quality.

Many European research projects and citizen capacity building initiatives in the energy sector have resulted in studies and public policy reports about energy communities. These studies are primarily focused on countries designed to improve a community or inventory methods that the State supports.

2.2. Energy Communities in Prahova County

Realization of our production and electrical energy capacities from solar sources through the installation of photovoltaic panels for self-consumption in proportion to 100% of Prahova's administrative territorial units.

Optimize processes and align beneficiaries with the strategy for integrating public administration through the implementation of standard procedures and mechanisms to support decision-making and long-term strategic planning.

The Prahova Development Strategy focuses on improving the quality of life for Prahova citizens through sustainable development in the region, involving public politicians at the regional, national, European, and international levels. Investing in renewable energy technologies ensures the main goal of increasing the efficiency of energy source utilization, which will contribute to energy independence and economic competitiveness at the European level.

In order to promote energy efficiency at the member level of the partnership, renewable energy communities are being developed at the county level providing social, economic, and environmental benefits to members of renewable energy communities.

Promoting awareness of the level of use of renewable energy by the citizens of the country, and to develop the skills to create energy in a consumer-like manner for partnership members' self-consumption and to contribute to the achievement of energy security goals, with a focus on reducing energy dependence and diversifying energy sources, by establishing a photovoltaic power plant with our installed capacity to generate energy from renewable sources.

The reduction of annual greenhouse gas emissions that has a significant impact and a comparable amount of CO₂ producing a moderate amount of electricity each year from renewable sources.

The guiding principles and long-term development goals should be integrated into the overall framework of cognition, appropriateness, and sociocultural and personal performance. The project's implementation will support environmentally balanced and sustainable development by ensuring sustainable global development through an open system and responsible use of resources with the highest level of environmental protection.

Energy community pilot projects have so far highlighted the following advantages, which are perceived by all parties involved—from community members to suppliers and operators of energy—as being the most significant: lowering emissions, fostering a sense of community and independence, lowering energy costs, and promoting financial stability.

Numerous studies have highlighted the factors that lead to the emergence of energy communities and the barriers that these communities face. Cross-cutting issues in the majority of European states demonstrate that the main challenges continue to be vague legal definitions, complicated regulations, and the lack of an appropriate support system

Other challenges include a lack of support for the growth of energy communities in national politics, resistance by communities to adopt certain renewable technologies, skepticism regarding cooperative and collective structures, and ignorance regarding the advantages of energy communities over national energy systems.

The need for green energy production (from renewable sources) is the driving force behind this project. Investing can help address the need to eliminate pollution on a global scale. Effective management of this energy will be carried out with the aid of an information management system integrated into the photovoltaic park.

This paper, describes the installation of photovoltaic electric power plants and demonstrates their usefulness. The central photovoltaic system consists of a series of photovoltaic panels that generate electricity in the current continuum (cc) and convert it into the current alternative (ca) through the use of electronic inverters. The characteristics of the system include frequency and the tension required of the transport operator.

For example, the installation using 550 W monocrystalline photovoltaic panels, results in production of an installed power of 8.6 MW. To achieve this goal, an 15636-watt photovoltaic panel system should be installed. The overall power of the photovoltaic panels, that will produce 8.6 MW; will have an inverter of 100 kW to convert current continuous energy into current alternative. The entire installed power is 8.6 MW.

These REPowerEU-specific communities with the goal of obtaining prosumator status don't refer to the fact that they are more commonly communities in the sense of general terms, such as local communities, local public authorities, care, installing their own photovoltaic panels, and becoming individual prosumators.

Participation in the green energy project has overcome initial skepticism, and local communities are proud to be able to contribute to the production of their own energy.

Estimates indicate that the energy communities should recover the investment in approximately three years.

In the emerging area where it is located, the Prahova energy community presented as an example, are characterized by a lot of enthusiasm, a variety of ideas, a good fit in the local context and in needy communities, a relationship with similar initiatives in Romania and outside of it, but regrettably, a lack of advocacy and representational capacity.

The idea behind the project was to establish an energy community where people could offset and share the energy they produced. The need to provide resilience and independence from the grid was essential given the lone distributor and remote location.

Due to their intense interest in the topic, the initiators have freely dedicated their time and energy to comprehending the idea, recording the requirements, figuring out the technical solution, and uniting the community around their notion. Romania 40's energy communities in perspective In an effort to gain support for their proposal, the initiators have a strong entrepreneurial profile, solving problems and conquering challenges. A small percentage of them are more in the anticipatory stage, waiting for a funding opportunity, a guide created by public authorities on the creation of energy communities, more specific legislation in the area, or even an authority-backed pilot project that they can use as a model.

Creative solutions from certain organizations and towns in Prahova County, indicate that challenges

may be overcome with cooperation and regulations better tailored to the requirements or unique characteristics of energy areas. Exposing examples of successful practices that have already been implemented or even endorsing pilot projects that mark a sea change in the dynamics of Prahova's energy communities.

Conclusions

Urban regeneration aims to revitalize urban areas that are in decline, improve living conditions, design public spaces, provide long-term solutions for urban mobility, and improve quality of life, among other things.

Ensuring the health and well-being of citizens; safeguarding and promoting built heritage; bolstering urban resilience to natural disasters and climate change effects, as well as supporting a dynamic economy, can all become easier to manage when combined with stable results through local strategic frameworks.

Therefore, in order to achieve the goals of sustainability and climate protection, industrial "verzi" policies that envision an urban regeneration process integrated into the transition to a carbon-reduced economy must be adopted.

The initiatives' framework to create an energy community is basically a non-commercial one; neither the context in which they originated nor the motive of their founders included profit. However, in Romania, the primary driving force for the creation of energy communities is social, even though ecological factors predominate at the European level.

Community initiators recognize that another barrier in the Romanian setting to create energy communities, is resistance to association, difficulty in cooperation, or hesitation toward shared property and the concept of cooperatives.

It is crucial that the authorities' degree of ambition rises in light of the strong public interest in creating energy communities in Romania and the severe delays in the full implementation of the European legislative framework.

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USAID AND THE ECONOMIC DEVELOPMENT OF THE REPUBLIC OF MOLDOVA: CONTRIBUTIONS, IMPACT, AND FUTURE PERSPECTIVES

DOI: <https://doi.org/10.53486/dri2025.06>

UDC: 341.232.2:[330.34:332.02](478)

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Abstract: *In the context of Moldova's evolving development landscape, international assistance has played a vital role in supporting structural reforms and economic modernization. Among the key development partners, the United States Agency for International Development (USAID) has maintained a significant presence for over three decades.*

The study quantifies the role and impact of USAID assistance in the Republic of Moldova over the past 30 years in building a modern country with the potential to integrate into the global market, a process marked by significant economic and political changes and obstacles. The research aims to assess the contributions of USAID in strengthening strategic sectors, enhancing institutional capacities, and facilitating the modernization of Moldova's private sector. Employing a mixed-methods approach—combining documentary analysis, statistical review, quantitative survey, and impact evaluation—the study provides empirical evidence on USAID's transformative influence in key domains such as ICT, sustainable agriculture, textiles, tourism, and winemaking.

Drawing on both official statistics and primary data from 80 surveyed beneficiaries, the research highlights the catalytic role of USAID in fostering innovation, digitalization, and export capacity, especially among SMEs. Furthermore, the study analyses the systemic risks associated with the agency's announced withdrawal in 2025, underlining vulnerabilities in institutional resilience, employment, and green transition efforts. The findings offer a solid empirical basis for policy formulation, advocating for diversified international partnerships and adaptive strategies to mitigate development gaps. This contribution fills an important gap in the literature by providing a contextualized and data-driven evaluation of external assistance effectiveness in an emerging economy.

Key words: *economic development, external assistance, USAID, public policy, Moldova*

JEL: F35, O19

1. Introduction

Since gaining independence, the Republic of Moldova has faced multiple structural, political, and economic challenges and obstacles. The process of development and combating the effects of the economic and political crises that the Republic of Moldova has gone through has been and continues to be supported by development partners. Development partners provide the technical and financial assistance necessary to minimize negative effects and contribute to long-term economic development. The support of development partners plays an essential role in the design and implementation of reforms and the integration of the Republic of Moldova into global economic communities, such as the European Union.

The main development partners are the European Commission, the International Monetary Fund, the World Bank, and the United States Agency for International Development (USAID). The United States Agency for International Development is one of the most important providers of technical and financial assistance, offering support worth \$280 million over the years. USAID's support is represented by strategic and long-term guidance, with intervention in the development and consolidation of multiple strategic sectors, contributing to the creation, modernization, and development of economic sectors and institutional consolidation in the Republic of Moldova.

The relevance of the topic is particularly evident in the geopolitical context and crises in the region, the effects of the war in Ukraine, the energy crisis, inflation, climate change, the need for digitalization, and ensuring sustainable development.

The suspension of US foreign assistance and the liquidation of USAID impact a significant number of national actors: economic agents, public institutions, and civil society, emphasizing the dependence of several sectors and strategic areas on USAID technical and financial assistance.

Quantifying the volume of foreign assistance received by the Republic of Moldova and assessing its impact on the republic's strategic sectors is relevant from an academic perspective and significant in terms of the urgency of identifying the alternative sources needed to continue reforms and ensure sustainable national development.

The study aims to investigate the role of external assistance provided by USAID in the economic development process of the Republic of Moldova by presenting the quantified results of technical and financial assistance received by strategic areas and the possible risks associated with stopping assistance for the sustainable development of the republic. While scholars such as Casian [1], Gîrbu[2], and Lozovanu [3] have examined the link between external aid and national development, comprehensive research offering a systemic and empirical perspective on the socio-economic impact of such assistance in the Moldovan context remains limited.

Therefore, this study aims to fill that gap by offering a structured analysis based on official statistics, public reports, and both quantitative and qualitative assessments of USAID assistance in Moldova's economic sectors. The methodology integrates statistical data from USAID reports, the Ministry of Economic Development and Digitalisation, and the National Bureau of Statistics, the External Assistance Management Platform and results obtained based on a survey of 80 companies that received technical and financial assistance from USAID funds.

The innovative nature of the research is demonstrated by the multidimensional analysis of the impact of USAID external assistance and the correlation between assistance and the results achieved by the Republic of Moldova in the process of institutional and economic development. The study also analyses a normative dimension, formulating recommendations on maintaining sustainable development in the process of phasing out USAID assistance, and targets academia, national decision-makers, international partners, and organizations with the aim of developing effective economic development models.

The purpose of the research is to examine the role and impact of USAID assistance in the economic development process of the Republic of Moldova.

The research is based on the following specific objectives:

1. Assessing the impact of USAID on the economic development process of the Republic of Moldova;
2. Examining the evolution of strategic areas impacted by external assistance provided by USAID;
3. Determining the economic risks generated by the cessation of USAID assistance.

The research will present a structured diagnosis of the impact of USAID's external assistance on key areas and the risks generated by its cessation. The research results will inform future policies and strategies for streamlining external support and promoting long-term economic progress.

2. Assessment of USAID's impact on the economic development of the Republic of Moldova

In the process of developing and consolidating as a state, the Republic of Moldova has faced numerous structural, economic, and political challenges. Barriers to development and the effects of global and regional crises have been gradually reduced or eliminated with the support of development partners, who have provided financial and technical assistance to emerging sectors. Strategic support has contributed to generating long-term, multiplier results. External assistance plays an undeniable role in the development and implementation of reforms and the economic integration of the republic into global economic systems, including EU accession.

According to data provided by the External Assistance Management Platform [6], the total volume of financial assistance received by the Republic of Moldova from independence until 2025 amounts to approximately EUR 3.3 billion (Fig. 1). The top donors include the European Commission, the International Monetary Fund, the European Investment Bank, the International Development Agency, the United States Agency for International Development (USAID), among others.

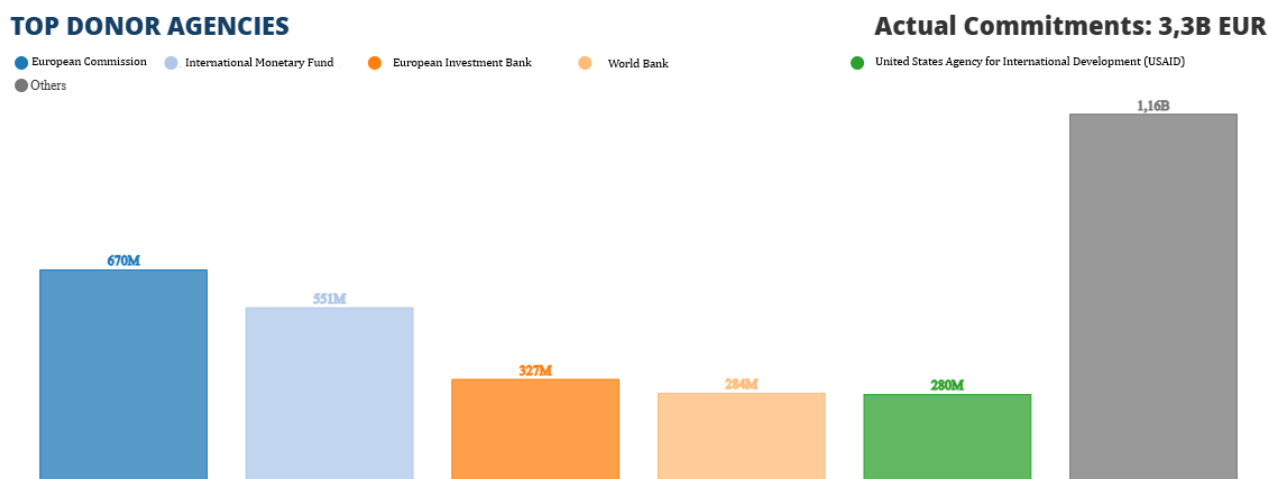


Figure 1. Volume of External Assistance Received by the Republic of Moldova during the Period 1992–2025

Source: External Assistance Management Platform. Available online: www.amp.gov.md

The ranking of development partners, based on the volume of assistance provided, underwent a significant shift in 2025, due to the cessation of USAID funding and the partial compensation of this deficit by other donors, notably the European Commission.

Since 1992, the support provided by the United States Agency for International Development (USAID) to the Republic of Moldova has constituted a foundational pillar in the country's economic and institutional transition. This contribution has been reflected through a wide range of programmes aimed at fostering private sector development, strengthening institutional capacity, reforming public administration, promoting trade—including e-commerce—and supporting Moldova's integration into the regional economy. Evaluating the impact of such support requires a multidimensional approach focused on measurable outcomes and structural transformations generated by financial and technical assistance.

According to data from the External Assistance Management Platform (AMP Moldova) [6] and USAID reports [4], between 1992 and 2025, the Republic of Moldova received over USD 280 million in non-reimbursable grants and technical assistance. Of this amount, approximately 37% was directed toward economic development, 21% to good governance, and the remainder to sectors such as energy, health, and education.

The economic impact of these interventions is evident through fundamental indicators such as GDP growth and the expansion of the small and medium-sized enterprise (SME) sector. One of the most significant support instruments was the EDGE Programme (Economic Development, Governance and Enterprise Growth), launched in 2020 to support entrepreneurship and integrate Moldovan companies into European value chains. By 2023, the programme had facilitated over 61 partnerships and investment projects, totalling USD 3.1 million, directly contributing to the export capacity of Moldovan SMEs. These initiatives targeted strategic sectors such as organic agriculture, sustainable textiles, information technology, winemaking, and rural tourism through the attraction of foreign visitors.[5]

From the perspective of institutional capacity building, USAID has supported reforms in the tax system, trade facilitation, and the alignment of economic legislation with European standards. For instance, through the Moldova Structural Reform Program (MSRP), implemented from 2018 to 2022 with a budget of USD 11.17 million, reforms were undertaken in public procurement, taxation, and digitalisation of services for businesses. As a result, more than 600 public officials were trained in modern economic management techniques, and the average time required to register a business was reduced by over 30%. Another notable effect was the increase in foreign direct investment (FDI), supported by an improved business environment. According to the Ministry of Economic Development and Digitalisation (2023), the growth rate of FDI in USAID-supported sectors was 18% higher than in non-supported sectors, indicating a positive correlation between USAID interventions and Moldova's investment attractiveness.[5]

On the social front, the economic effects of USAID support have helped reduce regional disparities by stimulating entrepreneurial initiatives in rural areas and promoting economic inclusion for women and youth. Between 2020 and 2024, USAID programmes impacted approximately 100,000 individuals, both directly and indirectly, of whom 46% were women and 38% were young people under the age of 35.

The financial and technical assistance provided by USAID reveals a transformative effect on the national economy, evident through the modernisation of the private sector, the optimisation of economic governance, and the intensification of Moldova's integration into regional and global markets. These results confirm USAID's role as a strategic facilitator of sustainable development and underline the importance of continuing multilateral partnerships, particularly in the development of emerging economic sectors such as creative industries, the energy sector—especially green energy production—and the transition to a green economy.

Strategic sectors impacted by USAID assistance

The impact of USAID assistance, focused on the economic development of the Republic of Moldova, has contributed significantly not only at the macroeconomic level but also in facilitating the promotion of effective governance. Programs implemented with USAID support have impacted several sectors, facilitating the transition to a strong, competitive economy based on innovation, digitization, and the continuous development of human capital. USAID assistance has been redirected toward the creation and development of value-added economic sectors, the creation of specific infrastructure necessary for these sectors, and the education of professional human capital involved in the development of target sectors.

The sectors impacted by USAID assistance are: information and communications technology (ICT), creative industries, high value-added agriculture, tourism, winemaking, the fashion industry, and the energy sector. The development of these sectors involved a combination of strategic actions: the integration of innovative production technologies, support for the development of companies in the field, support for certification, facilitation of exports, integration of local value chains into regional and global ones, and ensuring a relevant institutional framework for the development of the business environment.

The tangible results of USAID's intervention are: the "Tekwill" and "Tekwill in Every School" programs, which were designed to develop the ICT sector, build digital skills, create innovation ecosystems, and facilitate the launch and growth of well-known companies with a global impact. The launch of the "Mediacor" and "CyberCor" centers aims to develop new sectors and drive innovation in the media industry and the use of technology in data security. [7]. "ZipHouse" was developed as a center to boost the fashion industry and support the local designer community. The importance of the programs launched by USAID for the economic development of the Republic of Moldova is also relevant in ensuring the continuation of these interventions and the further development of Agroteck Arena, which will become a space for innovation, testing, and implementation of technologies

relevant to the agricultural sector. In parallel, the agri-food sector has benefitted from numerous interventions aimed at technological modernisation and sustainability. The "High-Performance Agriculture in Moldova" (APM) programmes have supported the adoption of modern technologies, smart irrigation systems, and organic certification. More than 150 beneficiaries have received assistance in applying advanced agricultural technologies, thereby increasing the sector's resilience and efficiency.

The winemaking industry, a traditional yet high-potential sector, received support through the "Competitiveness and Rural Resilience Project" (PCRR), which focused on rebranding and expanding export markets for Moldovan wines. Interventions included support for certification, processing infrastructure, international marketing, and the consolidation of the "Wine of Moldova" brand platform. These initiatives led to increased wine exports to the European Union, Japan, and the United States.

Rural tourism was another targeted sector, benefitting from investments in thematic route development, local heritage promotion, and the training of tourism service providers. Through projects such as CEED II and the Competitiveness and Rural Resilience Project (PCRR), numerous guesthouses, artisan centres, and cultural festivals were established.[8]

In response to the regional energy crisis in 2021, USAID launched the Moldova Energy Security Activity (MESA), a comprehensive programme aimed at diversifying energy sources, enhancing energy efficiency, and supporting the adoption of green technologies in public infrastructure and SMEs. MESA aligns with national objectives to reduce external energy dependence and accelerate the transition to a green economy.

A cross-cutting component of USAID's interventions has been the development of human capital. The need for a skilled workforce was addressed through professional training initiatives, digital education, and partnerships with educational institutions. Between 2017 and 2022, more than 8,000 individuals were trained in IT, entrepreneurship, design, and project management under the Moldova Workforce Development Activity.[7]

The "Tekwill in Every School" initiative, launched in 2020, achieved significant impact by training over 100,000 students and teachers in areas such as programming, robotics, artificial intelligence, and cybersecurity. This initiative enabled the nationwide introduction of digital education, reduced regional digital divides, and increased young people's employability.

Strategic partnerships with universities in Chişinău, Bălţi, and Cahul led to the modernisation of laboratories, curriculum updates, and the creation of educational hubs integrated into local innovation ecosystems.[10]

USAID has played a catalytic role in the development of a national network of innovation centres aimed at connecting education, research, and the private sector. Innovation centers launched with USAID support: Tekwill, Ziphouse, MediaCor, Fintech Hub, Nortek, Tekwill Comrat, Cybercor, Inotek, Glia Impact Hub, and Agroteck Arena play an essential role in regional development and provide access to innovation and educational resources to over 60,000 people annually, including students, entrepreneurs, freelancers, and researchers.

To conduct a qualitative assessment of the impact of USAID assistance, we analyzed statistical data from key impacted sectors and surveyed the direct beneficiaries of the programs—entrepreneurs who received nonreimbursable financial support and technical assistance in various fields.

The analysis of GDP evolution over the period 2010-2023 shows steady economic growth, with insignificant fluctuations, as a result of social and political crises in the region. Fig. 2 shows the periods of crisis, but also Moldova's resilience, marked by a rapid recovery, thanks to development partners. The analysis of the contribution of the main economic sectors benefiting from external assistance to GDP shows upward trends in ICT, tourism, and wine production, while the agricultural sector and the textile industry have declined. This is supported by the need to identify other impediments to the development of sectors, such as unpredictable changes in the international market or climatic factors with unpredictable effects.

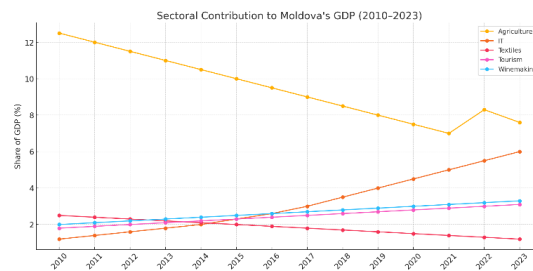
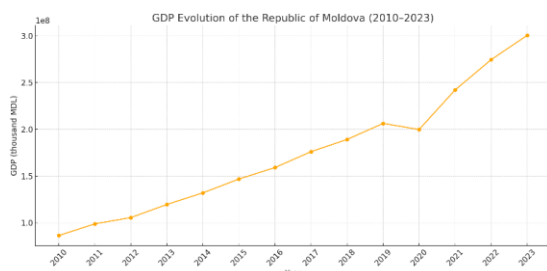


Figure 2. GDP growth, 2010–2023, current prices Figure 3. Contribution of sectors to GDP formation, 2010–2023

Source: Author's elaboration

Source: Author's elaboration

The development of these sectors is affected by both the external assistance received and environmental conditions and fluctuations in international markets. The impact of USAID assistance on the development of the entrepreneurial environment was accurately determined by surveying 80 companies that directly benefited from financial assistance in four key sectors: agriculture, textiles, winemaking, and tourism.

The survey results show that USAID financial assistance has contributed to the adoption of modern production technologies, digitization, and energy efficiency in beneficiary companies (98% of respondents). USAID assistance also contributed to an increase in the beneficiary companies' revenues by at least 15% (78% of beneficiaries). Respondents (57%), mainly from the wine and tourism sectors, mentioned that the support they received contributed to the formalization and development of their businesses. Companies in the agricultural sector mentioned that USAID support was advisory and financial support that enabled them to market their products in new markets. The companies surveyed repeatedly confirmed that the USAID support they received directly had long-term effects, facilitating local economic development, job creation, and the international expansion of local companies.

The economic impact of the suspension of USAID assistance on the Republic of Moldova

The end of USAID's external assistance is a critical moment for the development process of the Republic of Moldova, one of the recipient countries of external assistance, continuously over the last 30 years. The process represents the collapse of an architecture of innovation and progress, especially in the context of political and economic instability in the region.

The effects of the termination of USAID's external assistance on the Republic of Moldova can be analysed from several perspectives, including structural consequences with a negative impact on the dynamics of national economic development.

Firstly, the cessation of external assistance directly impacts strategic sectors, particularly the entrepreneurial sector, which is represented by 98% of SMEs. The sector will not receive assistance in strategic areas, and support for the digitisation of companies and the migration to alternative energy sources will be discontinued. Auxiliary industries that supported and facilitated the implementation of external assistance projects are also affected: event organisation, translation, certification and legal services, and related organisations that depend on these funds. The reduction in assistance leads to negative knock-on effects on employment and capital flows.

At the macroeconomic level, USAID has been a partner that has supported structural reforms and supplemented the budgets needed to combat crises: the COVID-19 pandemic, the energy crisis, and the lack of assistance creates additional pressure on the national public budget or conditions the need to identify or supplement the budget from other partners.

Furthermore, USAID's withdrawal will negatively influence the investment climate, and investors may become reluctant to invest locally, as the investment climate is constantly affected by various socio-political events in the region.

The economic impact of USAID's withdrawal is not limited to the loss of funds, but also involves a series of chain imbalances, including the unemployment of more than 250 USAID project employees, which affects the national capacity to ensure sustainable long-term economic growth.

3. Conclusions

The assessment of USAID's role and impact on national economic development over the past 30 years highlights the strategic and efficient allocation of resources. USAID's intervention has contributed to shaping the country's economic development path by supporting business environment reforms, digitalisation, innovation and human capital development.

USAID support has aligned with national development strategies, ensuring a multiplier effect of the results achieved in emerging sectors. The sectoral programmes implemented have yielded results such as increased investment, diversification of exports, increased digitalisation and innovation capacity of companies, and reduced regional disparities.

The end of USAID support directly impacts the development of strategic sectors, as well as the sustainable development of infrastructure. The loss of a strategic partner such as USAID, in a tense period, contributes to the revision of national policy and the identification or generation of the resources necessary to support strategic projects.

This research confirms not only the positive impact of USAID's assistance on Moldova's economic development but also the high degree of dependency that certain essential sectors have developed toward this support. In this regard, the absence of a well-managed transition and a viable alternative support framework may slow the pace of reforms, weaken economic performance, and exacerbate systemic vulnerabilities in the Moldovan economy.

The study highlights the urgent need to redefine Moldova's international cooperation paradigm and to reinforce a national strategy for attracting external funding, one based on diversification, institutional coherence, and the valorisation of regional partnerships. Simultaneously, it is imperative to mobilise internal resources and sustain innovation ecosystems through proactive public policies and smart investments capable of assuming the catalytic functions previously exercised by USAID.

In a transitioning economy with confirmed potential, the future of sustainable development will depend on the capacity of decision-makers to maintain the reform trajectory, translate past lessons into concrete actions, and ensure continuity of progress in a constantly evolving international environment.

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SOCIOECONOMIC CONDITIONS OF UKRAINIAN WAR REFUGEES IN MOLDOVA AND ROMANIA

DOI: <https://doi.org/10.53486/dri2025.07>

UDC: 364.65(478+498):314.745.22(477)

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Abstract: *The outbreak of Russia's Special Military Operation in Ukraine in 2022 has resulted in a significant refugee crisis, with millions of Ukrainians fleeing the conflict and seeking refuge in neighbouring countries, including Moldova and Romania. This research paper aims to examine the socio-economic conditions of Ukrainian war refugees in these two countries, focusing on the economic and social challenges faced by both the displaced population and the host nations. The study draws on secondary data, including reports from international organizations, government statistics, and academic articles, to assess the impact of the refugee crisis on Moldova and Romania. The methodology incorporates a review of existing literature, national and international reports, and findings from non-governmental organizations working in region. The research highlights the financial and social strain experienced by both countries, particularly Moldova, due to the high influx of refugees relative to its population size. The paper explores the burden placed on public services, housing, healthcare, and social welfare systems, as well as the difficulties faced by refugees in securing employment, accessing education, and integrating socially into their host communities. Despite these challenges, the study also identifies the resilience demonstrated by both Moldova and Romania through governmental and international humanitarian efforts. The findings underscore the urgent need for continued international support and the implementation of more effective integration policies. This paper contributes to the understanding of the socio-economic implications of the Ukrainian refugee crisis on Moldova and Romania and offers insights into the long term impacts on both refugees and host countries.*

Key words: *Ukrainian war refugees, socioeconomic conditions, Moldova, Romania, refugee burden, humanitarian support.*

JEL: J61, I38, R23

Introduction

The geopolitical landscape of Europe was dramatically altered with the onset of Russia's Special Military Operation in Ukraine in February 2022. This military intervention led to widespread displacement across Ukraine, creating one of the largest refugee crises in modern history. As Ukrainian civilians fled the war zones in search of safety, neighbouring countries, particularly Moldova and Romania, became pivotal hosts for millions of displaced individuals. Moldova, a smaller country with a population of just over 2.4 million, and Romania, with a larger and more developed economy, have both faced significant challenges as they absorbed the influx of refugees. Moldova and Romania, both of which share historical, cultural, and geographic ties to Ukraine, have seen their socioeconomic systems stretched to their limits. The Ukrainian refugees arriving in these countries have come from diverse socio-economic backgrounds, seeking shelter, food, medical assistance, and safety. The humanitarian burden of managing such a large and diverse group of people has strained both the public and private sectors in Moldova and Romania, placing additional pressure on already struggling economies. Both European states have made remarkable efforts for immediate relief for refugees. The influences of the Ukrainian war refugee issue on the national economies of Romania and Republic of Moldova is quite significant and disturbing.

United Nations Refugee Agency in Romania had registered 182,347 Ukrainian War refugees for temporary protection in the end of February 2025. While the United Nations Refugee Agency in Moldova inked 127,000 Ukrainian war refugees as per March 2025.

The crisis of Ukrainian war refugees falls in the scope of humanitarian issue but at the same time it is an economic issue also. There is tremendous pressure on healthcare, housing, education and social services in Moldova and Romania because rapid increase of human population. There are limited resources in Moldova. Because of this government of Moldova faces a serious challenge to provide the basic services and integration programs related to Ukrainian war refugees. In case of Romania, the economy is developed and larger and it the part of European Union. Despite this Romania is experiencing tremendous pressure on its economy because of Ukrainian war refugees. Unemployment, inflation and housing shortages because of larger refugee influx impacts the local Romanian communities and national economy.

This research paper make analysis the socioeconomic conditions of Ukrainian war refugees in Moldova and Romania. The paper examines (i) economic costs related to hosting refugees (ii) social integration challenges of refugees (iii) economic burden of Ukrainian war refugees in the host countries. By exploring the experiences of refugees in both Moldova and Romania, the paper will highlight the resilience of the host countries while also addressing the substantial economic and social difficulties they face. Additionally, this study aims to shed light on the effectiveness of current policies and the need for future international support to mitigate the long term impact of this crisis on both the refugees and the countries hosting them.

The importance of this research lies in its potential to inform policy decisions and humanitarian efforts. Understanding the socioeconomic challenges faced by Ukrainian war refugees in Moldova and Romania is critical for governments, international organizations, and non-governmental organizations working to improve the conditions of displaced populations. Moreover, it underscores the need for comprehensive integration programs that go beyond immediate relief and address long term issues such as employment, education, and social cohesion. The findings of this research are not only relevant to Moldova and Romania but also to other countries grappling with similar refugee crises and seeking sustainable solutions to support displaced populations.

Literature review

The socio-economic impacts of the Ukrainian war refugees in Moldova and Romania have been widely discussed in recent literature, focusing on both the challenges faced by refugees and the burden on host countries. Several studies highlight the significant strain placed on public services, including housing, healthcare, and education.

Economic impact on host countries

Previous research has shown that the economic burden of hosting refugees often includes increased demand for public services, rising inflation, and strain on the labour market. According to the IOM (2024), both Moldova and Romania have experienced rising housing costs due to the increased demand for rental properties, especially in urban centers. Moldova, with its smaller economy, faces a disproportionate strain on its public services (World Bank, 2024), while Romania, though economically stronger, still faces inflationary pressures and labour market disruptions (European Commission, 2024).

Social integration challenges

Studies on social integration have emphasized the language barriers and challenges to labour market inclusion faced by refugees. In Moldova, many refugees struggle to access healthcare and education due to the lack of language skills and the limited availability of integration programs (UNHCR, 2023). In Romania, while refugees have better access to services, social integration remains an issue due to language differences and unfamiliarity with local systems (EU, 2024).

Psychosocial effects on refugees

The psychological impact of displacement has been a focus in both Moldova and Romania. Refugees often experience trauma, isolation, and mental health challenges, which can hinder their ability to integrate into the host society. The IOM (2024) reports that mental health support services are often insufficient to meet the high demand for care, especially in Moldova.

Long term economic and social outcomes

While much of the focus has been on the immediate impacts of the refugee crisis, long term studies suggest that refugee populations can contribute to the host countries' economies over time if provided with adequate support for integration (Smith & Hauer, 2024). Employment integration and access to education are key factors in the successful socioeconomic integration of refugees, with positive impacts on local economies and social cohesion.

Methodology

This research employs a secondary data analysis approach to investigate the socioeconomic conditions of Ukrainian war refugees in Moldova and Romania. Given the challenges and limitations of primary data collection, secondary data from reputable sources such as international organizations, governmental reports, academic studies, and media outlets were utilized.

Data sources

The sources of data include:

- Reports from international organizations such as the United Nations High Commissioner for Refugees (UNHCR), International Organization for Migration (IOM), and the World Bank.
- Government publications from the Ministries of Social Affairs and Labour, as well as local government reports from Moldova and Romania.
- Academic articles and studies on the economic and social impacts of refugee influxes in Eastern Europe.
- News articles and policy papers that provide insights into the evolving situation of refugees in the host countries.

Data collection and analysis

Data were collected for the period of 2022-2025 to ensure relevance and reflect the most recent developments. The study focuses on two main areas:

Economic impacts: Data on gross domestic product changes, inflation, employment statistics, housing market trends, and social services expenditure were examined to assess the financial strain placed on both Moldova and Romania.

Social integration: Secondary data regarding refugee access to healthcare, education, language integration programs, and employment opportunities were analysed to understand the social challenges faced by refugees.

The data were analysed through a qualitative content analysis approach, categorizing the findings into thematic areas such as economic burden, employment, housing, healthcare, and education.

Findings

The findings of this study are based on a comprehensive analysis of secondary data, including reports from international organizations, government publications, academic articles, and media sources. The results highlight both the direct and indirect socio-economic impacts of the influx of Ukrainian refugees into Moldova and Romania. This section is divided into two main areas: (1) the economic impact on host countries, and (2) the challenges faced by refugees in terms of social integration.

1. Economic impact on Moldova and Romania

Increased economic burden on host countries

Both Moldova and Romania have experienced significant economic impacts as a result of the Ukrainian refugee crisis. The influx of refugees has placed considerable strain on public services and infrastructure, leading to both short term and long-term economic burdens. For Moldova, the smaller economy and limited resources have made it particularly vulnerable to the economic shock caused by the Ukrainian war refugee crisis.

According to the World Bank (2024), Moldova's gross domestic product saw a reduction of approximately 2-3% due to the costs associated with accommodating Ukrainian war refugees. These costs include increased demand for housing, healthcare, education, and social services. The

government has been forced to allocate a significant portion of its budget to meeting the basic needs of Ukrainian war refugees, which has reduced the availability of funds for other essential public services (World Bank, 2024).

In Romania, while the economic impact has been less severe, the country has still faced notable challenges. The IOM (2024) reports that Romania experienced rising inflation, particularly in housing markets, due to increased demand for rental properties. Major urban centers like Bucharest have seen rental prices soar as refugees settle in these areas. Although Romania's economy is more robust, the crisis has created pressure on public services, particularly in border regions and large cities where refugees have concentrated (IOM, 2024).

Strain on housing and public services

Housing has been one of the most visible areas of strain in both countries. In Moldova, where available housing is already limited, the arrival of a large number of refugees has led to overcrowding in certain areas. Local governments have struggled to provide adequate housing for refugees, especially in rural areas where infrastructure is less developed (UNHCR, 2023).

Similarly, Romania has faced increased demand for housing, particularly in cities near the Ukrainian border. The European Commission (2024) notes that the refugee influx has caused a shortage of affordable housing, driving up rental prices and creating competition between refugees and local populations. The rising cost of living has put additional pressure on the social welfare systems in both countries (European Commission, 2024).

Ukrainian war refugees represent a significant economic resource for both Moldova and Romania. The governments of these two countries have the potential to capitalize on this resource by generating funding for constructing accommodations for the refugees. One possible approach to achieve this is by implementing a model based on integrated man-hours and a barter system. This innovative model was introduced by Engineer Kamran Khan during the "Economics, Management, and Finance: Problems, Research, Results" session of the international conference titled *Communications, Society, Spirituality*, which took place in May 2024 at Russia's Ukhta State Technical University (Ukhta State Technical University, 2024). The same model was presented as a housing solution for homeless individuals by Engineer Kamran Khan in March 2025 at the international Scientific and Practical Conference titled "Chemistry. Ecology. Urbanism," held at Perm National Research Polytechnic University in Russia.

Both Moldova and Romania have also experienced an increased strain on public services such as healthcare and education. In Moldova, the healthcare system, which was already underfunded, has struggled to meet the needs of refugees who require medical attention, vaccinations, and psychological support (IOM, 2024). Romania, with its more developed healthcare infrastructure, has nonetheless seen an increase in the number of refugees accessing medical services, which has stretched the capacity of hospitals and clinics, especially in areas with high refugee concentrations (IOM, 2024).

Unemployment and labour market integration

One of the major economic challenges faced by both host countries is the integration of refugees into the labour market. Many refugees, particularly those from Ukraine, are skilled workers who face significant barriers to employment in Moldova and Romania. The lack of recognition of qualifications, language barriers, and unfamiliarity with local labour markets have contributed to high unemployment rates among refugees. In Moldova, refugees have found it particularly difficult to secure formal employment due to the country's limited job market and the lack of language proficiency among many refugees (Smith & Hauer, 2024). The IOM (2024) reports that while some refugees have found work in agriculture and the informal sector, many remain unemployed or underemployed (IOM, 2024).

In Romania, refugees have faced similar challenges in labor market integration. The EU (2024) reports that despite some efforts to facilitate refugee employment, such as language training and job placement services, the overall unemployment rate among refugees remains high. Many refugees are

employed in low wage, temporary jobs in sectors such as construction, retail, and agriculture. However, access to skilled jobs remains limited, and the lack of recognition of Ukrainian qualifications further exacerbates the problem (EU, 2024).

2. Social integration challenges for refugees

Language barriers and cultural adaptation

One of the major barriers to social integration for Ukrainian refugees in both Moldova and Romania is language. Many Ukrainians speak Russian. The official languages in Moldova and Romania is Romanian language. In Moldova, where Romanian is the most widely spoken language, Ukrainian refugees with limited knowledge of Romanian struggle to access education, healthcare, and employment. Smith and Hauer (2024) highlight that language barriers have made it difficult for many refugees to integrate into local communities, particularly in rural areas where the population speaks little Russian. In Romania, the language barrier remains a significant challenge for those who speak only Ukrainian or Russian. Language barriers affect refugees' ability to participate fully in society, limiting their access to public services, social networks, and employment opportunities (Davis, 2024).

Access to housing, healthcare, and education

Social services have also been an area of concern for refugees in both countries. In Moldova, refugees have faced difficulties in accessing adequate housing and healthcare, particularly in rural areas. The UNHCR (2023) notes that temporary shelters have often been overcrowded and refugees in these shelters face poor living conditions. In addition, refugees have reported difficulty accessing medical care, as Moldova's healthcare system struggles to accommodate the increased demand. (World Bank, 2024).

In Romania, while refugees generally have better access to social services, there are still significant barriers to healthcare and education. Many refugees struggle to navigate the Romanian healthcare system due to language barriers and a lack of knowledge about how to access services. Similarly, the IOM (2024) reports that while Ukrainian children have the right to attend Romanian schools, there are challenges related to integration into the educational system, especially in terms of language proficiency and curriculum differences (IOM, 2024).

Psychosocial impact

The psychological and social impact of displacement is another key issue for refugees. Many refugees from Ukraine have experienced trauma due to the war, displacement, and loss of loved ones. In Moldova, where mental health services are limited, refugees have reported feelings of isolation and depression. The IOM (2024) highlights the importance of providing mental health support, but the demand for such services often exceeds the available resources (IOM, 2024).

In Romania, while mental health services are more developed, there is still a gap in providing adequate psychological support for refugees. Reports from the UNHCR (2023) and IOM (2024) suggest that refugees often struggle to access mental health care, which exacerbates the long term social and psychological consequences of displacement (UNHCR, 2023; IOM, 2024).

The economic burden on Moldova and Romania's economies

The economic burden of hosting refugees from Ukraine has been significant for both Moldova and Romania, albeit in different magnitudes. Both countries, though geographically and culturally linked, have distinct economic structures and levels of development, which influence their capacity to absorb and support large numbers of Ukrainian war refugees. Moldova, with a smaller, less resilient economy, has been disproportionately affected, while Romania, with a more developed economy, has faced its own set of challenges, though its overall economic capacity has enabled a somewhat more stable response.

Economic strain on Moldova

Moldova, one of the poorest countries in Europe, has faced extraordinary challenges in accommodating a large number of Ukrainian war refugees. According to the United Nations High

Commissioner for Refugees (UNHCR, 2023), Moldova has received one of the highest per capita numbers of refugees in Europe, relative to its population size. This has resulted in an increased demand for essential public services, including healthcare, housing, and education. These public sectors in Moldova are underfunded.

Effect on economic growth

The economic impact of hosting Ukrainian war refugees in Moldova was shocking as per the estimate of World Bank (2024). There is a reduction of approximately 2 to 3% Moldova's GDP is recorded. This economic decline was happened because of allocation of public funds to Ukrainian war refugees related economic costs. This include expansion of housing facilities, healthcare and education spending. Moldova decline to work on its key infrastructure projects for the economic development because of redirection of resources for Ukrainian war refugees.

Public service and infrastructure under pressure

The large influx of Ukrainian war refugees made a tremendous burden on weak healthcare and education system of Moldova. The healthcare facilities for refugee population and the local population are struggling to accommodate as per World Health Organization (WHO, 2023).

Refugees often face delays in accessing medical services, and the sudden spike in demand has overwhelmed local hospitals, particularly in urban centers.

Similarly, the education system has been stretched thin. The Ministry of Education in Moldova has reported overcrowding in schools, with an increased need for educational materials and teachers who can provide instruction in both Romanian and Ukrainian (UNHCR, 2023). This has led to the diversion of funds that would have otherwise been used for general education system improvements. The strain on housing has also been particularly severe. While the Moldovan government has provided temporary shelters for refugees, the sheer number of people arriving has led to overcrowded conditions and rising rental prices in cities like Chisinau, where most refugees have settled. According to IOM (2024), rental prices have increased by up to 20% in some urban areas due to competition between refugees and local residents. This has further strained the local economy, as displaced Ukrainians often cannot afford private housing without support.

Unemployment and labour market challenges

Moldova's job market, already limited in scope, has been further strained by the influx of refugees. The International Labour Organization (ILO, 2024) reports that the unemployment rate in Moldova has risen, partly due to the competition for jobs between refugees and local populations. Refugees have found it difficult to integrate into the formal job market, largely due to language barriers, lack of job recognition, and the country's informal economy structure. Mostly refugees have been employed in agriculture sector, manual labour activities, and informal sector jobs. This provide a little economic stability.

Ukrainian war refugees are not able to find employment in their respective fields. This also negatively impact on the Moldova's productivity. The refugees from the urban areas of Ukraine have higher education and high professional skills. But these refugees are working at lower salaries and temporary jobs. This situation leads the path to underemployment. And it further exacerbates the pressure on the Moldova's economy. The government of Moldova need to create effective employment integration policies for refugees. It will help to counter the phenomena of marginalization of refugees in Moldova's labour market. In addition, it will contribute the economy of Moldova. The International Labour Organization (2024) inks that strong efforts are required to provide the language training for refugee employment. In addition, recognition of foreign qualifications is also essential.

Economic pressure on Romania

Romania has more diverse and bigger economy that Moldova. But the government of Romania has a big challenge to manage the large number of Ukrainian war refugees. Because of larger refugees influx, the Romanian economy is experiencing a high pressure.

Reduction of GDP

Romania is experiencing a decline in economic growth because of the high refugees influx. Romanian economy is not declining as quickly as Moldova's economy but the country is in problems. The European Commission (2024) reported that Romania's GDP growth rate has slowed from 4.5% in 2023 and 2.8% in 2024 respectively. This happens because of increased public spending on refugee related services.

The increased demand for housing, food, healthcare, and other basic goods has driven up prices, contributing to inflation. According to the National Bank of Romania (2024), inflation has risen by 4.2% in the past year, with housing costs increasing by 7.5%, largely driven by the refugee crisis. While inflation in Romania is relatively contained compared to other parts of Europe, the refugee crisis has been a significant contributor to the increase in living costs for the local population.

Strain on housing markets and rental prices

One of the most visible economic impacts in Romania has been the surge in housing costs, particularly in cities like Bucharest and Cluj-Napoca, where refugees have concentrated. The European Commission (2024) highlights that rental prices have increased by 10-15% in these urban centres as demand for temporary housing rises. This has made it more difficult for both refugees and local low income populations to find affordable housing, increasing the risk of homelessness and social unrest. The government has struggled to meet the demand for temporary housing, and while it has received support from the European Union to build more shelters, the process of building new accommodation has been slow and hindered by bureaucratic delays. Moreover, the demand for rental properties has had a knock-on effect on the broader housing market, driving up the cost of homeownership and further straining local economies.

Pressure on social welfare systems

Romania's social welfare system has also been under significant strain due to the refugee crisis. While the country's welfare infrastructure is more developed than Moldova's, it is still struggling to cope with the large influx of refugees. The IOM (2024) reports that Romania has increased spending on housing allowances, healthcare subsidies, and unemployment benefits for refugees, which has put additional pressure on the national budget.

Furthermore, the need for social integration programs such as language courses, vocational training, and legal assistance has increased significantly. The European Union has provided funding for these initiatives, but the scale of the refugee crisis has outpaced the support available. As a result, many refugees remain in a state of economic dependency, relying on state support to meet basic needs.

Labour market integration and unemployment

The Romanian labour market has had some success in integrating refugees into the workforce, particularly in cities where there are established networks and employment programs. However, labour market integration has been slow, particularly in rural areas. The IOM (2024) reports that refugees face challenges in securing formal employment due to language barriers, differences in educational systems, and the non-recognition of Ukrainian professional qualifications. As with Moldova, many refugees have found work in low wage and temporary sectors, such as agriculture, construction, and hospitality. The unemployment rate among refugees in Romania remains high, and integration into the formal labour market has been limited by structural issues in both the local and national economies (EU, 2024).

Resolving the Russia Ukraine conflict

Both Ukraine and Russia are part of the East Slavic group of nations, sharing deep cultural, historical, and religious ties. Their similarities in traditions and beliefs are rooted in centuries of shared history. However, the ongoing conflict between Russia and Ukraine, referred to by Russia as a "Special Military Operation," is not in the best economic interests of many global players, including the United States under the leadership of President Donald Trump, as well as Pakistan, Europe, and other countries around the world.

The government of Ukraine under the leadership of President Volodymyr Zelenskyy should engage in direct dialogue with the Russian government under the leadership of President Vladimir Vladimirovich Putin to address and resolve the root causes that led to the conflict in the first place. Through open negotiations and mutual understanding, the two sides can work together to eliminate the factors that escalated tensions and led to the war. Foreign ministries of the both Russian Federation and Ukraine should clearly write the conditions on its ministries website to end the war. After this negotiations can start between the two countries.

The United States under the leadership of Donald Trump and President of the European Commission Ursula von der Leyen could play a key role in facilitating and supporting this peace process. The implementation of United States and Ukraine rare earth minerals deal is possible, if there will be a complete peace with neighbouring Russian Federation.

Ending the Russia Ukraine conflict would bring significant benefits, especially for the Ukrainian refugees who have been displaced by the war and are now living in countries like Moldova, Romania, Russia, and various other European countries. A peaceful resolution would provide these refugees with the opportunity to return to Ukraine and rebuild their lives. It will help restore stability to the Europe. Pakistan based company Pakneftegaz is proposing to provide skilled manpower including engineers for the execution of rare earth minerals deal and reconstruction of Ukraine.

Conclusion

1. Economic burden on Moldova and Ukraine

The Ukrainian refugee crisis has placed a tremendous economic burden on both Moldova and Romania. Moldova has smaller economy. It has faced a more severe impact. It experienced decline in gross domestic product and significant pressure on housing and healthcare facilities. Romania, is also experiencing inflationary pressures, rising housing costs, and pressure on social welfare systems.

2. Social integration challenges of refugees

Both Moldova and Romania are facing challenges in integrating refugees into their social systems. Moldova has limited resources as compare to Romania. The obstacles for social integration are Language barriers, unfamiliarity with local systems, and limited access to employment opportunities. In Romania, healthcare facilities, education, and housing sectors are under stressed because of large refugee influx.

3. Impact on the employment

Refugees in both Moldova and Romania have faced difficulties in accessing formal employment. Many have found work in the informal sector or in low paid jobs. Domain specific Ukrainian refugee professionals cannot find jobs because of language barriers and the non recognition of Ukrainian qualifications. The result is no economic contribution in the host countries economy.

4. Psychosocial struggles and mental health needs

The psychological impact of displacement has been another crucial issue. Refugees from Ukraine often face mental health challenges, including trauma, anxiety, and depression. Both Moldova and Romania have insufficient mental health support systems to address these issues, particularly in Moldova, where resources are more limited. Providing adequate mental health care is essential for the long-term integration and wellbeing of refugees.

5. The need for sustainable solutions

The findings suggest that both Moldova and Romania need more sustainable, long term strategies for integrating refugees. These strategies should include better access to education, language training, job recognition programs, and mental health support. Additionally, more international aid and cooperation are necessary to alleviate the financial strain on these countries and help them meet the needs of the growing refugee population.

6. Positive long term outlook

Despite the immediate challenges, there is a potential for refugees to contribute positively to the host economies in the long term. With effective integration programs, refugees can fill labour shortages, contribute to the local economy, and support demographic growth in countries facing aging populations. The success of refugee integration hinges on the availability of comprehensive support systems that enable refugees to rebuild their lives and fully participate in society.

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EXPLORING THE EMPLOYABILITY LANDSCAPE THROUGH BIBLIOMETRIC ANALYSIS (1980-2025)

DOI: <https://doi.org/10.53486/dri2025.08>

UDC: 331.5:001.891

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Abstract: *The concept of employability has evolved into a multifaceted and increasingly vital issue arising from the interplay between structural labour market changes, educational institutions, and individual skills. The subject remains divided, particularly in economics, where no thorough synthesis has been provided, and the topic is relatively neglected in scholarly debate.*

This study conducts a bibliometric analysis using the Biblioshiny interface in RStudio, focusing on articles indexed in the Web of Science database from 1980 to 2025. The aim is to map employability research's intellectual structure and thematic development within the economic journals.

The analysis reveals steady growth in scholarly output, an expanding thematic focus, and a noticeable shift toward interdisciplinary perspectives that connect economics with education, psychology, and public policy. The paper's primary contributions include identifying key sources and authors, developing core concepts, and recognising new underexplored themes such as digital skills and entrepreneurial readiness. This study provides a systematic overview, thus offering a valuable foundation for future research and contributing to a more integrated understanding of employability within and beyond economics.

The research provides a systematic overview that serves as a valuable starting point for further studies and deepens the overall understanding of employability in economics and other domains.

Key words: *employability, labour market, bibliometric analysis, Web of Science database*

JEL: J24, I26

1. Introduction

Over time, employability has developed into a key topic of interest, shaped by ongoing debates in academia, policy circles, and the labour market. The ability of individuals to find and maintain employment has become crucial as labour markets transform due to technological advancements and global economic changes. Historically, the concept of employability relied on individual skills; however, researchers now recognise that it results from personal characteristics, educational background, socio-economic conditions, and institutional frameworks (Tomlinson, 2012; McQuaid and Lindsay, 2005). The shift from job security to career adaptability and lifelong learning has compelled institutions, employers, and policymakers to develop new strategies for labour market preparedness (Jackson and Tomlinson, 2020; Baruch and Rousseau, 2019). While numerous research studies on employability exist, there is a lack of thorough reviews summarising the academic literature. The systematic and quantitative research method of bibliometric analysis helps identify patterns in academic development.

This paper uses Biblioshiny in RStudio to analyse employability-related publications in economics included in the Web of Science (WoS) database between 1980 and 2025. It aims to identify key contributors, trace thematic patterns, and uncover underexplored areas. The guiding research question

is: *How has the academic literature on employability evolved within the context of economics-related research over the last four decades?* The study assumes an increasingly interdisciplinary and thematically diverse evolution of this field.

This paper is organised into five sections. The first section outlines the study's context and aims. The second engages with relevant literature. The third explains the methodological approach. The fourth section presents the results and their interpretation. Finally, the fifth offers concluding remarks and suggestions for further research.

2. Literature review

The concept of employability has evolved significantly, reflecting its interdisciplinary nature and growing relevance in academic and policy discussions. Early definitions centred on skills necessary for gaining and retaining employment (Van der Heijde and Van der Heijden, 2006; Hillage and Pollard, 1998). Gradually, employability became viewed as a dynamic psycho-social construct involving adaptability, identity, and human capital (Lo Presti and Pluviano, 2016; De Cuyper et al., 2012; Fugate, Kinicki and Ashforth, 2004).

Much research has explored perceived employability as a mediating factor between individual characteristics and employment outcomes (Vanhercke et al., 2014; Rothwell and Arnold, 2007; De Witte and Näswall, 2003). In parallel, studies have highlighted the positive influence of proactive career behaviours—such as job crafting, adaptability, and career self-management—on job satisfaction and performance (Akkermans and Tims, 2017; Clarke, 2017; Shoss, 2017; Schaufeli, 2015).

From an organisational standpoint, employability is closely tied to supportive HRM practices, a culture of continuous learning, and a shared responsibility between individuals and institutions (De Vos et al., 2011; Wittekind, Raeder and Grote, 2010; Baruch and Rousseau, 2019; Thijssen, Van der Heijden and Rocco, 2008; McQuaid and Lindsay, 2005).

In the educational domain, research has examined how higher education contributes to employability by fostering transferable, entrepreneurial, and experiential skills (Donald et al., 2018; Tomlinson, 2012). However, enduring mismatches between educational outcomes and labour market demands have led some scholars to advocate using employability as a metric in educational performance assessment (Jackson and Tomlinson, 2020; Pitan, 2016; Brunello and Schlotter, 2007).

Recent scholarship has also adopted intersectional and longitudinal lenses, analysing how variables such as gender, social class, and cultural background influence both employability perceptions and labour market access (Lo Presti and Pluviano, 2016; Dacre Pool and Qualter, 2013; Berntson, Sverke and Marklund, 2006). At the same time, entrepreneurship has gained traction as an alternative employability pathway, particularly amid youth unemployment and volatile labour conditions (Nabi et al., 2017; McKeever, Jack and Anderson, 2015).

Emerging bibliometric studies provide meta-level insights into the structure and trajectory of employability research. For example, Jackson and Bridgstock (2021) and Roslan et al. (2022) identify a growing scholarly interest in the field but highlight its theoretical fragmentation. Varghese and Senthil (2023) underscore the thematic dispersion across education, psychology, and policy domains. Similarly, Zamberi Ahmad and Rashid (2024) stress the increasing importance of entrepreneurial and digital competencies, while Sanni and Ekundayo (2023) call for more longitudinal and interdisciplinary bibliometric methodologies.

These findings reveal several dominant research orientations: individual-level investigations focus on personal agency, adaptability, and career self-management; organisational studies examine workplace learning and HRM; educational research explores the role of institutions in skill development; and economic approaches assess structural mismatches and policy responses. Despite its richness, the literature lacks a holistic synthesis which justifies applying a bibliometric approach to map conceptual developments, bridge thematic divides, and inform future research priorities.

3. Methodology

This study employs a quantitative approach through bibliometric analysis to investigate the evolution and characteristics of scientific production on employability within economics-related academic literature. The analysis was conducted using RStudio and the Biblioshiny package for statistical and visual exploration of bibliometric data. The dataset from the WoS includes 1,932 articles published between 1980 and 2025, selected in April 2025 using the keyword "employability." A subject-area filter was applied to focus on journals in the Business, Economics, Management, and Business Finance categories. The study is limited to WoS-indexed, English-language publications. Initially, the search returned 11,740 documents, which were then refined using classification filters to focus on economics-related content. The analysis focused on several bibliometric indicators, including general dataset information, most relevant sources, influential authors, highly cited documents, word frequency (word cloud), co-occurrence networks, and historiographic mapping. Bibliometric analysis, a well-established quantitative method, enables the evaluation of research structure, dynamics, and impact by identifying key contributors, conceptual trends, and academic collaboration networks. This methodological approach is aligned with the study's aim to map the conceptual structure and thematic evolution of the employability discourse in economics over the past 45 years.

4. Results and discussions

This section presents the dataset retrieved from the WoS database and the analysis results for the research period from 1980 to 2025. Using RStudio's Biblioshiny, a dataset of articles on employability published in Business, Economics, Management, and Business and Finance journals has been extracted and is summarised below.

Figure 1 presents the main descriptive insights for the analysed dataset. The sample comprises 788 sources, exhibiting an annual publication growth rate of 7.37%. On average, each document received 15.53 citations and has an age of approximately 7.71 years. A total of 75142 references were identified across the dataset. Furthermore, the corpus includes 4568 distinct author keywords and contributions from 4317 unique authors, all addressing employability-related themes. Of the 1932 documents analysed, 348 were single-authored, while the remainder were co-authored, with 22.98% reflecting instances of international collaboration.



Figure 1. Main information

Source: Author's creation

The analysis of the most relevant sources (Figure 2) highlights a multidimensional approach to employability. *Career Development International* (74 articles) is the primary source, focusing on professional mobility, career transitions, and the competencies required for workforce integration. The *International Journal of Management Education* is the second most relevant source, with 61 articles. It explores the role of managerial education in preparing professionals for the challenges of the labour market. Sources from the field of human resources, such as *The International Journal of Human Resource Management* (45 articles) and *Personnel Review* (43 articles), analyse organisational policies and their impact on employability. The *International Journal of Manpower* (37

articles) adds an economic dimension by discussing the economic influences on the labour market. Other relevant sources, such as *Accounting Education* (32 articles), *International Journal of Training and Development* (29 articles), *European Journal of Work and Organizational Psychology* (24 articles), *Work Employment and Society* (21 articles), and *Employee Relations* (17 articles), address continuing education skill development, and psychological and organisational factors.

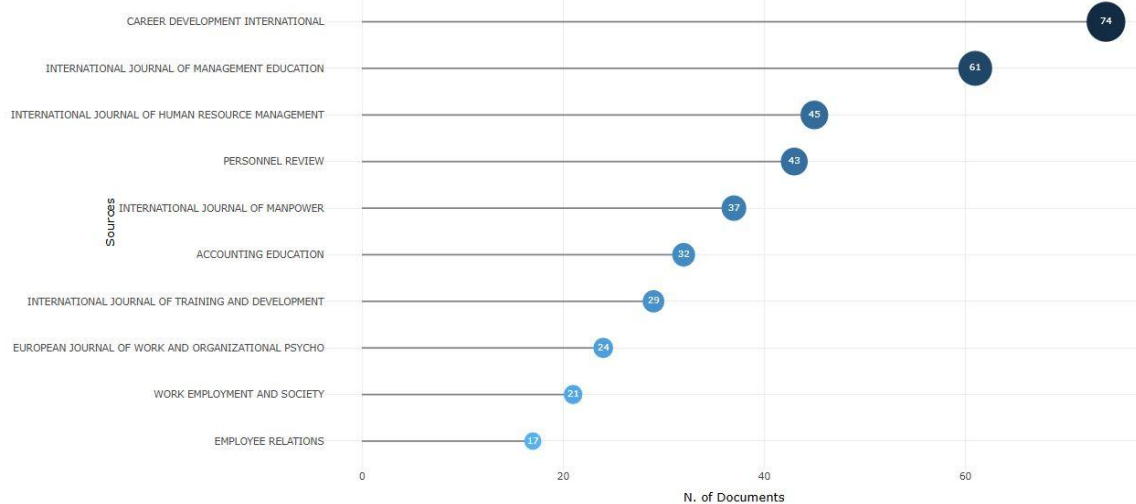


Figure 2. Top 10 Most Relevant Sources

Source: Author's creation

Figure 3 displays the top 10 influential authors with at least nine publications. Van der Heijden BIJM stands out as the most prolific contributor, with 27 articles, closely followed by De Cuyper N (26 articles) and Van der Heijden B (22 articles). This sustained involvement reflects a significant and continuous contribution to employability research, essential for strengthening the academic literature in this field. Noteworthy authors include De Witte H, with 17 articles, followed by Forrier A (15) and Akkermans J (14). Additionally, Donald WE and Jackson D have each published 11 articles, while Lo Presti A and Baruch Y have contributed 10 and 9 articles, respectively.

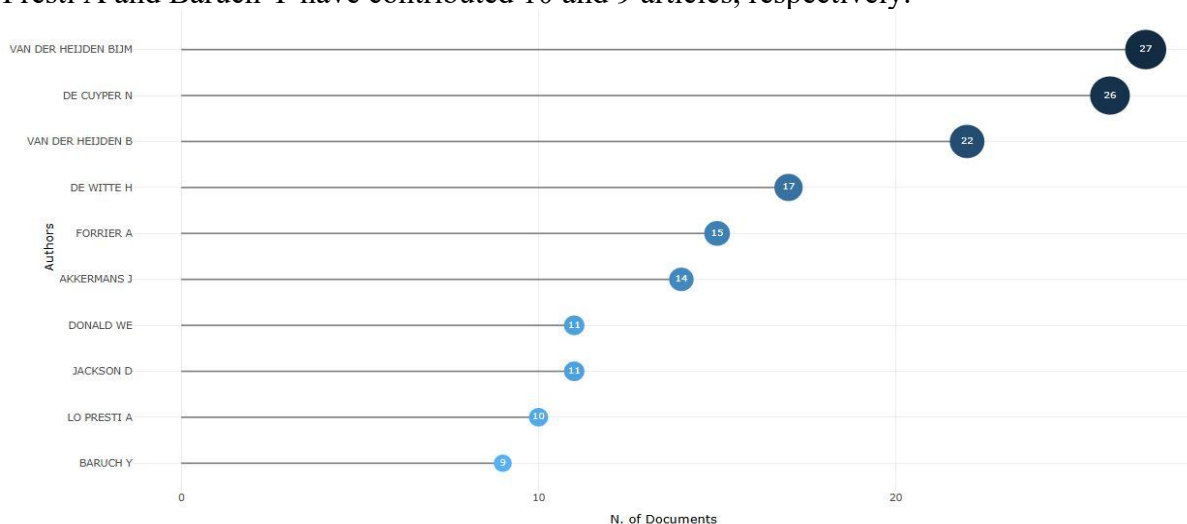


Figure 3. Top 10 Most Relevant Authors

Source: Author's creation

Table 1 ranks documents in the field of employability published in journals classified under management, business, business finance, and economics. The selected documents demonstrate the

multifaceted nature of employability, shaped by individual capabilities, institutional practices, and structural economic factors. The document at the top, by Van Der Heijde C.M. (2006) in *Human Resource Management: Published in Cooperation with the School of Business Administration*, holds a significant lead with 623 total citations and an annual citation rate 31.15. This paper has a normalised citation score of 8.20, indicating substantial influence and broad recognition in the field. Following this, Shoss MK's (2017) work in the *Journal of Management* has 516 citations and an exceptional annual citation rate of 57.33. This indicates the paper's recent popularity and significant impact on current employability and human resources research. Its normalised citation score of 31.7—the highest among all analysed works—reflects outstanding scholarly influence.

Rothwell A. (2007), with the paper published in *Personnel Review*, ranks third with 503 citations and an annual citation rate of 26.47. The normalised citation score of 11.13 suggests a consistent and relevant influence in the field.

McKeever's (2015) and Vanhercke's (2014) works exhibit high normalised citation scores, reflecting their growing impact in the past decade. Other contributions, such as those by Schaufeli (2015), Fugate (2008), Wittekind (2010), and De Cuyper (2012), demonstrate sustained relevance in organisational and psychological perspectives on employability. Additionally, Brunello's (2007) study introduces a distinct economic viewpoint, further underscoring the multidisciplinary character of the core literature.

McKeever's (2015) and Vanhercke's (2014) works stand out with high normalised citation scores (13.70 and 19.69, respectively) and annual citation rates of 29.45 and 25.58, reflecting a growing impact over the past decade. Other contributions, such as those by Schaufeli (2015) – 24.27 citations per year, normalised score 11.29; Fugate (2008) – 14.78 citations per year, score 8.89; Wittekind (2010) – 14.81 citations per year, score 9.12; and De Cuyper (2012) – 16.71 citations per year, score 8.85, demonstrate sustained relevance within organisational and psychological perspectives on employability. Additionally, Brunello's (2007) study, with 13.32 citations per year and a normalised score of 5.60, offers a distinct economic viewpoint, underscoring the multidisciplinary nature of the core literature.

Table 1. Top 10 Most Impactful Documents

Paper	Total Citations	TC per Year	Normalised TC
Van Der Heijde CM, 2006, <i>Hum Resour Manage-US</i>	623	31.15	8.20
Shoss MK, 2017, <i>J Manage</i>	516	57.33	31.74
Rothwell A, 2007, <i>Pers Rev</i>	503	26.47	11.13
McKeever, E. (2015). <i>J Bus Venturing</i>	324	29.45	13.70
Vanhercke D, 2014, <i>Pers Rev</i>	307	25.58	19.69
Schaufeli WB, 2015, <i>Career Dev Int</i>	267	24.27	11.29
Fugate M, (2008). <i>J Occup Organ Psych</i>	266	14.78	8.89
Brunello G, 2007, <i>Econ Policy</i>	253	13.32	5.60
Wittekind A, 2010, <i>J Organ Behav</i>	237	14.81	9.12
De Cuyper N (2012). <i>J Organ Behav</i>	234	16.71	8.85

Source: Author's creation

The word cloud (Figure 4) analysis highlights employability as the central concept, with the highest frequency (f=276), indicating its dominant presence in the literature. Closely associated terms such as performance (f=172), work (f=169), and employment (f=133) suggest a strong link between employability and workplace outcomes. The prominence of impact, education, and perceived employability reflects the importance of external factors and individual perceptions in shaping

Figure 6 emphasises fundamental aspects of employability, such as competence development, self-assessment of employability, and the relationship between career success and employability. For example, the works of Van der Heijden (2009, 2002) and De Cuyper (2012) have significantly influenced the definition and refinement of employability theory.

Research in this area shows that employability depends not just on a person's skills, but also on how these fit within the workplace context. Factors such as changes in professional careers, self-assessments, and job satisfaction are crucial in defining employability. Additionally, articles examining the self-assessment of employability and proactive employee behaviours (such as those by Fugate, 2008, and Rothwell, 2007) contribute to understanding how individuals perceive their employability and how this perception influences their performance in the labour market.

Most of these works are highly cited, suggesting they have significantly impacted academic research and practical applications. Moreover, the growing trend of citations reflects their ongoing integration into academic discussions and policies regarding the labour market and professional careers, underscoring the relevance of this research area.

In conclusion, these works significantly impact the theoretical and practical development of the employability concept, influencing academic research and human resources' organisational and strategic policies.

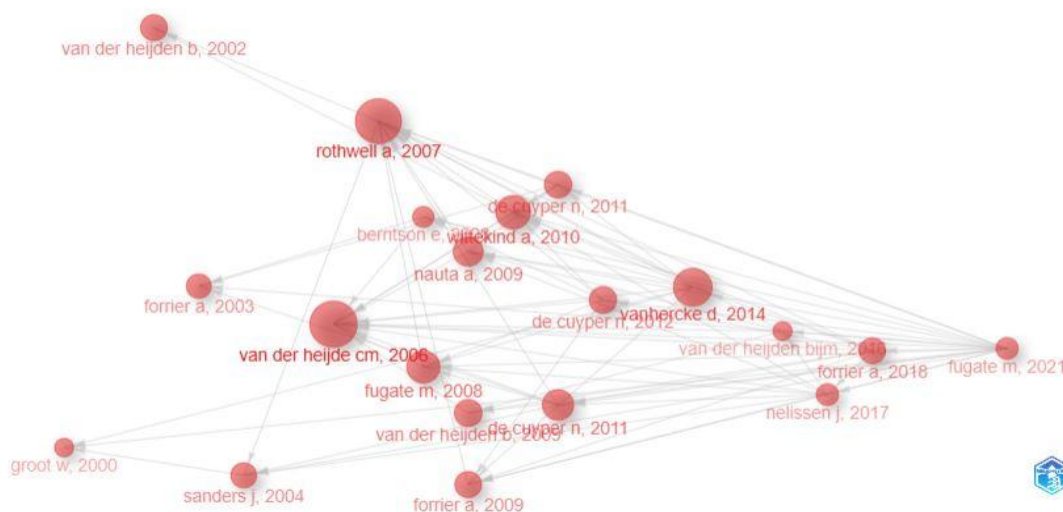


Figure 6. Histogram

Source: Author's creation

The bibliometric analysis indicates a significant increase in academic interest in employability within the economic context, especially post-2000. The literature primarily focuses on skills, higher education, and career adaptability. However, theoretical fragmentation persists, with few studies integrating economic, educational, and organisational perspectives. Most contributions originate from developed countries while emerging regions remain underrepresented. International collaborations are growing, yet they are still confined to regional networks. Employability's digital and entrepreneurial aspects are expanding, offering new research opportunities. The field is becoming increasingly interdisciplinary; however, the lack of unified conceptual frameworks affects coherence. These findings highlight the need for integrated approaches and more longitudinal methods in future studies.

5. Conclusions

This paper presents a bibliometric analysis of employability-related literature in economics, highlighting the field's growth and diversification from 1980 to 2025. It identifies key themes, influential authors, major journals, and evolving research interests. One significant contribution demonstrates how employability has increasingly become interdisciplinary, bridging economics with education, psychology, and policy studies.

The findings highlight less-explored areas, such as longitudinal approaches and integrating digital and entrepreneurial skills. These results help researchers, educators, and policymakers better understand the structure of the field and more effectively focus future work. However, the study is limited by its reliance on a single database (WoS) and its focus on economics, which might not fully capture other relevant perspectives.

The study effectively addresses the research question by offering an overview of how employability research has evolved within economics. It highlights shifts in focus over time, the emergence of interdisciplinary studies, and areas where further research is needed. In conclusion, this bibliometric approach provides valuable insights into studying employability in economic contexts. It establishes a foundation for deeper research, improved academic collaboration, and informed educational and labour market policy decision-making.

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TRANSFORMATIONS OF THE ECONOMIC STRUCTURE IN SMALL AND MEDIUM-SIZED CITIES (ON THE EXAMPLE OF THE CITIES OF ZĂRNEȘTI-ROMANIA AND STRĂȘENI-REP. MOLDOVA): ADAPTATION TO THE MARKET ECONOMY

DOI: <https://doi.org/10.53486/dri2025.09>

UDC: [711.4:332.1]:330.34(478+498)

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Abstract: *Small and medium-sized cities, regardless of their demographic size or their area of influence, have different territorial relationships that ensure their existence and that can define their area of urban influence. Any city has its area of influence over adjacent localities, it is characterized by its own structure that gives it certain types of relationships with them. Depending on certain particularities such as the level of development of the countries to which it belongs, the geographical position and location in the terrain, the density of urban centers and the size of the city, the coverage area of the area of influence of the respective city can be established.*

The geographical location of the two cities, represented by their location in the terrain in adjacent areas of major cities for example (Brașov, in the case of the city of Zărnești) and Chișinău (in the case of the city of Strășeni), has largely influenced the direction of their development, having many common features both in terms of achievements and outlook. Respectively, it follows a series of transformations in the economic structures of small and medium-sized cities (respectively the city of Zărnești in Romania and Strășeni in the Republic of Moldova and the study of these researches to adapt to the market economy. Through classical geographical methods, the qualitative and quantitative assessment of the economy of these cities will be carried out on the one hand, this research).

Keywords: *economic transformations; small and medium-sized cities; market economy; doctoral study.*

JEL classification: R.R1, O.O13, Î1.

Introduction

Currently, globally we find ourselves in a world in constant change.

Whether we are referring to a country, a continent, or a global level, we identify large gaps between the performances obtained by small and medium-sized cities compared to the rest of the cities, especially the capital cities.

Both at the European level and at the Global level, cities have a particular importance in the regional development of the countries to which they belong. In the last 30 years, many of these cities have undergone considerable economic transformations, some of their enterprises have been closed down because they were no longer profitable, or have been forced to change their profile through reconversion. [3].

This article refers to the cities of Zărnești in Romania and the municipality of Strășeni in the Republic of Moldova in the context of regional development and local competitiveness through the application of legal instruments, such as local development strategies, programs and projects.

The role that cities play in innovation and in the creation of new economic opportunities, determines them to enter into continuous competition at both national, European and global levels. [4]. A pressing problem that has emerged in recent decades at the global and European levels has been the use of natural resources, land within their perimeter, as well as heritage. These situations have arisen in both Romania and the Republic of Moldova, constituting important topics on the agenda. Currently, the two sister states are facing the same situations, and their urban localities are experiencing major

problems in terms of the modernization of transport systems, the re-engineering of enterprises, as well as the interest in how to capitalize on spatial resources that target these two countries. [4].

After 1991, in both Romanian states, the markets disappeared, and the long road to the market economy left its mark even more on the increasingly difficult development of cities, many of the small and medium-sized cities, including Zărnești and Strășeni, which in certain fields of activity, had to be re-engineered and re-profiled in order to produce finished products that could face the competition in the market. [4]. Thus, in many small and medium-sized cities on both banks of the Prut, sustained efforts are being made to overcome these situations. [2].

The comparative study undertaken here is included in a larger research that targets two cities located west and east of the Prut River and is the subject of a doctoral study.

The city of Zărnești is located in central Romania at the foot of the Piatra Craiului Massif and belongs to the Central Development Region. At the level of Brașov County, the city is located in the central south part, in the Țara Bârsei Region, approx. 30 km southwest of the city of Brașov, occupying an area of 204.75 km², which represents 3.78% of the county's area. The locality of Zărnești has a population of 25,741 inhabitants. (01.01.2024, [13], accessed: 05.05.2025). Zărnești was declared a city in 1951, and since 1968, it has included the village of Tohanul Nou, located 5 km away. *Table 1, Table 2.* Access to Zărnești can be done by road using DN 73 and DN 73 A, as well as the railway, Brașov-Zărnești, which is the terminal point. [6], [8], [10].

Geographically, the city of Straseneni is located in Straseneni District, a district that is included in the Central Development Region of the Republic of Moldova. Straseneni is documented in 1545, and in the second half of the 20th century, it becomes an important industrial center. Starting with 2016, Straseneni was proclaimed a municipality, with a population of 19,225 in 2024, *Source: Table 1*, [12]. Located on the banks of the Bâc River, Straseneni municipality is located at a distance of approx. 25 km from Chisinau, in the north-west direction. The administrative territory of the city and totals 60.82 km². The municipality also includes the village of Făgureni, located at a distance of 5 km west of it. *Table 1, Table 2.* [9].

Table 1. Area and population of the localities of Zărnești and Strășeni in 2024

No. crt.	City name	Area	Population
1	Zărnești	204,75 km ²	25 741 people at 01.01.2024
2	Strășeni	60,82 km ²	19 225 people at 01.01.2024

Source: I.N.S. Tempo Online, Romania and <https://worldpopulationreview.com/countries/cities/moldova>

Table 2. Additional details about the localities of Zărnești and Strășeni

No. crt.	City name	Year of documentary attestation	Year of declaration as a city	Year of declaration as a municipality	The village belonging to
1	Zărnești	1373	1951	-	Tohanul Nou
2	Strășeni	1545	1965	2016	Făgureni

Source: Zărnești City Hall (Registration Service); Strășeni City Hall (Registration Department)

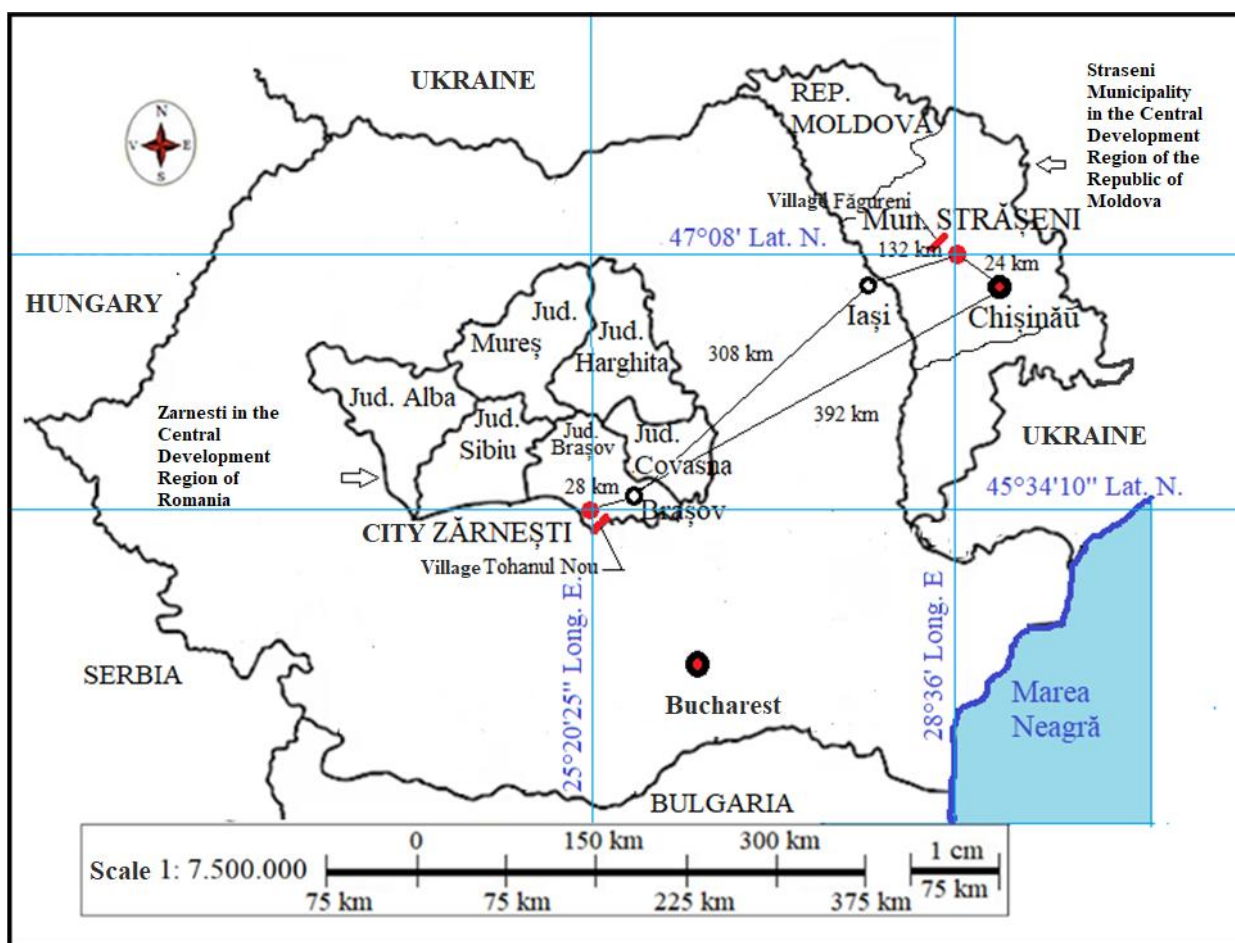


Figure 1. Location of Zărnești city on the map of Romania and of Strașeni Municipality on the map of the Republic of Moldova (map processed and adapted by the author).

Source of map outline: <https://www.twinkl.ro/resource/ro2-g-3-vecinii-romaniei-fia-de-lucru>

Among the common features of these cities, it can be mentioned that in the past both cities had a centralized system, the economic structures were rigid, presented a low adaptability to the current system of transition to a market economy and had a poor use of economic and human potential.

The strategic development plans of these cities do not fully reflect the requirements of sustainable development. The European legislation applied over 17 years as a member of the European Union, had major repercussions in the development of small and medium-sized cities in good conditions in the context of territorial decentralization, this experience can be taken over and adapted among the cities of the Republic of Moldova.

The land fund is insufficiently exploited in both localities, and today the imprint of their socialist past is still preserved. In Zărnești, the emphasis is on the development of small and medium-sized enterprises (SMEs). Both in Romania and in the Republic of Moldova there is the right of ownership of agricultural land.

Regarding the use and exploitation of land, in both countries there are a series of laws and normative acts that regulate their proper use, such as: LAW no. 3 of December 28, 1962 on the FORESTRY CODE, from Romania; Land Fund Law no. 18/1991 - amendments (Law no. 231/2018); Environmental Protection Law no. 137/1995 from Romania and others, and Laws from the Republic of Moldova such as: Law no. 121-XVI/04.05.2007 on the administration and nationalization of public property; Law on the cadastre of real estate no. 1543-XIII/25.02.1998; Law No. 91-XVI/5.04.2007, on public property lands and their delimitation, etc.

Currently, both localities are developing quite dynamically, with the intention of adapting and coping with the regional competition of cities, in the current context of decentralization applied through regional development policy, their transition being marked by both achievements and failures. Source: [7]. Both cities are tourist localities, especially Zărnești, and Strășeni is a tourist city in the making.

Among the problems with economic specificity, the following can be mentioned: inadequate capitalization of economic potential, poor adaptability to the requirements of the internal and external market, the presence of poorly competitive economic entities, the lack of well-paid jobs, the large number of people unemployed of various types, and others. [4].

The emphasis is on the study, knowledge and evaluation of the economic and human potential existing in these two localities, located in different countries, which, although they are at a considerable distance, are linked by certain common features regarding the geodemographic and geoeconomic evolution. [1]. Regarding human potential, it can be stated that in recent decades the population of Zărnești has had an average of approx. 26,000 inhabitants/year, and that of Strășeni has remained around 20,000, both populations having a slight fluctuation towards linear.

Materials and methods

The author set as an important goal the realization of a comparative study of the two cities, of the way of their integration, in the urban system of Romania and the Republic of Moldova, respectively. Moldova, in the context of economic decentralization achieved through regional development policy and to highlight both the similarities and differences of the problems faced by these medium-sized cities, their origin, as well as the ways to solve them. Thus, the author conducted a comparative analysis of the two Romanian cities, located in different countries on the left and right of the Prut, and at the same time followed and evaluated the stages of their sustainable development and how they can adapt to the market economy.

In the approach of this article, the comparison method was used, emphasizing the similarities, but also the differences from a geographical point of view between the two cities, as well as the potential they have. This method is frequently used in human geography and offers the possibility of highlighting which of the two cities, through the instruments and actions taken, were more effective in what we call socio-economic development..

When studying the two cities, various research methods specific to Human Geography were used (analytical, historical, comparative, observation and geographical description). Many of the reference data were obtained from the services of the city halls of the two cities. Through the comparative analysis, it was found that the two cities under study do not have the same degree of economic development, because the branches of the economy of the two localities differ, and the strategic development plans of these cities do not fully reflect the requirements of sustainable development.

Among other methods specific to Human Geography, the following methods were used in the evaluation process: historical, mathematical and geographical description, and the data used were extracted from the yearbooks and statistical publications of the National Bureau of Statistics of the Republic of Moldova, from those of the National Institute of Statistics of Romania - through the Brașov County Directorate of Statistics, as well as from the City Halls of the two localities. At the same time, the author tried to identify to what extent these two cities, somewhat close in economic potential, having average dimensions in terms of demographic component, can adapt to the new conditions of socio-economic development, as well as to what extent the regional and local development policy allows them to develop their own identity and to value the local potential they have, in order to face urban competition.

Results and discussions

For several decades now, the world economy has been in recession, affecting both developed and developing countries. In both Romania and the Republic of Moldova, the long road of transition to a market economy has worsened the economic situation of the two countries. The consequences of these economic transformations have been similar to those of developed countries, and economic

problems are in an alarming decline. [3]. Among the most acute economic problems that are the subject of discussion are: the economic degradation that has occurred in the last 3 decades, the loss of markets in both countries, the poor adaptation of the economic structure to market requirements, structures not adapted to the existing potential.

Even if the situation in these cities is apparently relatively good compared to other cities in the regions they are part of, they are faced with a number of common, but also specific, problems in the current context of the socio-economic transitions they are experiencing. [3].

Through a brief analysis of the two cities, the author intends to highlight both the similarities and differences in the problems faced by these medium-sized cities, their origin, and the ways to solve them. The town of Zărnești has experienced several stages of economic development: a stage of development during the communist period from the 1960s to the 1990s, then a period of decline from 1990 to 2000, and again a stage of "economic recovery" from the 2000s to the present. Between the 1960s and 1990s, forced industrialization took place throughout Romania, including Zărnești. The city experienced industrial development until the 1990s, then a period of regression occurred that lasted until around the 2000s. During this period, a number of economic units were closed down, many reduced their activity, and others were re-profiled. Since there is an Industrial Park on the city's territory, established around the 2000s, a number of new units were established here. The Industrial Park offers cheap labor and qualified personnel in various fields, with several companies with different profiles operating here. [10]. In recent years, part of the industry in Zărnești has reoriented itself towards the processing of resources, but also of locally existing products. Currently, the workforce is qualified for the industrial field, but this requires re-specialization for the tertiary sector (services field), which currently has future prospects (natural tourist potential). [11].

On the territory of the Straseni locality, there are approximately 2,780 registered and active economic agents. [9]. [12]. A prominent place is occupied by the food industry, especially the wine industry. Straseni municipality is distinguished by its chemical industry, machine building industry and construction materials industry. [9].

Conclusions

The cities of Straseni and Zarnesti have a number of common, but also distinct features in their geodemographic and geoeconomic evolution, in the current period of transition that both states are going through. [4].

Both localities are part of the Central Development Zone of the countries they belong to;

The geographical location of the Zarnesti and Straseni localities near important cities, such as the city of Brasov, and the capital Chisinau, respectively, is a great advantage; [11], [12].

The lack of well-paid jobs can be noted in both cities, which accentuates the seriousness of the problem regarding both employment and economic growth, which has gained momentum recently; [4].

Economic recovery is possible in both cases through major capital investments from within, but especially from outside, and attracting investments by accessing national and international funds; [4].

The land fund is valued differently in both cities, preserving the imprint of the socialist past that these localities had. [5]. The strategic development plans of the two cities do not fully reflect the requirements of sustainable development. Today, both cities (Strășeni and Zărnești) are making efforts to create new jobs - some of the inhabitants of these localities, even migrating to other countries, in search of jobs. [4].

Currently, both cities are making efforts for continuous modernization on all levels.

The city of Strășeni has socio-demographic and socio-economic structures with a higher degree of instability, given the longer-term transition that the Republic of Moldova is going through. However, it has the conditions and infrastructure to become an important tourist city in the Central Development Region of the Republic of Moldova. [12].

Currently, the town of Straseneni is making great efforts to overcome the transition stage and move towards economic development. [4], [9].

The town of Straseneni is a budding tourist town with a developed infrastructure in this regard.

In recent decades, Zarnesti has experienced many qualitative transformations. For the foreseeable future, the increase in the number of Small and Medium Enterprises has been taken into account. [10]. The town offers high agricultural potential, and the climate and soils in the area allow the growth and development of plants in good conditions. [10].

In the field of tourism in Zarnesti, the existence of the Piatra Craiului Natural Park with a Mountain Rescue Service and high tourist potential usable throughout the year is noteworthy. The development of the tourist infrastructure by the end of 2025 aims to implement projects aimed at protecting the environment and ensuring the increase in the attractiveness of the area. [11].

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FROM FEEDBACK LOOP TO VICIOUS CIRCLE: THE INTERPLAY OF SCIENCE, ECONOMICS AND POLITICS IN THE AGE OF "PERMACRISIS"

DOI: <https://doi.org/10.53486/dri2025.10>

UDC: 001.891:330:32(478)

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Abstract: *Science, economy, and politics are fundamental pillars of Western civilization, contributing to societal progress through the development of democracy, technology, and capital accumulation. Yuval Noah Harari (2015) describes their interaction as the "feedback loop of the Scientific Revolution", a virtuous but fragile circle that transform itself into a vicious circle: democracy becomes a form without substance, science loses its independence, and capitalism, influenced by technology and corporate interests, captures the state, deepening inequalities and reshaping the essence of social contract. This potential degeneration has been theorized by authors like Chrystia Freeland (2012), who linked it to the rise of global "plutocrats", and Noam Chomsky (2018), who described the concentration of economic wealth and political power taking over the democratic state. The fundamental question is: to what extent has this loop maintained its virtuous quality, and to what extent has it been transformed into a vicious circle, especially in recent crises? What are the causes and consequences of this transformation? This paper analyses the dynamics of transformation on two levels: normative and descriptive, with a case study on Romania in the era of "polycrisis" (Tooze, 2022) and "permacrisis" (Koukakis, 2023).*

Key words: *science, economy, politics, feedback loop, vicious circle, crisis*

Introduction

Science, economy, and politics are fundamental pillars of Western civilization, contributing to societal progress through the development of democracy, technology, and capital accumulation. Yuval Noah Harari (2015) describes their interaction as the "feedback loop of the Scientific Revolution": political and economic institutions provide resources for research, which in turn offers new powers used to obtain new resources, partially reinvested in research. However, this balance is fragile and the "virtuous" loop can easily transform into a vicious circle: democracy becomes form without substance, science loses its independence (rationality and the quest for truth are abandoned), and capitalism, influenced by technology and corporate interests, degenerates, deepening polarization and inequalities.

This potential degeneration has been observed by authors like Chrystia Freeland (2012), who linked it to the rise of global super-rich elite, the "plutocrats", and Noam Chomsky (2017), who described a similar vicious circle where the concentration of economic wealth and political power captures the democratic state transforming it into its opposite, post-democracy (Crouch, 2004). The fundamental question is: to what extent has this loop maintained its virtuous quality, and to what extent has it transformed into a vicious circle, especially in recent crises? What are the causes and consequences of this involution?

This paper will analyze this dynamic on two levels: normative - how the relationship should function and descriptive - how it functions in reality, with a case study on Romania in the era of "polycrisis" and "permacrisis" (2020 -2025).

2. Conceptual Clarifications

To understand the dynamics between science, economy, and politics, clarification of certain concepts is necessary. A "feedback loop" is a cyclical process where the outcome of an action influences future actions (Stermann, 2000). There is "positive" feedback that amplifies change and has a destabilizing potential, and "negative" feedback that promotes stability (Meadows, 2008). These terms describe

effects (self-reinforcing vs. self-correcting), not value judgments (Ford, 2010). The concept is linked to circular causality and homeostasis, which are useful in analyzing complex socio-political systems (Richardson, 1991; Axelrod & Cohen, 2000).

The "feedback loop of the Scientific Revolution" as described by Harari (2015) consists of a self-amplifying positive dynamic of knowledge, resources, and power. Their interaction generates mutually beneficial results. "To progress, science needs more than research. It depends on the mutual reinforcement of science, politics, and economics. Political and economic institutions provide the resources without which scientific research is almost impossible. In return, scientific research provides new powers that are used, among other things, to obtain new resources, some of which are reinvested in research" (Harari, 2015, p. 278). This would be the "virtuous circle".

In contrast, a "vicious circle" is a self-perpetuating negative feedback loop where cause and effect reinforce each other destructively, blocking correction. In politics, it can explain, for example, democratic degradation: weakening control leads to corruption, generating mistrust, reducing participation, and allowing corruption to intensify (Diamond, 2008; Levitsky & Ziblatt, 2018). Concepts like "defective democracy" (Merkel, 2004) capture this dynamic.

The concepts of "permacrisis" (Tooze, 2022) and "polycrisis" (Koukakis, 2023) have emerged relatively recently in the literature. Analytically, they capture different dimensions of contemporary global challenges, reflecting both the duration and interconnectedness of the crises faced by political regimes and governments in a world portrayed as increasingly volatile and insecure.

The term "permacrisis" has been documented since the 1970s (in the context of French social policy), but only entered common parlance in 2022, after the COVID-19 pandemic, when it was chosen by Collins Dictionary as the word of the year. It is defined as "a prolonged period of instability and insecurity", reflecting post-pandemic societal anxiety. It is derived from "permanent crisis", describing a prolonged state of instability in which crises are continuous, creating a "new normal" of almost endless disruption. The key characteristic of "permacrisis" is its chronic nature. Societies face consecutive crises without being able to return to the stability previously experienced. For example, immediately after the COVID-19 'crisis', it was prolonged by the geopolitical turmoil caused by Russia's invasion of Ukraine, superimposed on top of the energy, climate, and public debt crises and various political upheavals.

The concept of "polycrisis" has its roots in the complexity theory of Edgar Morin and Anne Brigitte Kern (1999). They have used it to argue that the contemporary world is not confronted with just "one vital problem, but with many vital problems, and this complex inter-solidarity of problems, antagonisms, crises, uncontrolled processes and the planet's general crisis constitutes the number one vital problem" (Morin & Kern, 1999: 74). Following this line, "polycrisis" refers to multiple interconnected crises that interact synergistically and thus create complex effects greater than the sum of their parts.

In a critical theory interpretation, "permacrisis" and "polycrisis" can be viewed as hegemonic nodes in late neoliberal discourse. In this perspective, political discourse is a hegemonic field of articulation of meaning (Laclau & Mouffe, 1985). Crises, far from being brute facts, are effects of hegemonic articulation, which can either coagulate an opposition (through chains of equivalence) or fragment it. "Permactrisis" discursively fixes a perpetual urgency that delegitimizes opposition, while "polycrisis" pluralizes and fragments the field of conflict, dissolving antagonistic potential into a complex of technical problems. These narratives thus provide discursive coherence to a system that seems incoherent, for example, justifying austerity, deregulation, securitization, or top-down decisions, even some abusive measures. Living in a "polycrisis" or "permactrisis" leaves no room for structural change, with the establishment trying to block policy alternatives and build consensus around the status quo. "Better to keep the current system (stability) than risk chaos" is a familiar slogan used by governments all around the world. In this sense, "crisis" is not necessarily a rupture or change of

paradigm, but a form of hegemonic continuity, a self-preserving function of the post-democratic neoliberal order.

The narratives of "permacrisis" and "polycrisis" operate at cognitive and affective levels. They construct a specific emotional climate, a combination of anxiety, political fatigue, and resignation, all characteristics of "post-democracy" (Crouch, 2004). Their usage is meant to generate an "*affective attrition*" of the citizen and a state of mind characterized by the normalization of fear. The continuing crisis becomes a hegemonic narrative framework by invalidating alternative options and labeling them as "unrealistic" or even "dangerous" to social stability, a.k.a. the *status quo*.

By stabilizing a narrative of instability, these two concepts tend to delegitimize demands for democratic transformation in the name of a perpetual emergency, described by Giorgio Agamben (2005) as the "state of exception". This "state of exception" increasingly tends to present itself as the dominant paradigm of governance of contemporary politics. The same author interprets the measures taken by governments during the coronavirus pandemic in the same vein:

"A society that lives in a continuous state of exception cannot be free. We actually live in a society that has sacrificed freedom to so-called 'reasons of security' and has thus condemned itself to live in a permanent state of fear and insecurity" (Agamben, 2020: 20-21). The formal declaration of a "state of exception" is avoided and increasingly replaced by an unprecedented generalization of the security paradigm as a normal technique of governance" (Agamben, 2020: 18).

At the political discourse level, "permacrisis" is a prolonged state of exception. It describes but also creates political reality, so it can be considered a "performative" discourse of power. In the philosophy of language and speech acts theory, *performative utterances* are sentences that describe a given reality, and also change the social reality they are describing (Austin, 1962).

Lauren Berlant (2011) talks about the "chronicization of crisis" as a form of biopolitics. She introduces the notion of crisis ordinariness. This concept describes how the state of crisis becomes an everyday condition, profoundly affecting the perception and subjective experience of individuals in the context of neoliberal capitalism. When everything becomes non-transparent, and governance is produced under the rule of emergencies, democracy is in great suffering. When "everything is interdependent", political failure can be shifted to the systemic level, and political and administrative responsibility is diffused. These affective states produce a post-democratic subject: adaptive, cautious, passive, rather than rebellious or vindictive.

This ongoing governance of crisis is the essence of "post-democracy" as described by Colin Crouch (2004). Formal democratic institutions remain intact, but the political process is stripped of popular content, dominated by political elites and technocratic discourses. There is always a "crisis" at hand to be used by the government to gain more power and impose order. The new normality of "state of exception" suspends democratic normative for security: biological security (like during the pandemic), geopolitical (during a war), or even ideological security (during electoral campaigns). The logic of these genuine or constructed "crises" is to reinforce a "post-democracy", in which citizens are transformed into spectators of perpetual emergency government.

I. NORMATIVE PLAN: IDEAL INTERACTIONS AND INHERENT TENSIONS

This section explores the interactions in practice between science, economy, and politics for a virtuous feedback loop, while also examining the inherent tensions. It shows how this feedback loop turns into a "vicious circle" when the relationship between knowledge, resources, and power becomes asymmetrical, instrumentalized, and normatively opaque. Instead of a system of mutual correction and deliberation, a regime of circular self-validation is formed, in which decisions, but especially errors, are perpetuated and consolidated in the form of "objective necessities".

The "vicious circle" actually means the fusion of science, economics, and politics, in the sense of the concentration of power. This can be understood as a process of functional and institutional convergence, in which the traditional boundaries between these spheres become permeable, and the

logic of one (in most cases, the logic of capitalism) comes to dominate the whole. This convergence does not imply simple collaboration, but a reconfiguration of the field of power, in which the autonomy of each sphere is eroded, and decision-making is centralized in a hybrid, opaque, and difficult-to-account-for complex.

3. The Feedback Loop of Science, Economy, and Politics

3.1. Science and Economy: Knowledge as Power and the Risk of Corruption

The prestige of modern science derives not only from the pursuit of rationality and the quest for truth, but from the power and benefits it offers, with the value of knowledge often judged by its capacity to generate power, utility, and profit. This instrumentalist view, though not universally accepted (the value of knowledge for its own sake also exists), remains extremely influential nowadays. It has consolidated the link between science and technology, often perceived as interdependent (Harari, 2015). Capitalism and the Industrial Revolution cemented this symbiosis, transforming the modern world.

However, this symbiosis implies critical dependence: science is costly and relies on external funding (governments as well, not only private corporations). Without massive investment, modern progress would be inconceivable (Harari, 2015). Paradoxically, funding, while a catalyst, is also a major vulnerability. Resources attract economic and political interests that can shape or influence research directions. Funders invest conditionally, pursuing their own objectives. Power funds science to gain more power, but "power tends to corrupt" (Lord Acton, 1887).

Although counter-mechanisms exist (peer review, conflict of interest policies, scientific ethos - Merton, 1973), the patronage of governments and corporations is obvious and rarely disinterested. This relationship can corrupt research by subordinating the scientific agenda to external interests. The ideal of "pure science" is hard to achieve, as priorities are often dictated by financial flows, reflecting funders' interests, often presented and framed as public goods, rather than real social needs.

At a more general level, as Neil Postman (1993) noticed in "Technopoly: The Surrender of Culture to Technology", technology has come to dominate culture. His main argument is that humanity has transformed from a tool-using culture into what he calls a "technopoly" or a society where technology is deified and culture seeks its authorization, satisfaction, and direction from technology. It is no longer merely a human tool but has become the dominant force that shapes cultural values, social structures, and human thinking. What makes Postman's arguments particularly striking is that he formulated them in the early 1990s, way before the internet became ubiquitous. His concerns about television have proven even more relevant nowadays in the age of smartphones and social media.

3.2. Science and Politics: Tensions Between Expertise and Democracy

The science-politics interaction is fundamental but tense. Complex policy decisions require scientific information, yet political logic (values, interests, or democratic legitimacy) differs from scientific logic (evidence and objectivity). The ideal of technocracy is also problematic: science informs about "what is", but politics decides "what should be", involving value judgments beyond expertise (Pamuk, 2021; Lentsch & Weingart, 2011). Moreover, science isn't monolithic: disagreements and provisional knowledge exist. Still, science can establish factual boundaries and combat lying in politics, but also "post-truth". Maintaining science's autonomy and legitimate advisory mechanisms are constant challenges, requiring robust institutions and a culture of truth and dialogue.

The ideal relationship would be "co-production" of knowledge (Jasanoff, 2004), through transparent collaboration between experts, policymakers, and the public, recognizing the value and limits of expertise, with the primacy of democratic decision-making. In practice, the relationship is marked by instrumentalization: political leaders cherry-pick evidence, ignore consensus, or attack science (Resnik, 2009). Conversely, experts risk imposing "technical" solutions on political problems ("scientism" or "expertocracy"). Both erode public trust (Nichols, 2017). For example, debates on COVID-19 vaccination illustrate the clash between technical arguments and legitimate ethical-social concerns.

3.3. Politics and Economy: Interdependence and the Risk of State Capture

The interdependence between politics and the economy is a constant historical paradigm. The two spheres are interlinked and influencing each other, although they are functioning according to a totally different philosophy: capitalism is driven by private profit, while democracy has in its center the general will and the need of common good. In liberal democracies, the role of the state is to set market rules, like property rights, fair competition and correcting market failures, but also redistribution. In a democratic political regime the role of the market is to generate resources (Merkel, 2018; Iversen & Soskice, 2019).

This ideal separation of politics and economics is undermined by capital's natural tendency to influence politics, and to capture entirely the social and political realm. Conversely, politics can distort the economy through excessive interventionism, clientelism, and arbitrary regulations, all these negative stifling private initiative (Ciupitu, 2015; Stavre, 2017).

In the most advanced phase of capitalism, "late capitalism" - a concept first coined by Werner Sombart in 1902 in his book "Der Moderne Kapitalismus" - the traditional definition of the economic system is no longer accurate. Instead of a free market that calibrates itself without state intervention, "late capitalism" functions with close links with government, monopolies and oligopolies. The 2008 economic crisis explicitly demonstrated the fusion of the seemingly free market and the political sphere when governments pumped taxpayers' billions into bailing out banks deemed "too big to fail". The idea that there are private companies that has grown to a size that their failure would trigger global chaos shows how trapped is humanity in the global financial system. Whereas under communism the market was dictated by the state, we are now experiencing a situation in which the state is dictated by the market.

Wealth concentration provides disproportionate resources to shape policies via lobbying, campaign finance, media control, "revolving doors" (Hacker & Pierson, 2010; Streeck, 2011), and other mechanisms. "State capture" subordinates public interest to private interest, rendering formal political equality illusory (Chomsky, 2017; Wolin, 2008). While economic influence isn't necessarily illegitimate, it becomes problematic when disproportionate and non-transparent. History proved that the belief that profit always brings societal benefits is false (Magnuson, 2022).

Globalization has heightened the tension between politics or democracy and money. Capital mobility increased corporate power relative to states, limiting the capacity to regulate, tax, and maintain the welfare state (Rodrik, 2011; Streeck, 2011). "Rodrik's trilemma" (globalization, sovereignty, democracy - only two can coexist) suggests democracy has often been sacrificed for hyper-globalization (Martin & Schumann, 1997; Hertz, 2001), through austerity and deregulation policies that deepened inequalities.

4. Globalization and the Tension Between Democracy, Sovereignty, and the Market

As Harrari argued, history's "chief engine" for the past 500 years has probably been the "feedback loop" between science, capital, and empire, or the armed hand of capital. Capitalism has driven European expansionism over the past few centuries, and capitalism has been closely related to empire-building, as European countries stepped in militarily to advance the interests of their investors. After the end of the imperial era and colonialism, globalization might be considered as the new form of capital expansionism. The intensification of cross-border flows has reshaped the interactions between science, economy, and politics. While bringing benefits (economic growth, innovation), it has generated tensions with democracy and national sovereignty ("Rodrik's trilemma" 2011).

4.1. Science and Technology in a Global Context

Globalization facilitated international scientific collaboration (e.g., COVID-19) but intensified competition for talent, resources, and technological supremacy. New technologies (AI, biotechnology) raise ethical and regulatory issues often exceeding the capacity of nation-states, requiring difficult

international coordination (e.g., regulating GAFAM - Google, Apple, Facebook, Amazon, Microsoft). In addition, global corporations tend to escape control and always try to "weaken" political power.

4.2. The Globalized Economy and Pressures on Democracy

The main argument of globalization highlights its capacity for lifting many out of poverty and the need for national redistribution policies, not rejecting globalization itself. On the other side, capital mobility has limited the autonomy of national economic policies. Pressure for international competitiveness often led to deregulation, labor market flexibility, and capital tax cuts, negatively affecting inequality and the state's capacity to fund public goods (Streeck, 2011; Hickel, 2017). International financial institutions and trade agreements often promoted a neoliberal model (globalization's "straitjacket" as described by Rodrik, 2011), generating radical populist and nationalist reactions.

4.3. National Sovereignty in the Global Era

Globalization has eroded traditional national sovereignty. This is a fact. Global problems require collective solutions, involving competence transfer to international organizations ("shared sovereignty" or "multi-level governance"). This is often perceived, legitimately, as a loss of democratic control (Hooghe & Marks, 2009), creating tensions between supranational integration and national autonomy. Proponents of global governance argue that absolute sovereignty is illusory, and international cooperation is necessary.

In conclusion, globalized capitalism has created an interconnected but more tense world. The feedback loop operates globally, influenced by actors and norms beyond the nation-state. In this globalized world, the merger of power, resources, and knowledge does not generate a classic dictatorship, but an informal regime of asymmetrically distributed power, in which the decision is produced by a techno-scientific-economic complex. The classic categories of politicians, scientists, and tycoons are no longer distinct. They merge into networks of interests and influence. Power is no longer held, but managed jointly, outside of democratic control.

II. DESCRIPTIVE PLAN: CASE STUDY - ROMANIA IN THE ERA OF "POLYCRISIS"

5. The Dynamics of the Science-Politics-Economy Relationship in the Romanian Pandemic Context: An Unbalanced Loop

In this part, we explore the interplay among science, economy and politics in Romania amidst the challenges posed by the COVID-19 crisis within the larger framework of multiple crises (polycrisis) and enduring crises (permacrisis). This timeframe sheds light on how the mechanism of "feedback loop" failed to operate. When faced with crisis induced stressors it was showcasing its susceptibility to descending into a recurring pattern.

In the context of the pandemic, the relationship between science, politics and the economy seemed to be imbalanced and interconnected in various ways. This period has vividly shown how science and politics are intertwined with the economy, how science clashed with political influences and urgent actions tested the relationships between the government and businesses as well, as citizens.

5.1. The Unclear Importance of Expertise

Scientific and medical expertise was invoked to underpin government action (e.g., Raed Arafat, head of the Department for Emergency Situations - DSU). Experts communicated the virus's complexity and the need for measures. However, this centrality of expertise was ambiguous. Epistemic authority was eroded by accusations of politicization and poor and contradictory communication, doubled by a massive wave of disinformation ("infodemic"). All of them are fueled by chronic mistrust in authorities (Bargaoanu et. al, 2021; Mosila, 2023). Contradictory messages of authorities and "fake news" eroded trust, leading to contestation, polarization, and the dismantling of the social fabric.

5.2. Technocratic Governance and the Legitimacy Crisis

The crisis management bypassed democratic processes, being criticized for lacking transparency and raising concerns of potential misuse (Neblo & Wallace, 2021). The credibility of the government was undermined by poor rule of law that underlined the tension between the need for swift action and respect for constitutional guarantees (Lentsch & Weingart, 2011). Additionally, a lack of transparency in decision-making and poor communication added to the chaos.

5.3. Politicization and the Paradox of Scientific Advice

Invoking "science" was used as a religious ritual because the state response was marked by political calculations. President Klaus Werner Iohannis and the leaders of the National Liberal Party (PNL), who were at the same time heads of the Romanian Government (Ludovic Orban - 2020; Florin Cîțu - 2021), were caught between the efficacy of the restrictive measures and their political survival. Their crisis management was described as "politicized and militarized" (Poenaru, 2021). This illustrates the "paradox of scientific advice" (Pamuk, 2021): the more scientific expertise became relevant and necessary for legitimizing policy decisions (utility), the more suspicion grew that it is being instrumentalized or 'bent' to serve pre-existing political agendas, thus undermining its perceived neutrality and, ultimately, epistemic authority. The widespread perception of the politicization of health decisions and the chronic public distrust of the political class and state institutions (Bargaoanu et. al, 2021), has created fertile ground for skepticism, conspiracy theories and dramatically undermined governmental efforts to build the social consensus necessary for compliance and, subsequently, for the success of the vaccination campaign.

5.4. Economic Impact and the Capitalism vs. Democracy Tension

Lockdowns and restrictions had severe economic consequences (economic decline, unemployment, business difficulties) (Velica et al., 2022). This exacerbated the tension between market logic and public health/social protection imperatives (Merkel, 2018). The government attempted a dual discourse (protecting lives vs. economic support), implementing measures (technical unemployment, loan deferrals, SME guarantees). However, the impact was considerable (economic contraction, budget deficit), raising questions about aid distribution equity, efficiency, and potential state capture (Chomsky, 2017).

5.5. The hastening pace of technology and the risks it brings about

The spread of the pandemic triggered a shift towards digitalization, encompassing work setups and online learning platforms, as well as the surge of e-commerce activities (Moldovan et. al, 2022). This swift transformation has brought to light existing disparities regarding access and usage, which may worsen over time. As society increasingly depends on platforms and engages in data gathering practices that include tracking and digital certifications, concerns about the rise of "surveillance capitalism" as discussed by Zuboff (2019) have resurfaced, along with fears about the potential emergence of "techno-feudalism" (Varoufakis, 2023). These developments are anticipated to have direct implications on democratic processes.

6. Emergence of Negative Feedback Loops and Vicious Circles

The analysis reveals not just an unbalanced feedback loop, but also subsequent "vicious circles" that undermined the collective response.

6.1. The Destructive Cycle of Distrust and Politicization

Chronic mistrust facilitated politicization. Health decisions were interpreted politically, fueling suspicion and contestation, further eroding trust. Politicians adopted populist discourses or instrumentalized expertise, reinforcing the perception of politicization. Result: social fragmentation, difficulty implementing measures, failure of the vaccination campaign (the second lowest rate in the European Union) (Toró et al., 2024).

6.2. The Vicious Circle of Corruption and Inefficiency

The pandemic created opportunities for corruption (emergency public procurement, reduced transparency). Scandals (like Unifarm, Lețcani Hospital, or PCR machines) involved suspicious purchases and high-ranking officials. Corruption diverted resources, contributing to health response inefficiency and fueling public cynicism and mistrust, making anti-corruption efforts harder (Uslamer, 2006). The rule of law was undermined: military ordinances, unconstitutional fines (CCR Decision 152/2020), hindered judicial review, and marginalized Parliament. The "checks and balances" principle was ignored, leading to the "rule by law" instead of "rule of law".

6.3. The Vicious Circle of Disinformation and Ignorance

Disinformation, malinformation (Wardle & Derakshan, 2017), and conspiracy theories proliferated, exploiting vulnerabilities (functional illiteracy and polarization) and amplified by algorithms and interested actors. The "infodemic" fueled skepticism towards scientific recommendations and health measures, generating risky behaviors. Skepticism increased vulnerability to further disinformation. Anti-disinformation efforts were ineffective, undermined by lack of trust and "willful ignorance" (Mihali, 2023).

6.4. The Vicious Circle of Disinformation, Protests, and Radicalization

Disinformation and mistrust fueled anti-restriction and anti-vaccination protests, providing a platform for radical groups. Street protests coalesced discontent about economic hardship, mistrust, conspiracies, anti-science populism, etc., and were used by *political entrepreneurs* like the representatives of the Alliance for the Union of Romanians Party (AUR) for political gains. The party managed to obtain more than 9% of the popular vote in December 2020, becoming the fourth largest political group in the Romanian Parliament. Its nationalist and anti-system rhetoric normalized radical positions and attracted large segments of frustrated population: those left behind by capitalist and European "progress", those who distrusted governmental crisis management, etc.. Radicalization hindered dialogue and deepened polarization, so the result in 2024 and 2025 was not surprising: the rise of the populist's parties and their presidential candidates. Combined, AUR, S.O.S Romania, The Party of Young People (POT) are the largest political movement with up to 35% of the seats of the newly elected parliament and their two presidential candidates - Călin Georgescu and George Simion - managed to convince more than 5.3 milion of voters.

6.5. The Loop of Economic Precarity and Health Vulnerability

The economic shock of the governmental measures taken during the COVID-19 pandemic impacted living standards, especially for the vulnerable categories, because the government support failed to fully compensate for all the losses (Velica et al., 2022). Poor conditions exposed disadvantaged groups to higher health risks and created a negative poverty - poor health loop. It highlighted existing inequalities, with costs socialized in a very similar way to the financial crisis of 2008: the health system failure was transferred to patients. In the same time, increased precarity and failed social and health systems generated anxiety and social stress which fuelled distrust in government, perceived as inefficient. The shift of balance between rights and obligations towards the latest deepened the breakdown of the social fabric and the perception of a non-democratic governance, call it soft-authoritarianism.

6.6. Conclusions on the Romanian Case Study

The Romanian case illustrates the fragility of science-politics-economy interactions in crisis. The "feedback loop" manifested as unbalanced loops and vicious circles. Appeal to expertise was undermined by politicization and mistrust. Crisis governance undermined democracy. Economic impact was severe, and state support was insufficient. Disinformation proliferated, fueling social and

political radicalization. Simply invoking science was not enough. In the absence of an integrated approach - building trust through transparency, strengthening democratic institutions, combating corruption and disinformation, focusing on social equity - the failure of crisis management was almost inevitable, leading to irreversible erosion of the social contract and democracy.

The discourse of "fear" and the logic of "crisis" were used not merely to describe, but also for performative purposes: they produced the reality they named, building consensus around exceptional measures and not based on mutual trust.

There were at least four dimensions along which „permacrisis" and „polycrisis" have functioned, ideologically and affectively, as post-democratic discursive instruments of governance (Brown, 2015). First, the „permacrisis" scenario suspended deliberation (the temporality of the exception). Second, the "polycrisis" justified the evacuation of politics and the technocratic approach (systemic complexity). Third, they both generated anxiety, civic fatigue, resignation, in other words, non-democratic affects (affective regime). Fourth, they blocked political alternatives and maintained the status quo (hegemonic function).

With decreased citizen participation and the de-politicization of decision-making processes, the idea of "permacrisis" legitimized, on the one hand, the expansion of executive power and technocratic bureaucracy, on the other hand, the temporary (but prolonged) retreat from democratic deliberation. In this post-democratic context, the fusion of power, resources, and knowledge reflected a concentration of power in an "iron triangle" system, in which scientists legitimize decisions, corporations provide infrastructure and resources, and politicians provide the legal framework and public acceptability. For example, during 2020 and 2021, large pharmaceutical companies and digital distribution networks cooperated with the state to organize vaccination campaigns. At the same time, public discourse was strictly calibrated on expertocratic recommendations, marginalizing critical or hesitant voices, even from within the academic world. A post-democratic governance regime was thus taking shape, in which citizen participation was replaced by induced consensual risk management. "Permacrisis" normalized the exceptional, so the crisis became the new norm even after the end of the pandemic. Since then, citizens function under permanent anxiety and, consequently, submission. "Permacrisis" and "polycrisis" functioned not only as analytical descriptions of the unstable contemporary global environment but also as narrative devices that served political hegemony. They were used as powerful discursive devices to justify "permanent states of exception" and measures that bypass democratic control, block political alternatives, and emphasize technocratic tendencies.

7. General Conclusion: Before the Circle is Closing Down

This paper argued that the "feedback loop of the Scientific Revolution" (Harari, 2015) has degenerated into a "vicious circle" (Freeland, 2012; Chomsky, 2017) in the contemporary "crisis" context, marking a potential civilizational drift. Science, subordinated to political and corporate interests, partially lost neutrality, becoming instrumentalized (oriented towards utility and profit, not truth and common good). The COVID-19 crisis exacerbated embedded tensions: "official science" generated paradoxes and mistrust, abuse of epistemic authority, lack of transparency, and censorship undermined trust.

Simultaneously, the political sphere degraded towards "post-democracy" (de-politicization, technocratization, evacuation of ideological conflict, citizen viewed as consumer). Democratic forms persist, but politics is captured by techno-economic elites. Ideological conflict is replaced by fabricated technocratic consensus and political marketing. State communication relies on submission, overexposure, and routine, immersing individuals in a constructed "reality" (Teodorescu, 2007). The discourse of "permacrisis" justifies and consolidates "the state of exception", governmental measures bypassing democratic control. By this, a techno-political regime based on anxiety and fear is consolidated.

Democratic backsliding is linked to the rise of a new "tech" plutocracy, where economic power translates into political influence. The fusion of capital, technology, and politics generates a "capitalist

dictatorship" (Zafirovski, 2022), emphasized by globalization. The current imbalance, dominated by the logic of capital and technology detached from democratic control and guided by radical ideologies ("accelerationism"), threatens democracy.

The feedback loop has turned into a vicious circle that, like a reflexive system (Soros, 2014), reinforces itself based on transfigured concepts. Initial optimism about technology's impact (*e-democracy*) turned to pessimistic. The intertwining of technology and politics raises the specter of extended social control and a potential post-human drift, where decisions are made by algorithms and non-transparent interests.

Democracy, science, and a capitalist economy that have served society for so long are not givens, but are under continuous construction, exposed to the vicissitudes of the *zeitgeist* that they are created. These "idols" of the past already seem to be in twilight, so their future and that of humanity depends on the collective ability to renegotiate the terms of their interaction before the vicious circle is closed for good.

Acknowledgment

The author declares the use of generative artificial-intelligence tools (ChatGPT, Manus.im and Deepl.com) solely for linguistic support, like translation, text checking and rephrasing, formatting adjustments and text restructuring. All AI contributions were critically reviewed and approved by the author, who assumes full responsibility for the accuracy, originality, and integrity of the final content.

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CHARACTERISTICS OF ACTIVITIES OF GLOBAL ORGANIZATIONS AND COUNTRIES IN THE CONTEXT OF ASSESSING THE IMPACT OF CLIMATE CHANGE ON WATER RESOURCES

DOI: <https://doi.org/10.53486/dri2025.11>

UDC: 327.7:504.05

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Abstract: *Since water is one of the key resources that humans need, dozens of global organizations around the world are studying the impact of climate on it. It has been determined that due to a significant increase in population, an acute problem of drinking water shortage may arise, and hundreds of thousands of people will be on the verge of dehydration. The situation is further complicated by the rapid development of urbanized areas, whose growth puts significant pressure on the water resources of the surrounding areas. Therefore, climate change, together with population growth, can lead to a shortage of drinking water in densely populated regions of the planet that already suffer from a constant shortage, especially in Africa and Asia, which is why this study is relevant. The aim of the study is to conduct a statistical assessment of the impact of climate change on water resources at the global and country scales. Based on the goal, the following task have been formed: to characterize the activities of global organizations in the context of reducing the impact of climate change on water resources. The following methods were used in writing this paper: content analysis - to study the change in the use of water resources caused by climate change; statistical analysis - to analyze the indicators of water resources assessment; scientific literature method - to determine the impact of climate change on water resources; tabular and graphical methods - to visualize the results obtained and a number of other methods.*

Key words: *between water resources, climate change, sustainable development, water availability*

JEL: C18, C82, Q25, Q53

1. Introduction. The European Union is showing a steady downward trend in water consumption, which may indicate the introduction of water-saving technologies, the transition to sustainable practices, and a reduced dependence on water-intensive production. Europe is experiencing frequent changes in climate conditions, from heat waves to heavy rains, which stimulates adaptive water management. In Latin America, water consumption is growing gradually due to the development of agriculture and infrastructure. At the same time, climate threats, such as Amazonian forest degradation, have a significant impact on the hydrological cycle, changing the seasonality and availability of water. In North America, consumption has remained stable at around 480 billion cubic meters, indicating a balance between high water use and effective management mechanisms.

In general, climate change is increasingly affecting water consumption in the world, both because of the need to adapt to new weather conditions and because of damage to water infrastructure, changes in precipitation seasons, and a decrease in natural resource recovery. That is why it is advisable for global countries to consider increasing investments in technologies that contribute to water conservation and sustainable consumption.

2. Basic content. The activities of global organizations to reduce the impact of climate change on water resources are an extremely important component of global environmental and social strategies. As the climate crisis deepens, manifested through droughts, floods, glacial melting, and disruption of the hydrological cycle, international institutions play a key role in coordinating efforts, implementing innovative approaches, and supporting countries in overcoming water vulnerability.

The European Green Deal envisages that the EU will become climate neutral by 2050, which will

require significant investments from both the public and private sectors. According to an analysis of EU reports, about €350 billion will need to be invested annually in the energy system alone by 2030 to achieve a 55% reduction in emissions (European Commission, 2021). This, in turn, requires significant investment in projects that help conserve water resources and increase the resilience of the water sector to the effects of climate change. The most effective method of attracting investment in EU member states is the issuance of green bonds, the structural volume of which is shown in Fig. 1.

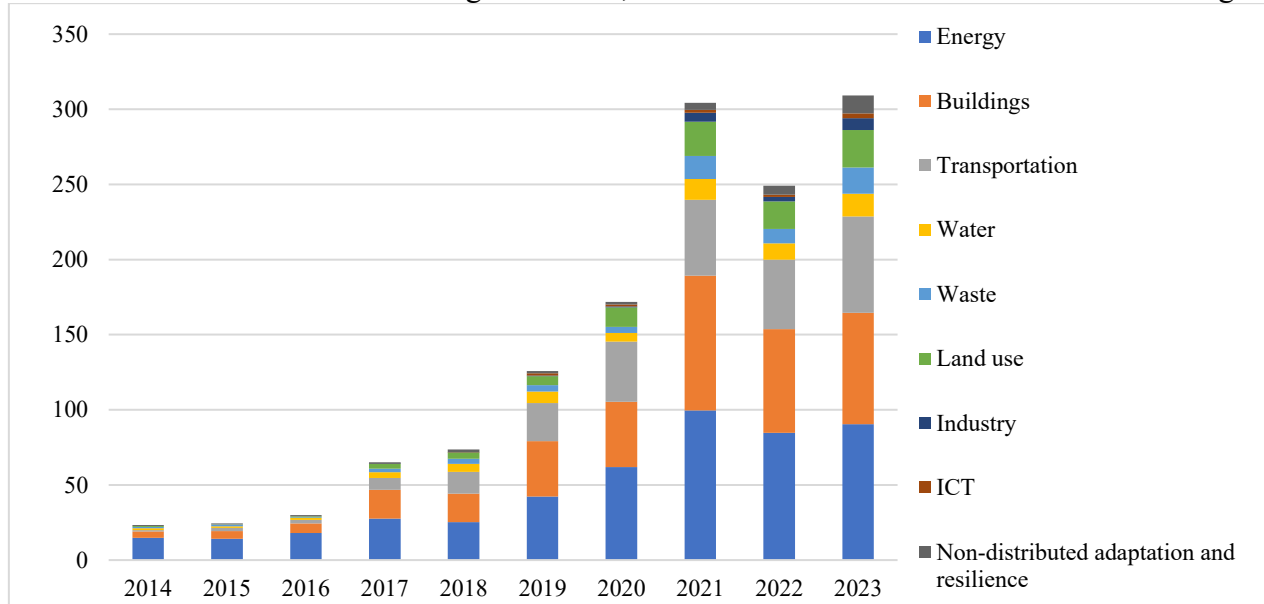


Figure 1. Dynamics of water-related bonds in the overall structure of green bonds in the EU member states for the period 2014-2023, USD billion USD

Source: Climate Bonds, 2024

Analyzing the data in Fig. 1, we can observe a gradual increase in investments in this sector. During this period, the amount of investments in water resources increased from 1.2 billion USD in 2014 to 15.2 billion USD in 2023. USD in 2014 to 15.2 billion USD in 2013. USD in 2023. This indicates the growing attention to the problem of water resources in the context of climate change, as changes in climate conditions significantly affect the water balance, reducing water availability and creating the need for new methods of water management.

The increase in water investments during this period correlates with global trends related to climate change adaptation, which includes projects aimed at improving water quality. For example, in 2019, there was a sharp increase in investments in water resources, which may be due to the active development of water conservation projects in response to the increasing intensity of droughts in many regions of Europe.

As a result, it is proposed to provide data on the volume of green bonds in water resources by world countries (Fig. 2).

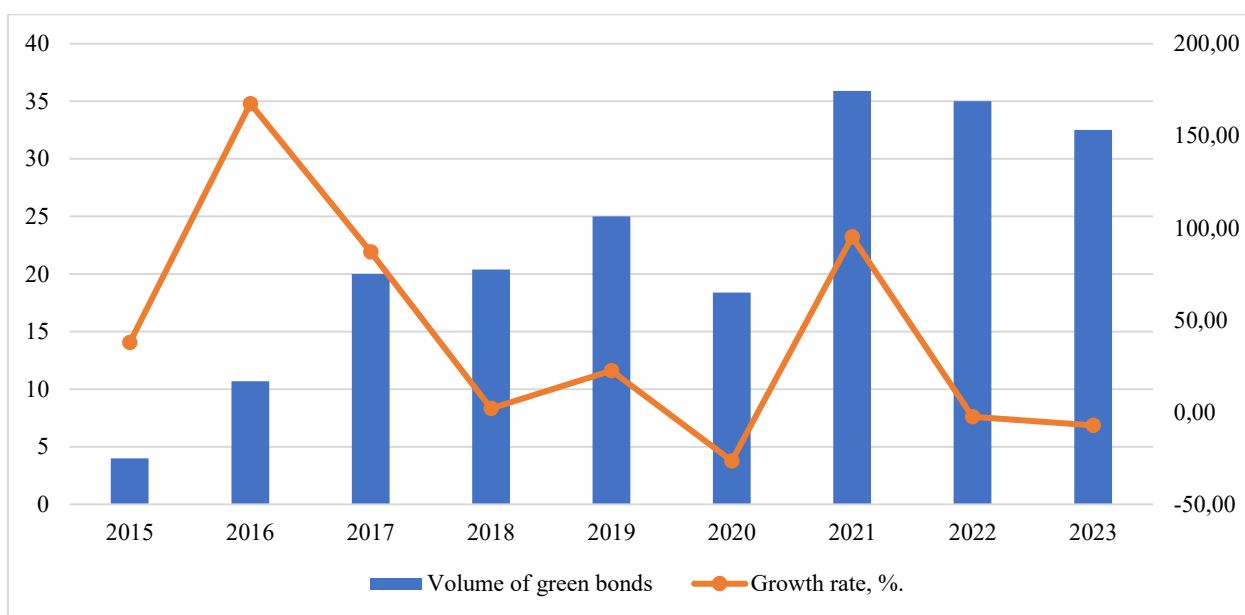


Figure 2. Dynamics of water bonds by world countries in 2014-2023,
 USD billion USD

Source: Climate Bonds, 2024

Analyzing the data in Fig. 2, we can note a significant increase in investment, as during this period the volume of green bonds in water resources increased from 2.9 billion USD in 2014 to 32.5 billion USD in 2023. USD in 2014 to 32.5 billion USD in 2023. This indicates the growing importance of investing in water resources in the context of climate change, as the challenges associated with water shortages are increasing every year.

The overall trend shows a steady increase in investment, with the exception of certain downturns in 2020 and 2022. The largest increase in water bonds is observed in 2016 (167.5%), which is likely the result of a significant increase in international efforts to finance projects. Other years also show significant growth, although the pace varies - in 2019, the growth was 22.55%, which confirms the continued focus on investment in this sector in the face of global climate change. In 2020, there was a significant drop in the growth rate of green bonds (-26.4%), which may be the result of the impact of the COVID-19 pandemic, which caused economic instability and the suspension of some environmental initiatives.

Given these trends, it can be concluded that although there has been an increase in investment in water resources, it is uneven and depends on the economic situation, climate conditions, and global initiatives. That is why, to ensure the sustainability of water resources in the future, it is necessary to maintain and increase the volume of investments, as well as focus on the efficient use of these funds for the implementation of adaptation and mitigation measures.

Table 1 summarizes the key areas of action of the world's countries in the context of combating climate change and its impact on water resources.

Table 1. Characteristics of measures taken by world countries in the context of climate change and its impact on water resources.

Country	Characteristics of the events
Germany	A policy of sustainable water use is being implemented, including legislative initiatives to control water consumption and encourage its economical use. Significant investments have been made in modernizing wastewater treatment facilities and technologies. The agricultural sector uses drip irrigation systems and rainwater harvesting methods. The country is also implementing research projects aimed at preserving water in the face of climate change.
Netherlands	The country has one of the most developed water management systems in the world, with special attention paid to combating sea level rise and flood prevention. The "Room for the River" program has been implemented, which provides for the creation of additional space for water in conditions of high risk of flooding. Innovative technologies are also being used to collect, purify and reuse water, which reduces dependence on natural sources.
France	National climate change adaptation plans have been developed that include measures to preserve water resources. These include the modernization of water supply and the introduction of water-saving technologies in industry and utilities. Special government organizations also conduct public awareness campaigns on the rational use of water.
USA	Several climate change adaptation strategies have been developed at the national and regional levels, with a focus on the western and southern states that suffer from prolonged droughts and water shortages. Water conservation programs are being implemented in agriculture, urban planning, and industry, and projects are being funded to clean water and modernize water supply infrastructure.
China	Invests heavily in modernizing irrigation and water supply systems, primarily introducing efficient irrigation systems that reduce water losses and encourage water reuse and treatment.
Australia	The Water for the Future program is being implemented, which includes investments in seawater desalination, wastewater reuse, and rainwater harvesting. Digital technologies are also actively used to monitor the state of water resources.
India	The government funds numerous programs to preserve water in rural areas, especially in arid regions, such as rainwater harvesting projects, reconstruction of traditional wells, and modernization of water supply systems. Farmers are trained on how to use water efficiently.
Canada	The state supports research aimed at adapting to climate change and preserving fresh water and implements projects to purify water, preserve lakes and swamps, and implement water management software.
Japan	The country uses renewable energy for water treatment and supply, including solar panels and hydroelectric power plants. Urban and industrial infrastructure is being modernized with a view to water conservation, including automated systems, water reuse, and filtration.
Brazil	Special attention is paid to the conservation of the Amazon forests, which play a key role in the continent's water cycle. National strategies have been developed to combat droughts, restore reservoirs and protect river systems, and programs are being implemented to improve access to water in rural areas, promote sustainable land use and environmental education.

Source: European Commission, 2019; Ministry of Environment, 2020; Water Europe, 2024; U.S. Environmental Protection Agency, 2021; Ministry of Health & Family Welfare Government of India, 2018; Comisión Económica para América Latina y el Caribe, 2015

The general analysis of the table shows that different countries of the world, taking into account their geographical, climatic, economic and social conditions, are implementing comprehensive measures for the conservation and efficient management of water resources.

Countries with a high level of economic development, such as Germany, the Netherlands, the United States, and Japan, focus on technological innovation, infrastructure modernization, development of national strategies, and implementation of systematic water management. They are actively investing in research, new methods of water purification, reuse, and digital monitoring.

Instead, developing countries such as India, China, and Brazil focus on making water accessible to the public, restoring traditional sources, harvesting rainwater, and modernizing rural networks. Particular attention is paid to droughts that threaten food security and the preservation of natural ecosystems, such as the Amazon forest. The approach of Australia and Canada, which implement comprehensive environmental programs, combining environmental protection measures with technological solutions and actively involving local communities, is unique.

It has been shown that all countries, regardless of their level of development, are striving for integrated water resources management, realizing their critical role in ensuring sustainable development, ecological balance, and quality of life. At the same time, it is important that most of them are already acting proactively by implementing adaptation strategies to climate change, which only

3. Conclusions. The study of the statistical assessment of the impact of climate change on water resources at the global and country scales has led to the following conclusions:

Based on the study of scientific literature, it has been found that climate change has a significant impact on water resources both globally and regionally. The main problems include a reduction in freshwater reserves, deterioration of its quality, and disruption of the natural hydrological regime. These changes have serious environmental and socio-economic consequences that require an integrated approach to water management. Priority tasks are to increase the effectiveness of adaptation strategies, improve the regulatory framework, and intensify research in the field of climate change in order to minimize the negative impact on aquatic ecosystems.

It is also worth noting that climate change is increasingly affecting global water consumption: both due to the need to adapt to new climatic conditions and as a result of damage to water infrastructure, changes in precipitation patterns, and a decrease in the natural recovery of water resources. In this regard, it is advisable for the world's countries to increase investments in the implementation of water-saving technologies and promote sustainable water use.

The article shows that the activities of global organizations and countries in the field of reducing the impact of climate change on water resources are complex and multilevel: from global monitoring and scientific assessments to the practical implementation of infrastructure and financial solutions. Green finance plays a special role, which is actively developing in the context of investments in water projects, in particular through the issuance of green bonds. This approach contributes to water conservation, climate change adaptation, and sustainable development, especially in the face of growing global challenges.

Under the current conditions of military conflict and climate change, the state of water resources in Ukraine is undergoing a significant negative impact, which threatens not only environmental safety but also the overall level of public health. Despite the challenging situation, the country is making some progress in reducing water pollution and water stress, and has significant potential to develop hydropower as part of a green transformation. Thanks to international support, projects to restore and modernize water infrastructure are being actively implemented, which not only ensures access to quality water but also promotes sustainable water management in wartime and under increased climate risks.

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Section 2:

MANAGEMENT AND MARKETING

MODERN APPROACHES TO MARKETING MANAGEMENT: THE PRACTICE OF MOLDOVAN COMPANIES

DOI: <https://doi.org/10.53486/dri2025.12>

UDC: 339.138:005(478)

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Abstract. *Effective marketing management is a crucial condition for the sustainable development of companies in a highly dynamic market environment. Modern marketing management requires not only the implementation of innovative tools but also a comprehensive approach to management, strategic planning, and adaptation to external changes. Drawing on theoretical frameworks and empirical analysis of forth companies (case study) in the Republic of Moldova, the paper explores the practical application of agile marketing, omnichannel integration, data-driven decision-making, and ESG-oriented strategies. The findings reveal that the successful implementation of these approaches enhances customer experience, operational adaptability, and long-term brand value. The research contributes to a deeper understanding of how marketing management evolves into a holistic, value-driven paradigm.*

Keywords: *marketing management, strategic planning, agile marketing, omnichannel strategies, data-driven marketing, ESG, corporate responsibility*

JEL codes: *M00, M11, M30, M31*

Introduction

Approaches to defining marketing management are constantly evolving, reflecting transformations. Definitions and approaches to marketing management have evolved in response to business environment transformations driven by digitalization and technological advancements. While classical models such as 4P, 7P, and STP were once central, modern frameworks redefine marketing management as a holistic system built upon data, technologies, and organizational values.

The rise of digital platforms, automation, big data, and AI has intensified the role of analytics and personalization. Marketing management now entails not only strategic planning and campaign execution but also real-time monitoring and adaptation. Flexibility and customer-centricity are prioritized, along with the need to incorporate economic, social, ethical, and environmental dimensions. Digital transformation complements marketing with automated analytics and sustainability principles, demanding marketers with updated competencies and agile mindsets. Consequently, marketing management has become integrative-strategic, technological, and value-driven-shifting from a functional role to a paradigm aligned with the digital economy and evolving consumer expectations. Globalization and mobile technologies further expand companies' reach, requiring adaptive and digitally competent marketing systems.

The objective of this study is to synthesize and analyze modern approaches to marketing management, with a focus on data-driven strategies, flexible management models, and sustainability principles, as well as to identify the specific features of their practical application by companies in the Republic of Moldova.

Literature Review

Kotler (2003) defines marketing management as the art and science of selecting target markets and acquiring, retaining, and growing a customer base by creating and delivering superior value. He emphasizes the balance between strategy and tactics, analytics and creativity, and a strong customer orientation. Lambin (2007) views marketing management as a social process aimed at adapting the enterprise to a changing external environment. He considers marketing a strategic management tool essential for building sustainable market positions in conditions of high uncertainty and competition.

David Aaker (2011) introduces branding as a key component of marketing management, emphasizing the importance of building, maintaining, and developing brands as intangible assets that determine competitiveness and customer loyalty.

With the onset of digital transformation in marketing activities, new approaches and tools have emerged, requiring a rethinking of traditional marketing management. Digital marketing strategy integrates online and offline channels, the use of data and technology to achieve business goals (Chaffey & Ellis-Chadwick, 2019). Digitalization has not only changed communication channels but also transformed the ways companies interact with customers, enabling deep personalization, automation, and real-time analytics.

The dynamic changes in the external environment, the development of digital technologies, the growing importance of customer experience, and the increasing role of data and analytics in decision-making have contributed to the continuous expansion and deepening of marketing management. Whereas previously marketing management was primarily seen as a process of planning, executing, and controlling marketing activities aimed at satisfying customer needs and achieving profits, it has now evolved into a more complex concept under the conditions of digital transformation. The American Marketing Association (2023) highlights marketing management as a cyclical, systematic process aimed at meeting target market needs while achieving organizational objectives. This definition reflects the modern managerial essence of the concept, highlighting the cyclical and systematic nature of the process.

Contemporary marketing practice increasingly relies on digital technologies, analytical tools, and flexible management models. As a result, several key areas have come to the forefront: Digital Marketing, enabling multichannel communication with consumers; Agile Marketing, allowing for rapid adaptation to market changes; Omnichannel Marketing, which creates a unified user experience across all touchpoints; Personalized Marketing, based on data analysis and individual customer approaches; Data-Driven Marketing, where decisions are made based on deep analytics; and ESG and ethical marketing, which focus on sustainable development, transparency, and corporate social responsibility. These approaches reflect a new reality in which marketing is not only a promotional tool but also a strategic component of a company's digital transformation.

Dave Chaffey (Chaffey, D., & Ellis-Chadwick, F., 2019) presents digital marketing as a process built around six key components (the "6Ds"), which form the foundation of digital marketing:

1. Digital Devices – smartphones, personal computers, tablets, and smart devices;
2. Digital Platforms – social media platforms (e.g., Facebook, Instagram), email services, messaging apps, marketplaces (e.g., PandaShop, 999.md), and search engines (e.g., Google, Yandex);
3. Digital Media – SEO, email marketing, social networks, PPC (pay-per-click advertising);
4. Digital Data – demographic data, preferences, purchase history, interactions, and geolocation;
5. Digital Technology – analytics tools (e.g., Google Analytics), artificial intelligence and machine learning, CRM systems, and real-time personalization technologies;
6. Digital Transformation – the integration of digital technologies at all levels of business operations.

Agile Marketing is a flexible and iterative approach to marketing based on the principles of adaptability, collaboration, and continuous improvement. Rooted in Agile methodologies originally developed for software engineering (such as Scrum and Kanban), it adapts these principles to manage marketing processes, allowing teams to work more flexibly, iteratively, and cohesively (Accardi-Petersen, 2012).

The first stage in Agile marketing management involves setting SMART goals—Specific, Measurable, Achievable, Relevant, and Time-bound. This ensures clarity of objectives and success criteria. Next, key performance indicators (KPIs) are defined—reach, engagement, conversion, ROI, and others necessary to evaluate campaign effectiveness. Then, consumer personas are developed—archetypal profiles of customers that enable the creation of personalized offers.

The following step is Customer Journey Mapping, which identifies key touchpoints and potential "pain points" in the customer experience. A backlog of tasks is created for execution within short cycles or sprints (1–2 weeks), after which results are analyzed to identify improvement areas. Daily stand-ups, brief coordination meetings, are held to enhance transparency and operational efficiency. A key element is continuous testing and adaptation, including A/B testing and real-time data analysis (Gera, Gera, & Mishra, 2019).

Omnichannel Marketing involves not just the presence of multiple customer interaction channels but their deep integration. The approach ensures a seamless and consistent user experience, regardless of the device or platform being used (Palmatier, R. W., 2019).

Personalized Marketing enables businesses to tailor their marketing efforts to the individual needs, interests, and preferences of each specific customer (Chandra, 2022), using data to generate relevant and targeted messages, offers, and experiences (International Journal of Computer Applications, 2023). A company applying personalized marketing should meet the following criteria: data collection and usage; use of CRM or CDP systems; personalized communications; real-time dynamic personalization; A/B testing and machine learning; segmentation down to the "segment of one"; and transparency with a strong commitment to privacy compliance.

Data-driven marketing refers to the use of customer, behavioral, market, and operational data to personalize marketing messages, optimize communication channels, increase ROI, and enhance the overall customer experience (Wedel, M., & Kannan, P. K., 2016). This type of marketing provides the foundation—an analytical infrastructure, data processing tools, and a systematic approach to decision-making—covering the entire cycle from data collection to strategic planning of marketing activities, market segmentation, demand forecasting, and evaluation of campaign effectiveness.

ESG (Environmental, Social, Governance) is a management approach that considers the environmental, social, and governance aspects of a company's operations.

Within marketing management, ESG influences the following:

- brand development: companies communicate values of sustainability and social responsibility, thereby strengthening trust and customer loyalty;
- communications: marketing campaigns focus on transparency, green initiatives, and honesty;
- packaging and product: the use of environmentally friendly materials and sustainable supply chains becomes an integral part of brand positioning.

Ethical marketing is an approach in which marketing practices are grounded in the principles of honesty, responsibility, and respect for consumers and society as a whole. It involves adherence to moral norms across all aspects of marketing—from product development to promotion and sales. Ethical marketing includes honest representation of products and services, fair pricing, responsible advertising practices, and respect for the cultural and social values of consumers (Lee & Jin, 2019).

Methodology

A qualitative case study method was employed, which provides a deep understanding of how marketing concepts are implemented in specific organizational contexts and allows for a comprehensive analysis that encompasses both strategic and operational dimensions of marketing activity. The research focused on four companies operating in the Republic of Moldova: MakeUp.md, METRO Moldova, Linella, and Kaufland Moldova. The selection of cases was based on several key criteria: active market presence, high brand recognition, diversity of marketing tools used, and availability of information about company activities in open sources. The companies represent different retail formats—from online retail to chain hypermarkets—allowing for the identification of distinctive marketing approaches across various business types.

Data for analysis were collected from official company websites, news publications, social media pages, online reports, promotional campaign materials, and customer loyalty programs. The use of various sources ensured the validity and reliability of the collected information.

It should be noted that the research has certain limitations. Relying primarily on qualitative data, it does not allow for a quantitative assessment of the effectiveness of the implemented strategies.

Research Results

Table 1 presents a comparative analysis of the implementation of key modern approaches to marketing management in four companies, highlighting the distinctive features of how each company applies its marketing strategies. All have embraced digital transformation, data-driven tools, and elements of agile and personalized marketing. However, implementation depth varies.

Table 1. Implementation of Modern Approaches to Marketing Management in Companies of the Republic of Moldova (Case Study)

Company	MakeUp.md	METRO Moldova	Linella	Kaufland Moldova
Agile Marketing	Yes	Partially	Yes	Yes
Omnichannel Marketing	No	Yes	Yes	Yes
Personalized Marketing	Yes	Yes	Partially	Yes
Data Driven Marketing	Yes	Yes	Yes	Yes
Digital transformation	Yes	Yes	Yes	Yes
ESG / Ethical Marketing	Not specified	Partially	Yes	Partially
Features of implementation	Extensive use of digital tools, email marketing, automatic notifications, beauty blog	Online platform and mobile application, integration with physical stores, METRO Plus program	Using AI for forecasting, assortment analytics, supporting local producers, sustainability	AI tools for creative generation and personalization, digital loyalty card, focus on authenticity

Source: developed by the author

MakeUp.md is one of the most prominent examples of active digital marketing tool implementation on the Moldovan market. The company is part of the international MakeUp group, specializing in online sales of cosmetics and perfumes. To effectively engage with customers, MakeUp.md utilizes a wide range of digital tools: over 2 million Facebook followers, more than 700,000 Instagram followers, a YouTube channel, an online digest, a beauty editorial blog, over 3 million product reviews on the website, and a dedicated community — the Makeup Club — for sharing beauty tips and experiences. The company also actively uses email marketing and web analytics tools.

One example of MakeUp.md's personalized marketing approach is the automatic notification feature. When a customer adds a product to their cart, they can receive an email if the price of that product drops. Additionally, if the desired item is temporarily out of stock, the user can request a restock notification, which is sent as soon as the product becomes available.

A noteworthy example of effective omnichannel marketing implementation in Moldova is METRO Moldova. The company has created an integrated ecosystem of digital and physical channels, ensuring convenience, flexibility, and a personalized customer experience at every stage of interaction. For wholesale buyers, an online platform called MShop has been developed, offering easy ordering and full access to the product range. For retail customers, the Zakaz delivery system is available — via both website and mobile app — with home delivery service.

The METRO Companion mobile app provides users with access to a digital membership card, purchase history, bonus points, and personalized offers, effectively integrating online and offline experiences. Additionally, the METRO Plus loyalty program offers customers bonus points, individual discounts, and special promotions based on analysis of purchasing behavior. One of the key elements of METRO's omnichannel strategy is the consistency between digital platforms and physical stores. For example, customers can place an order online and pick it up at the nearest store, offering convenience and flexibility.

Both MakeUp.md and METRO partially implement personalized marketing tools. MakeUp.md, for instance, uses personalized email newsletters featuring products that may interest specific users. This is made possible through behavioral analysis on the website, including browsing history, items added to the cart, and previous purchases.

METRO Moldova, on the other hand, leverages the METRO Plus loyalty program, through which customers receive personalized discounts and offers based on the analysis of their purchase history, visit frequency, and product preferences. Additionally, through the METRO Companion mobile app, users receive customized recommendations and notifications, enabling marketing communications to be tailored to the interests of specific audience segments.

Linella, the largest national supermarket chain in the Republic of Moldova, actively implements modern marketing management approaches, including digital marketing, agile marketing, omnichannel strategies, data-driven marketing, as well as ESG and ethical marketing. Linella maintains a strong online presence through its official website, where up-to-date offers, recipes, and contests are featured. The company actively uses social media to promote campaigns and engage with customers. The online store was designed in line with corporate branding and ensures real-time synchronization of prices and inventory, enabling customers to access accurate product availability information.

The company actively uses analytical tools to optimize its product assortment and manage product categories. The implementation of solutions from SymphonyAI and Num8erz.Range has enabled the company to increase demand forecasting accuracy to 95% and improve product availability on shelves to 80%. Data analysis has shown that the system implementation brought the following benefits to Linella:

1. Inventory optimization. Improved forecast accuracy allowed for a reduction in excess inventory, freeing up working capital and space in retail outlets.
2. Reduced labor for order processing. Transitioning from a decentralized to a centralized ordering approach reduced the time needed to create orders and allowed store personnel and managers to focus on other tasks, as well as decreasing the number of errors.
3. Improved product availability. With user-friendly dashboards, stores monitor product availability for each item and category daily, helping to prevent stockouts and avoid lost sales.
4. Enhanced central office control. The system generates orders based on sales history and considers numerous factors, including promotions, delivery schedules, and shipment timings. Eliminating the need to recheck centralized orders has shortened processing times.
5. Shelf stock presentation. Empty shelves or products that appear aged on display can frustrate customers. The system considers the amount of display stock required until the next delivery, helping to prevent shelf gaps and improve the shopping experience.

Linella provides a seamless shopping experience through various channels: physical stores, an online platform, and a mobile app. Its loyalty program is integrated across all channels, enabling customers to earn and redeem bonuses regardless of their shopping method. The company places great emphasis on sustainability and social responsibility, supporting local producers by offering more than 50% of its products from local sources. It also implements environmental initiatives such as installing solar panels, electric vehicle charging stations, and using biodegradable bags.

Kaufland Moldova is actively developing its digital channels. The digital loyalty card *Kaufland Card*

was launched, and its usage share has grown from 30% to 70% between 2019 and 2024. Investments in digital tools have increased significantly—by over 400%—including in social media, mobile apps, and display advertising (GDN).

To visualize video project concepts, Kaufland uses artificial intelligence tools such as Midjourney, which help quickly generate moodboard options based on detailed technical briefs. This accelerates the creative preparation stage, offers visual ideas to the team, and simplifies the coordination process with contractors. Additionally, to personalize promotional offers for customers, the company applies AI solutions like Reko, which analyze purchase data and user preferences to create personalized promotions and recommendations. These tools help Kaufland deliver more relevant offers, enhancing response rates and customer loyalty.

Despite digitalization, the company emphasizes the human factor, emotions, and authenticity in communication. AI is regarded as an auxiliary tool, but decision-making and creative output remain human-driven.

Conclusion

Modern conditions of digital transformation, rapid technological advancement, and fast-changing consumer behavior present new challenges for businesses, requiring companies to shift toward more complex, flexible, and adaptive models of marketing management. Traditional methods of promotion and customer interaction are no longer sufficient to meet the expectations of today's consumer, who values personalization, convenience, transparency, and corporate social responsibility.

The practices of companies such as Kaufland Moldova, Linella, MakeUp.md, and Metro Moldova illustrate the successful integration of contemporary marketing management approaches, which combine digital technologies, agile methodologies, omnichannel communication, and data-driven solutions. The use of digital marketing allows companies to expand audience reach, respond swiftly to changing demand, and effectively personalize the customer experience. Agile methods support the rapid adjustment of marketing strategies, hypothesis testing, and fast decision-making.

Thus, marketing management is evolving from a set of operational functions into a comprehensive managerial paradigm, integrated into business strategy and grounded in principles of flexibility, analytics, and sustainability. Companies aiming for long-term growth must develop not only a marketing toolkit but also the infrastructure to manage and leverage it effectively.

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The research was conducted under the subprogram 030101 “Strengthening the resilience, competitiveness, and stability of the economy of the Republic of Moldova in the context of the EU accession process.”

PSYCHOSOMATIC PRACTICES AND INNOVATION AS PILLARS OF ORGANIZATIONAL COMMITMENT IN UNCERTAIN TIMES

DOI: <https://doi.org/10.53486/dri2025.13>

UDC: 159.9:[005.334:005.32]

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Abstract: *This study investigates how psychosomatic resilience and innovative practices can increase organizational commitment in dynamic business contexts. Amid economic downturns, technological disruptions, and workforce challenges, companies need effective strategies to sustain employee dedication and loyalty. The research examines how psychosomatic approaches, which emphasize the interplay of mental and physical health, combined with innovation-oriented initiatives, lead to enduring organizational loyalty. Using a systematic literature review, the study synthesizes insights from academic articles and industry reports published from 2010 to 2024. Materials were sourced from academic databases and rigorously evaluated through thematic analysis to uncover leading trends and strategic perspectives. Results indicate that adopting psychosomatic measures, such as stress reduction programs and resilience training at the workplace, paired with innovation-driven strategies, enhance employee motivation, engagement, and retention. Leadership plays a pivotal role in integrating these strategies by fostering psychological safety and adaptability. This research enriches the field of strategic human resource management and provides actionable guidance for modern leaders aiming to bolster organizational resilience. Being constrained by reliance on secondary data, the study still provides a multidisciplinary framework and suggests avenues for future empirical studies and more specific industry applications.*

Key words: *psychosomatic resilience, innovation, organizational commitment, employee engagement, turbulent environments*

JEL: M12, M54, O31, I19

1. Introduction

In today's dynamic business environment, organizational commitment plays a crucial role in shaping company success. It reflects employees' psychological attachment and loyalty, directly influencing motivation, performance, and retention. Research shows that organizations with committed employees benefit from increased productivity, lower turnover, and stronger customer satisfaction (Awwad et al., 2024). However, modern businesses operate in turbulent conditions, facing economic crises, technological shifts, and geopolitical instability. These challenges create uncertainty, leading to disengagement, absenteeism, and reduced organizational performance. To navigate such complexities, companies must adopt innovative strategies that enhance both resilience and adaptability. One effective approach is integrating psychosomatic resilience with innovation, fostering a work culture that supports both employee well-being and creative problem-solving. Organizational commitment refers to the psychological bond employees develop with their organization, influencing their willingness to remain and contribute. Meyer and Allen (1991) conceptualized it through three dimensions: affective commitment, based on emotional attachment; continuance commitment, influenced by perceived costs of leaving; and normative commitment, driven by a sense of obligation. These elements collectively shape engagement, directly impacting workplace performance.

Studies confirm that committed employees drive organizational success. Meyer et al. (2002) found that high organizational commitment correlates with greater productivity, innovation, and financial stability. Employees who feel committed exhibit discretionary behaviors that strengthen team dynamics and customer relations. Furthermore, Massoud and Jameel (2020) highlight that engaged employees improve customer satisfaction, as their commitment to quality service fosters long-term customer loyalty. Given these advantages, businesses must actively nurture commitment, especially in unstable environments where job security and morale are frequently challenged.

The contemporary business world is shaped by volatility, uncertainty, complexity, and ambiguity (VUCA). Economic downturns, rapid technological advancements, and geopolitical instability exacerbate these uncertainties (Rimita, 2019). Economic crises can lead to budget cuts, layoffs, and reduced consumer spending, creating financial strain and eroding employee confidence. Organizations operating in sectors vulnerable to financial fluctuations must adopt stability-focused strategies to retain committed employees.

Technological disruptions present another major challenge. With industries evolving through digital transformation, automation, and artificial intelligence, employees may face job insecurity or skill redundancy. Failure to adapt can result in reduced morale and diminished commitment. Geopolitical instability, such as trade conflicts and regulatory shifts, further destabilizes businesses. Policy changes and global tensions can disrupt supply chains and force structural changes, causing employee uncertainty regarding job security and career prospects.

External disruptions have direct psychological impacts, often triggering stress, anxiety, and disengagement. Research by Boyne and Meier (2009) suggests that unpredictable environments negatively affect organizational performance, as employees struggle to stay motivated amid instability. To address these concerns, companies must implement strategies that strengthen resilience and foster commitment, ensuring employee engagement despite external volatility.

Organizations must integrate psychosomatic resilience and innovation to counteract turbulence. Psychosomatic resilience connects mental and physical well-being, recognizing that workplace stress manifests in symptoms like fatigue, burnout, and decreased productivity. Companies prioritizing mental health programs, mindfulness, and emotional intelligence training cultivate supportive environments that enhance commitment. Studies show that employees with lower stress levels exhibit higher engagement (Buga, 2023), reinforcing the need for structured well-being initiatives.

Alongside psychosomatic resilience, fostering innovation is key to sustaining commitment. Innovation extends beyond technology, promoting an adaptive mindset where employees embrace change and contribute to problem-solving. Companies that cultivate innovation empower employees, making them more invested in organizational success. Dzieńdziora et al. (2022) found that innovative workplaces instill a sense of purpose, increasing motivation and long-term commitment.

The synergy between psychosomatic resilience and innovation presents a holistic approach to commitment. Employees supported in managing stress and uncertainty are more likely to contribute to a culture of innovation. In turn, organizations that encourage creativity provide employees with control and agency, reducing psychological distress. Combining these strategies enables companies to maintain a stable and engaged workforce despite external disruptions.

This paper explores how organizations can foster employee commitment by integrating psychosomatic resilience and innovation. It examines the role of psychosomatic strategies in enhancing well-being and commitment, evaluates how innovation strengthens engagement and adaptability, and proposes a framework for integrating these strategies to reinforce organizational resilience. The paper begins with a Methodology section that outlines a systematic literature review of academic and industry sources on organizational commitment, psychosomatic resilience, and innovation. The Literature Review builds a theoretical foundation, showing how psychosomatic resilience and innovation contribute to stability and engagement in uncertain environments. In the Findings, the paper analyzes how mental resilience and innovation jointly support long-term employee commitment, particularly in volatile conditions. The

Discussion interprets these insights, offering practical recommendations for leadership and HR, including stress reduction, employee support, and innovation initiatives. The Conclusion reinforces the value of integrating psychosomatic and innovative strategies to strengthen commitment and adaptability in turbulent organizational contexts.

2. Methodology

This study uses a systematic literature review (SLR) to explore the relationship between organizational commitment, psychosomatic resilience, and innovation in turbulent environments. The SLR method enables a structured synthesis of theoretical and empirical findings across the disciplines of management, psychology, and innovation, based on the methodology outlined by Tranfield et al. (2003). Sources were selected from high-quality databases including Web of Science, Scopus, and ProQuest, and supplemented with industry reports from leading consulting firms. Only peer-reviewed articles published between 2010 and 2024 were included to ensure contemporary relevance. Key search terms included *organizational commitment*, *psychosomatic resilience*, *employee engagement in crisis*, and *innovation and loyalty*.

A thematic analysis, following Braun and Clarke (2006), was used to identify patterns and group findings into core themes such as workplace stress, innovation as a driver of engagement, and strategies for maintaining commitment in uncertainty. This helped synthesize diverse insights into a cohesive framework for understanding how psychosomatic and innovative practices support commitment.

While the SLR offers academic rigor and interdisciplinary breadth, it also has limitations. These include a reliance on secondary data, limiting causal inference, and potential publication bias, as positive findings are more frequently published. Furthermore, insights from adjacent fields like neuroscience or behavioural economics may be underrepresented. An SLR was chosen over empirical methods due to the interdisciplinary scope and complexity of the topic. Longitudinal or experimental studies would be required to test specific interventions. Thus, this method offers a robust and structured foundation for theory-building and future applied research.

3. Literature Review

3.1. Understanding Organizational Commitment in Uncertain Times

Organizational commitment reflects an employee's psychological attachment to their organization, influencing retention and performance. Porter et al. (1974) described organizational commitment as an individual's alignment with a company's objectives and their readiness to put in effort. Meyer and Allen (1991) further enhanced this idea, identifying three dimensions: *affective commitment* (emotional connection to the organization), *continuance commitment* (recognition of the costs of leaving), and *normative commitment* (a sense of duty). These elements are key for fostering employee engagement and loyalty, which are the basis for organizational stability.

Challenging business contexts, characterized by economic instability, technological disruptions, and geopolitical conflicts, pose significant barriers to maintaining a high commitment. Economic downturns can lead to job insecurity, to layoffs, and decrease morale and employee dedication (Dögl and Holtbrügge, 2014; Filimonau et al., 2020). Rapid technological advancement can outpace existing skills, resulting in a higher workplace stress. Geopolitical instability further intensifies these challenges, influencing motivation and employee retention (Reade and Lee, 2012; Einwiller et al., 2021).

Leadership must nurture commitment amid such uncertainties. Transformational leadership, which motivates employees by fostering a shared vision, strengthens commitment and leads to positive organizational behaviors, reducing turnover (Sun and Wang, 2017; Herman et al., 2013). Moreover, acknowledging employees' efforts increases morale and engagement, particularly in volatile work settings (Anitha, 2014; Markos and Sridevi, 2010).

3.2. Psychosomatic Resilience as a Strategy for Organizational Stability

Psychosomatic resilience refers to a human's capacity to preserve both mental and physical health under workplace pressures. Stress, anxiety, and burnout commonly manifest in physical symptoms such as chronic fatigue or heart-related conditions (Siegrist, 2016). Fostering psychosomatic well-being is important for maintaining employee productivity and dedication in demanding work environments.

Hans Selye's *General Adaptation Syndrome (GAS)* framework showcases the stages of chronic stress: alarm, resistance, and exhaustion, with extended stress culminating in burnout (Maslach and Leiter, 2016). The *Job Demand-Resource (JD-R) Model* points that high job demands, when not balanced with adequate resources, often lead to increased employee strain and disengagement (Bakker and Demerouti, 2017).

Organizations implementing psychosomatic health strategies foster resilience, reducing turnover (Schaufeli, 2017).

Stress-related challenges, including economic downturns and restructuring, negatively impact well-being and performance (Ganster and Rosen, 2013). Job insecurity heightens anxiety and physical health risks, reducing engagement (Cotton et al., 2022). Employees with low psychosomatic resilience struggle with emotional regulation, leading to impaired decision-making and job dissatisfaction (Hobfoll et al., 2018). This weakens affective commitment and increases turnover risk (Cooper and Quick, 2017).

Companies adopting stress-reduction initiatives, such as flexible work policies, wellness programs, and skill development, improve resilience (Grawitch et al., 2015). Self-regulation techniques, including mindfulness and cognitive restructuring, enhance emotional resilience and job satisfaction (Vohs and Baumeister, 2016). A meta-analysis found mindfulness interventions reduce burnout and improve retention (Lomas et al., 2017). Companies like Google and Intel have successfully implemented such programs, boosting commitment (Good et al., 2016).

Other psychosomatic interventions include biofeedback training, relaxation techniques, and resilience coaching. Biofeedback improves stress regulation by tracking physiological responses (Yu et al., 2018). Organizations promoting physical activity, sleep hygiene, and nutrition see higher job engagement and lower absenteeism (Ratey and Loehr, 2011, Siu et al., 2014). Workplace coaching incorporating breathing exercises and guided visualization improves resilience and commitment (Grant, 2017).

3.3. Innovation as a Driver of Organizational Commitment

Innovation contributes to organizational success by stimulating adaptability and strengthening employee loyalty. It fosters engagement by instilling a sense of purpose and opportunities for professional growth (Amabile and Pratt, 2016). By promoting a creative problem-solving approach, innovation sustains employee dedication, and reduces workplace stagnation. The Job Demand-Resource (JD-R) Model shows that access to innovative opportunities increases motivation and improves retention (Bakker and Demerouti, 2017). Workers in progressive organizations are more probable to develop emotional attachment, or affective commitment, to their workplace.

Companies that make innovation a priority report higher levels of engagement and lower turnover (Liu et al., 2019). Employees who feel their contributions are cherished show greater loyalty. Furthermore, innovative environments are appealing to younger people who seek career advancement and creative freedom.

Innovation enables organizations to manage crises while fostering employee commitment. For instance, under Satya Nadella's leadership, Microsoft adopted a growth-oriented culture, moving away from outdated hierarchies toward a learning-focused environment, which boosted employee engagement and retention (Ibarra et al., 2018). Similarly, in the early 2000s, LEGO dealt with financial hurdles but decided not to reduce the workforce and introduced the LEGO Ideas Platform,

a collaborative initiative engaging both employees and customers in product development. This approach reinvigorated engagement and refreshed the brand (Robertson and Breen, 2013).

During the COVID-19 crisis, Siemens implemented a digital transformation program using hybrid work arrangements and AI-supported collaboration tools. These changes led to greater job satisfaction and productivity, proving that innovation sustains commitment amid uncertainty (Benmoussa, 2023). An innovation-driven culture contributes to employee well-being by enhancing psychological safety, empowerment, and skill growth. Psychological safety, where workers are not afraid to take risks, boosts creativity and engagement (Newman et al., 2017).

Organizations promoting continuous learning and knowledge-sharing boost motivation and commitment. Google's 20% time policy, which allows employees to work on passion projects, is linked to increased innovation and job satisfaction (Bock, 2015).

4. Findings

This section synthesizes key insights from psychosomatic strategies and innovation and their combined impact on organizational commitment. Psychosomatic strategies significantly enhance employee well-being and productivity. Mindfulness interventions have also been linked to lower burnout and higher job satisfaction (Lomas et al., 2017).

Innovation fosters creativity and problem-solving, strengthening employee engagement. Research confirms that companies emphasizing innovation experience lower attrition and higher job satisfaction (Liu et al., 2019). Pro-innovative HR practices enhance psychological contracts, boosting commitment and workplace morale (Gadomska-Lila and Rogozińska-Pawelczyk, 2021). Transformational leadership supports psychosomatic and innovative practices, creating environments that promote well-being and creativity. Leaders with strong psychological capital positively influence employee innovation and engagement (Li et al., 2020). Organizational interventions are most effective when backed by proactive leadership. Psychological safety—employees' ability to take risks without fear—enhances innovation and engagement. Team psychological safety has been linked to improved communication and innovative performance (Gong et al., 2012).

Organizations combining psychosomatic resilience programs with innovation initiatives see higher employee engagement. Companies that promote well-being alongside creativity foster commitment and retention (Keskes, 2014). Psychometric assessment tools have modernised talent management by improving employee engagement and performance. Human resource strategies that promote ongoing learning and innovative problem-solving are a strong basis for employee dedication. Studies show that cultivating an innovative culture increases job satisfaction and psychological well-being (Gadomska-Lila and Rogozińska-Pawelczyk, 2021). However, challenges such as resource constraints and resistance from management can slow down the adoption of these practices. Addressing these barriers requires highly committed leadership and a workplace culture that values both employee well-being and innovation.

5. Discussion

The systematic review shows the vital connection between psychosomatic approaches and innovative practices in improving organizational commitment, especially during instable times.

Psychosomatic interventions, play a pivotal role in supporting employees' mental and physical well-being. These methods are between psychological and physiological health, alleviating stress-related symptoms like continuous fatigue and heart conditions, which are common in demanding workplaces (Siegrist, 2016). By adopting such strategies, organizations can stimulate employee engagement and productivity, ultimately leading to greater loyalty to the organization.

Innovation is essential for companies that aim to be competitive amid fast-paced technological changes and economic crises. A focus on innovation not only enhances organizational performance but also leads to a greater adaptability. Such an environment encourages employees to come up with creative solutions,

which reduces job dissatisfaction and turnover intentions. As a result, a strong innovation culture is associated with improved employee engagement and dedication (Benmoussa, 2023).

Leadership is paramount in blending psychosomatic strategies with innovation efforts. Transformational leaders who value employee well-being and promote creative thinking foster a workplace climate that puts psychological safety among the top priorities.

This, in turn, leads to improved communication, increased trust, and a stronger sense of organizational commitment among employees (Liu et al., 2019).

Psychological safety, defined as a shared belief that the work environment is safe for interpersonal risk-taking, plays a mediating role in the relationship between psychosomatic strategies, innovation, and organizational commitment. A psychologically safe workplace encourages employees to express ideas and concerns without fear of negative consequences, thereby promoting innovation and strengthening commitment (Gong et al., 2012).

In volatile and uncertain contexts, managers and leaders must adopt strategies that integrate psychosomatic approaches and innovation to maintain and enhance organizational commitment. Managers should implement psychosomatic interventions, such as mindfulness training and stress management programs, to support employees' mental and physical health. By addressing work-related stressors, organizations can reduce psychosomatic symptoms and improve overall well-being, leading to increased commitment and reduced turnover (Ganster and Rosen, 2013). Encouraging a culture that values creativity and continuous improvement enables organizations to adapt to changing environments effectively. Providing resources and opportunities for employees to engage in innovative projects enhances job satisfaction and loyalty (Amabile and Pratt, 2016). Leaders must cultivate adaptive capabilities to navigate complex and dynamic situations. The Michigan Model of Leadership emphasizes the importance of recognizing and managing competing tensions, enabling leaders to make informed decisions that balance organizational needs with employee well-being (Cignitas et al., 2021).

Creating an environment where employees feel safe to take interpersonal risks is essential. Leaders can achieve this by promoting open communication, demonstrating empathy, and showing genuine concern for employees' well-being, thereby fostering a sense of security that encourages innovation and commitment (Edmondson, 1999). Organizations should proactively address potential stressors by designing work processes that consider employees' psychological health. This includes ensuring manageable workloads, clear communication during organizational changes, and providing support systems to help employees navigate transitions (Dollard and Bakker, 2010).

While existing literature underscores the benefits of integrating psychosomatic approaches and innovation to bolster organizational commitment, several areas warrant further exploration. Long-term studies are needed to assess the sustained impact of combined psychosomatic and innovation interventions on organizational commitment. Such research would provide insights into the enduring effects of these strategies and inform best practices for implementation. Investigating how different industries can tailor psychosomatic and innovation strategies to their unique challenges would offer valuable, context-specific guidance. For instance, the healthcare sector may benefit from resilience training programs designed to address the high-stress nature of clinical environments (Marcatto et al., 2024). Cultural dimensions significantly influence the effectiveness of psychosomatic and innovation initiatives. Research examining how cultural differences impact the adoption and success of these strategies can help multinational organizations design culturally sensitive interventions (Hofstede, 2001). With the rise of remote work, studies should explore how virtual environments affect the implementation and outcomes of psychosomatic and innovation strategies. Understanding these dynamics is crucial for developing effective remote work policies that maintain employee well-being and commitment (Charalampous et al., 2019). Research focusing on the combined impact of psychosomatic and innovation interventions can identify potential synergies that amplify organizational commitment. This includes examining how the integration of these approaches influences various dimensions of commitment, such as affective, continuance, and normative commitment.

6. Conclusions

This study explored the critical intersection between psychosomatic strategies and innovation as mechanisms for strengthening organizational commitment in turbulent environments. Drawing from an extensive literature review and thematic synthesis, the findings affirm that employee well-being and adaptability are deeply interconnected and central to organizational resilience and success.

Psychosomatic strategies—such as mindfulness, stress management, and resilience training—directly address the psychological and physiological burdens employees face in unstable contexts. By mitigating stress-related symptoms and promoting emotional regulation, these practices not only improve individual health outcomes but also enhance organizational loyalty and engagement. Organizations that prioritize psychosomatic resilience are better equipped to retain talent and foster a supportive workplace culture.

Simultaneously, fostering a culture of innovation emerges as a vital driver of organizational commitment. Innovation empowers employees to contribute creatively, enhances their sense of purpose, and reinforces affective commitment to the organization. Case studies of organizations such as Microsoft, LEGO, and Siemens demonstrate that innovating during crises helps companies to maintain operations while improving employee trust, motivation, and job satisfaction.

Leadership is pivotal to mixing psychosomatic and innovative approaches. Transformational and adaptive leaders who value psychological safety, foster creativity, and advocate for employee well-being create workplaces where individuals can excel. Psychological safety serves as a key mediator, linking innovation with engagement by enabling employees to take risks without fear, thereby improving both creativity and organizational loyalty.

For leaders and managers, the findings point out a critical shift: well-being and innovation should not be treated separately. Adopting an integrated approach that supports both psychosomatic health and encourages creative problem-solving is of great importance for sustaining employee commitment, particularly in times of economic volatility, technological shifts, and global challenges.

Further research can explore how combined psychosomatic-innovation frameworks work over extended periods, across different sectors, and in mixed cultural contexts. Longitudinal studies, industry-specific cases, and observation of remote work dynamics will offer insights to modernise these approaches.

Ultimately, organizations that focus on both the emotional resilience and creative capacity of their employees will not only get through turbulent times but also become more adaptable, resilient, and prepared for long-term success in the complex global landscape.

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CONSTRUCTION MATERIALS MARKET IN THE REPUBLIC OF MOLDOVA: DYNAMICS, DEMAND AND INVESTMENT PROSPECTS

DOI: <https://doi.org/10.53486/dri2025.14>

UDC: 658.5(478):691.17

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Abstract. *Given the rapid changes in the Republic of Moldova's construction sector, it is important to conduct exhaustive market environment research in order to support strategic management choices, particularly those relating to the establishment of new production facilities. In this study, the subject of analysis is the feasibility of opening a factory for the production of adhesives for thermal insulation systems. The theoretical significance of this analysis lies in identifying the relationship between price indexes in construction and the investment attractiveness of niche segments of the construction market. Therefore, this article's goal is to assess the rationale behind opening a thermal insulation adhesive factory by examining how the Republic of Moldova's building market has changed over the last five years. Official data for the years 2019–2023 from the National Bureau of Statistics of the Republic of Moldova is used as an empirical basis for this purpose. This data enables the identification of pricing trend dynamics and their possible influence on the anticipated business model.*

Key words: *strategic decision, construction materials, demand, organization, analyses.*

J.E.L. classification: M00, M1, M2

1. Introduction

The decision to open a factory in Moldova is a strategic one that requires comprehensive analysis. To ensure the project's success, it is necessary to consider the specific characteristics of the market environment, the dynamics of the construction sector, and general market trends. As Michael Porter notes, “a deep understanding of the industry structure and competitive forces is the basis for developing a sustainable strategy” (Porter, 2008). In addition to the above, I. Ansoff emphasizes that “strategic decisions should be based on a thorough comparison of external opportunities with the internal potential of the company” (Ansoff, 1987). In that regard, the market analysis lowers uncertainty, enables a well-informed planning approach, and supports management choices that support the long-term growth of new production.

Assessing the market environment is essential for making strategic decisions on the initiation of new production in the quickly changing construction sector of the Republic of Moldova. The National Bureau of Statistic (NBS) of the Republic of Moldova's building price index data for the years 2019–2023 were used in this research to determine if it would be feasible to open a plant for the manufacturing of thermal insulation adhesives (NBS, 2024).

Relevance and motivation for choosing the research topic are established by the need to make informed management decisions in a volatile market environment and the growing interest in localizing manufacturing in the Republic of Moldova. As the construction industry expands, new advancements in the field of high-quality building materials—particularly adhesives for thermal insulation—are required. Additionally, the purpose of the research is to evaluate the viability of establishing a factory to produce thermal insulation adhesives while accounting for the macroeconomic and market dynamics of the Republic of Moldova.

The construction price index data published by the National Bureau of Statistics of the Republic of Moldova for 2019–2023 (NBS, 2024) is one of the secondary data sources used in the study investigation. The use of this secondary data allows a retrospective analysis of the sector dynamics,

an objective assessment of price developments and provides a solid basis for estimating market opportunities.

Furthermore, the analysis is sustained by the practical experience and knowledge of the author in the field of construction and business strategy, which contributes to an applied and relevant interpretation of the data in the specific context of the Moldovan market.

2. Basic content

According to official data, the composite price index for the construction industry has shown steady growth since 2019, rising from 103.3 in 2019 to 104.4 in 2023. More specifically, the price index for construction and installation work, which most accurately reflects activity in the consumption of construction materials, rose from 104.7 to 108.7 over the same period. Due to geopolitical and economic shifts that impacted the rise in the cost of raw materials, logistics, and construction services generally, the increase was especially apparent in 2022, when the index achieved a value of 123.8. Figure 1 illustrates this data.

Opening local adhesive production in Moldova reduces import costs, stabilises prices for consumers and increases profitability. In the context of rising prices and the transition to energy efficient construction, such production will ensure sustainable demand (Aftenev, 2023).

Thus, based on the analysis of price dynamics in construction, we can conclude that the opening of a factory in Republic of Moldova is a strategically step, and the market for materials construction maintains positive development dynamics. In further growth or stability of demand is expected in the next five years, which confirms the prospectivity and economic feasibility of this project.

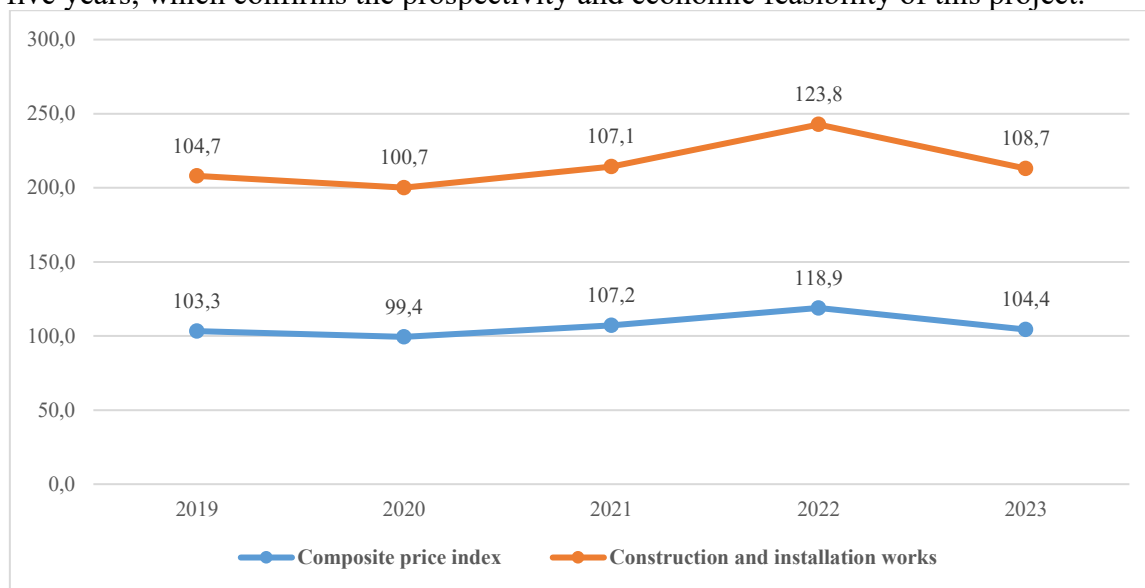


Figure 1. Price indices in construction by indicators and years

Source: Information taken from (NBS, 2024)

The number of construction enterprises by type of ownership for the years 2019–2023 can be used to draw a number of important conclusions about the status and development trends of the construction industry in the Republic of Moldova (NBS, 2024). These results are reflected in Table 2. Nationally, the overall number of construction organizations grew from 1,624 in 2019 to 2,006 in 2023 over the five years. The increase is particularly notable in 2019–2022, when the number of organizations increased by over 380. Although there is a slight decrease from 2.011 to 2.006 in 2023, the total number of companies remains at a high level compared to previous years, indicating stability and sustained interest in the industry.

The private sector remains the most dynamic, accounting for the vast majority of all construction

organisations. The number of private construction companies increased from 1,560 in 2019 to 1,940 in 2023 (NBS, 2024), indicating the active development of SMEs in construction and renovation. This also indicates that the private sector is highly competitive, flexible and adaptable to market conditions. The number of public (state-owned) organisations remains consistently low, ranging from 6 to 14 enterprises, which underlines the dominance of private ownership in the industry and the gradual reduction of the role of the state as a direct developer.

The aforementioned information thus enables the author to come to the assumption that Moldova's construction sector is expanding and that private enterprises are active, which in turn fosters favorable conditions for the growth of domestic manufacturing of building supplies, such as glue for thermal insulation. The increase in the number of participants in market indirectly indicates the presence of demand and need for quality construction solutions, which confirms the feasibility of investments in this sector of the economy.

Table 2. Construction organisations by form of ownership, 2019-2023.

Category	2019	2020	2021	2022	2023
General	1,624	1,881	1,886	2,011	2,006
Public	8	6	14	12	12
Private	1,560	1,808	1,818	1,945	1,940
Mixed (public and private), without foreign participation	12	12	12	12	11

Source: Information taken from the (NBS, 2024)

Table 3 presents data from the Republic of Moldova's 2021–2023 construction works cost analysis by types and construction objects, which indicates a sustainable growth of the construction industry and a shift in priorities in the allocation of investments between major repairs and new construction. The total volume of construction works steadily increased from MDL 16.9 billion in 2021 to MDL 18.7 billion in 2023. The growth rate is about 11% over three years, which confirms the activity of the construction sector and its investment attractiveness. Particularly significant is the increase in the volume of non-residential construction from MDL 4.3 billion in 2021 to MDL 5.57 billion in 2023, an increase of 29% (NBS, 2024). This reflects the expansion of business infrastructure and increasing demand for construction and finishing materials, including glue for thermal insulation.

As for new construction, it remains at a stable high level of about MDL 9-9.5 billion annually, while there is a slight decrease in the costs of new residential construction from MDL 5.37 billion in 2021 to MDL 4.16 billion in 2023. This may indicate a saturation of the primary residential market or a redistribution of investments to other segments. The most striking positive dynamics is observed in the capital repairs of non-residential buildings, where expenditures increased from MDL 1.44 billion in 2021 to MDL 2.17 billion in 2023, an increase of more than 50% (NBS, 2024). This is particularly important from the point of view of local adhesive production, as thermal insulation adhesives are widely used precisely in the renovation and modernisation of buildings.

Thus, it can be concluded that the building materials market in Moldova remains in demand and promising, and the transition to an active phase of capital repairs of non-residential stock makes it particularly favourable for players such as Caparol. The opening of an insulation adhesive factory is a strategically sound move, as the product meets the growing market needs and energy efficiency policy.

Table 3. Construction works, by elements of works design and objects

	2021			2022			2023		
	Cost of construction works (thousand lei, current prices)			Cost of construction works (thousand lei, current prices)			Cost of construction (thousand lei, current prices)		
	General	Residential buildings	Non- residential buildings	General	Residential buildings	Non- residential buildings	General	Residential buildings	Non- residential buildings
General	16,914,133.4	5,593,464.0	4,308,210.4	17,780,265.7	4,748,688.2	4,872,831.0	18,738,496.1	4,487,446.5	5,571,221.0
New construction	9,542,287.9	5,374,141.4	1,852,319.3	9,680,539.0	4,434,756.6	1,978,923.1	9,021,416.0	4,163,163.6	2,036,973.7
Overhaul	3,698,067.6	70,544.9	1,440,185.3	3,844,209.5	142,130.9	1,768,457.1	4,817,429.1	149,386.4	2,173,135.9

Source: (NBS, 2024)

According to the data of the National Bureau of Statistics of Moldova, which are shown in Table 4, in the period from 2022 to 2024 there is a stable activity in the field of housing construction. Thus, the number of issued permits for construction of individual dwellings remains at a high level: 2217 in 2022, 2173 in 2023 and 2170 in 2024 (NBS, 2024). This indicates a stable interest in private construction, which entails a steady demand for construction and finishing materials, including insulation and adhesives.

Particularly noteworthy is the growth in building permits for apartment buildings: from 79 in 2023 to 106 in 2024, an increase of 34%. Given that apartment buildings almost always require comprehensive insulation of facades and walls, we can confidently state that this segment will provide additional demand for the company's products in the coming years.

Table 4. Building permits issued for 2022-2024.

			2022	2023	2024
The whole country	January-December	Residential buildings (apartment buildings)	83	79	106
		Individual houses	2,217	2,173	2,170
		Hotels and similar buildings	13	16	32
		Other buildings	864	920	681

Source: Information taken from the (NBS, 2024)

Thus, based on the statistical data from the Figure 2, the author can conclude that the market of construction materials in the Republic of Moldova remains active, and the demand for adhesives, especially in the field of thermal insulation, will continue and is likely to increase. This confirms the strategic validity of the launch of adhesive production in the country and indicates the existence of favourable conditions for further growth and development of the company.



Figure 2. Issued building construction permits for 2022-2024.

Source: Information taken from the (NBS, 2024)

Analysing the production dynamics of key types of construction materials allows us to better understand the changes in the construction industry of the Republic of Moldova and to assess the potential for development of companies operating in this segment. In order to assess the market conditions, let us consider the statistics for four product categories: varnishes and paints, dry gypsum mixtures, prefabricated concrete elements, and ready-mix concrete; we can review these data in Table 5.

Based on data from the National Bureau of Statistics, there was growth in most items between 2019 and 2021. For example, the production of varnishes and paints increased from 29,358 tonnes in 2019 to 31,867.6 tonnes in 2021 (NBS, 2024). However, a steady decline began from 2022, with only 18,521.1 tonnes produced in 2023, down 41.8% from the peak year of 2021. Similar circumstances may be seen in the dry gypsum mixtures category, where the volume decreased to 181.6 thousand tonnes (-19.2%) in 2023 after increasing to 224.7 thousand tonnes in 2022. The dynamics of the manufacturing of prefabricated concrete pieces are especially significant; they less than doubled, from 533.2 thousand tonnes in 2021 to 209 thousand tonnes in 2023 (-60%).

There was also a decline in the volume of ready-mix concrete, from a peak of 2,454.4 thousand tonnes in 2022 to 1,739.2 thousand tonnes in 2023, a decrease of 29.2%.

Table 5. Production of main types of industrial products

CATEGORIES	2019	2020	2021	2022	2023
Varnishes and paints, tonnes	29 358,0	31 152,2	31 867,6	18 975,3	18 521,1
Dry gypsum mixtures, thousand tonnes	194,3	217,2	210,7	224,7	181,6
Prefabricated elements for construction from cement, concrete or artificial stone, thousand tonnes	527,5	603,0	533,2	220,9	209,0
Non-fireproof concrete ready for pouring, thousand tonnes	2 061,5	1 894,2	2 168,2	2 454,4	1 739,2

Source: Information taken from the (NBS, 2024)

The conclusion from these data is clear: starting from 2022, the construction materials market in Moldova will experience a decline, which may be due to the completion of major construction projects, a decrease in financing to the construction industry or general economic instability. The decline in production reflects structural changes in the Moldovan construction market. This does not necessarily mean a crisis, but rather a transformation of demand, where the emphasis is shifting towards renovation, energy efficiency, import substitution and new forms of construction. The analysis shows that the share of major repairs has been increasing in recent years. This means that developers and private clients are increasingly opting for renovation and modernization rather than complete construction from scratch. For companies, this is a challenge, but also a chance to adapt by focusing on high-quality, niche and energy-efficient products such as insulation adhesives.

According to the National Centre for Sustainable Energy, in April 2024, the Government of the Republic of Moldova approved the Financing Programme of the Fund for Energy Efficiency in the Residential Sector for 2024-2027 (Government of the Republic of Moldova, 2024). With a budget of 1.4 billion lei, the EEF programme creates a sustainable solvent demand for facade insulation products, including specialised adhesives. A key feature of the programme is the mixed financing mechanism: up to 70% of the project cost is covered by grants from the EHIF, 30% is the residents' own contribution, at least 50% of the heated area to be repaired must belong to vulnerable households, including those in energy poverty.

This is especially true for apartment buildings, where a complex façade system is required and adhesive is its key component. The company's decision to start local production of adhesives in Moldova can be considered strategically justified, taking into account the growing demand caused by

the state energy efficiency policy. This allows the company to: reduce costs compared to importing adhesives, offer a more competitive price to contractors working within the framework of state programmes, gain an advantage as a local supplier able to respond quickly to demand, be integrated into the state agenda and qualify for participation in tenders or partnership projects for thermal modernisation of residential buildings.

Thus, the launch of adhesive production in Moldova strengthens the organisation's position on the building materials market and opens access to large-scale projects financed by the state and international partners.

3. Conclusions

Based on the analysis of statistical data of the National Bureau of Statistics of RM for the period 2019-2023, we can conclude that the production volumes of key construction materials decreased: paint and varnish materials by 42%, prefabricated concrete elements by 60%, dry mixes by 16%, concrete by 15%. In parallel, there was an increase in capital repairs of non-residential buildings (+50%). Despite the downturn in new construction, there is still a steady demand for products for renovation and energy efficient solutions. The launch adhesive manufacturing is a wise strategic move for the examined company, especially considering the increasing need for thermal insulation. By focusing on the expanding building restoration and energy efficiency market, the company may carve out a viable niche.

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MANAGERIAL INNOVATION AND SUSTAINABLE ENTREPRENEURSHIP EDUCATION: STRATEGIC INSIGHTS FROM HIGH SCHOOL SYSTEMS

DOI: <https://doi.org/10.53486/dri2025.15>
UDC: 005.342:373(478)

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Abstract: *This article investigates how managerial innovation contributes to the development of sustainable entrepreneurial skills in secondary education, with a focus on practices from Romania and the Republic of Moldova. The primary objective is to highlight the impact of innovative managerial strategies on teaching and learning processes in a context marked by economic, social, and environmental challenges. The study adopts a qualitative methodology, relying on the comparative analysis of curricular documents, educational strategies, and relevant institutional case studies. The findings reveal the effectiveness of active pedagogical methods—such as project-based learning, school-community partnerships, and international collaborations—in promoting an entrepreneurial education grounded in sustainability principles. The research also identifies systemic limitations, including unequal access to resources, resistance to change, and the lack of ongoing teacher training. In light of these aspects, the study proposes directions for curriculum reform and institutional development, emphasizing the importance of a shared vision among teachers, policymakers, and the private sector. The contribution of this research lies in the development of a theoretical and practical model for implementing sustainable entrepreneurship in schools and in recognizing the essential role of educational institutions in shaping a fair and responsible future.*

Keywords: *sustainable entrepreneurship, educational leadership, organizational culture, sustainable development*

JEL: I21, L26, O35

1. Introduction

In the current context of rapid social and economic transformation, coupled with escalating environmental issues, education plays a strategic role in preparing young people to face global challenges. One of the globally recognized priorities is the promotion of sustainable thinking that supports innovation and fosters social and ecological balance. The topic is relevant not only from an academic standpoint but also as a direct response to the 2030 Agenda for Sustainable Development of the United Nations, which emphasizes the need for quality education as a cornerstone of global progress (Istrate, 2021; Cojan, 2022). Within this specific framework, the development of an educational culture centered on sustainable entrepreneurship is regarded as a key element in contemporary curriculum reform. Education not only stimulates innovation and entrepreneurial spirit, but also promotes values of social, environmental, and cultural responsibility (Georgescu, 2024). The aim of this study is to investigate the effectiveness of educational strategies applied in secondary education for the development of sustainable entrepreneurial competences, through the lens of managerial innovation and curricular adaptation. The research focuses on identifying “strategic deviations” in current curricular plans that hinder the integration of sustainability principles into educational content. This article not only examines the current state of entrepreneurial education in the two countries, but also proposes a strategic and action-oriented vision that may contribute to preparing a new generation of educational leaders and young entrepreneurs committed to building a sustainable future.

2. Theoretical and Conceptual Framework

This research is grounded in a set of key concepts that shape the theoretical and practical directions of the study, offering analytical clarity for each construct within the scope of sustainable entrepreneurship education.

- **Sustainable entrepreneurship** is defined as the process of identifying and developing business initiatives that generate economic value while simultaneously taking into account social responsibility and environmental protection. According to the literature, this concept involves assessing entrepreneurial decisions based on their long-term impact on natural resources and local communities, moving from a profit-only logic to an ethical and sustainable approach (Fanea-Ivanovici & Baber, 2022).
- **Managerial innovation** refers to the continuous adaptation of how educational institutions manage activities in response to a changing environment and the challenges it presents. This involves revising decision-making processes, integrating new technologies, and implementing innovative pedagogical approaches to enhance educational performance and support curriculum revision (Avidov-Ungar & Eshet-Alkalai, 2011).
- **Educational leadership** encompasses the set of skills and behaviors through which education leaders influence learning processes and organizational culture. This type of leadership fosters innovation, supports the professional growth of teaching staff, and promotes a vision of education grounded in social responsibility and sustainable development (Rață & Bîrnaz, 2023).
- **Organizational culture** reflects the entire system of values, norms, and practices that define institutional identity and influence the capacity to adopt and implement innovation. A positive organizational environment provides a favorable context for change and supports the promotion of an educational model that is sustainable, inclusive, and participatory (Berkovich & Eyal, 2021).
- The concept of **sustainable development** is highly relevant in the context of modern education and implies meeting the needs of the present generation without compromising the ability of future generations to meet their own. It involves balancing economic, social, and environmental dimensions. In the field of education, sustainable development offers a guiding framework for curricular reform and encourages students to develop critical and ethical perspectives (Chang & Lien, 2020).

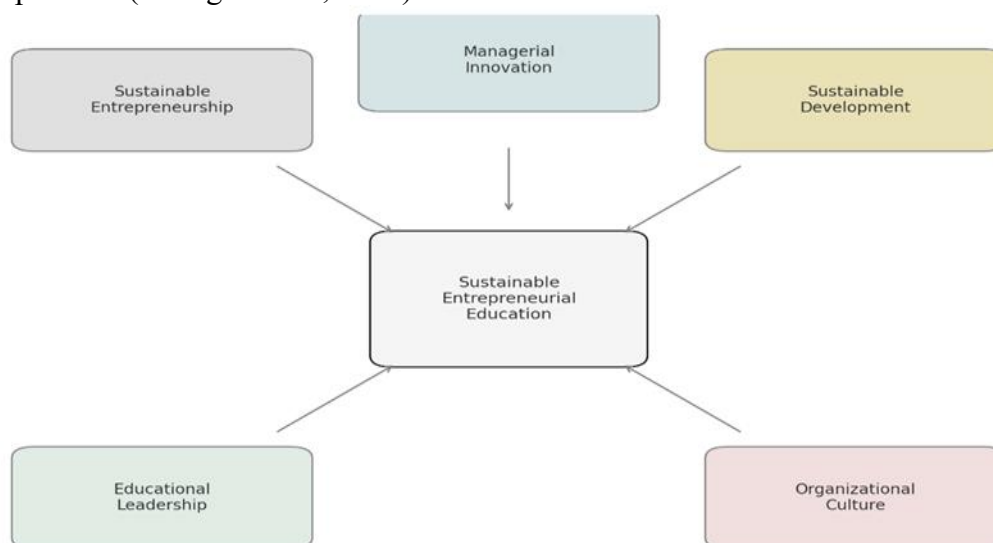


Figure 1. Conceptual Model of Sustainable Entrepreneurship Education in High School

Source: developed by author based on the conducted study and scientific research

These foundational ideas serve as the analytical backbone of the research, guiding the interpretation of curricular and managerial approaches and informing the formulation of strategic recommendations for achieving equitable and sustainable entrepreneurship education.

3. Literature Review

Recent research in the field of education reflects a growing concern for aligning curricula with the evolving social, economic, and environmental challenges of our time. There is a consistent emphasis on the role of sustainability in education and the need for pedagogical innovation in the context of ongoing curricular reforms (Melnic, 2023).

The studies reviewed converge around four main thematic directions:

- **Curriculum revision and implementation barriers**

Political ambiguity influences teachers' autonomy and the role of the state in setting educational standards (Lai, 2010). Moreover, the literature highlights how reforms impact professional identity (Malekipour et al., 2017) and the pressing need to update curriculum content to reflect real societal and economic demands (Dambudzo, 2015).

- **Innovative teaching methods and experiential learning**

The use of interactive methods, such as case studies and simulations, increases student engagement and supports the development of entrepreneurial skills (Zhang, 2023), while also promoting applied competencies and positive entrepreneurial behaviors (Tarekegne, 2019).

- **Sustainability education**

It is appropriate to integrate the durable development objectives (Sustainable Development Goals) into educational programs (Chang & Lien, 2020), train educational leaders who can stand global challenges and support sustainability, which is frequently affected by the absence of a relevant curriculum on this aspect (Fanea-Ivanovici and Barber, 2022).

- **Digitalization and flexibility**

There is a call for enforcing an adaptable and varying learning plan to meet the requirements of culturally expanded and individualized students in the educational workflow (Gunawan et al., 2023; Stewart and Walker-Glaves, 2020) and an assimilated reaching out process between the main subjects of study as an effective technique to enrich the educational experience of students, with the aim of developing visionary skills (Salovaara et al., 2019). Moreover it underscores the importance of digitalizing the educational pathway in ensuring the innovative skills and advanced capabilities, indispensable in today's digitalized and changing economy. (Zou, 2022).

In the academic field, various required subjects are identified that underlie the development of an adapted curriculum for sustainability and entrepreneurship education (Nwosu et al., 2023). These themes range from the difficulties encountered in implementing reforms to the role of the state and educational policies or the integration of innovative pedagogical methods and the digitalization of education and various other aspects such as interdisciplinarity and flexibility of school programs. Theoretical contributions related to these areas provide illustrative clues for the development of education according to current requirements. For a clear systematization of these relationships, figure 2 provides a visual representation of the correspondences between the main theoretical themes and the contributions identified in the specialized literature. Its tabular structure and directional connections facilitate the understanding of the conceptual logic that underpins the research model proposed in this study.



Figure 2. Synthesis of Theoretical Directions in Curriculum Reforms
Source: developed by author based on the conducted study and scientific research

4. Research Methodology

This study investigates how the principles of education for sustainable entrepreneurship are integrated into the secondary education systems of Romania and the Republic of Moldova. The choice of this research paradigm is justified by the need to construct an interpretative framework based on educational realities through the analysis of curricular content and strategic documents. The study employs a qualitative research design, specifically a comparative document analysis approach. Through this methodology, the study identifies both similarities and differences between the two national education systems in terms of how sustainable entrepreneurship is conceptualized, structured, and implemented.

The research adopts an exploratory and interpretative perspective and seeks to examine the impact of curricular and managerial strategies on the development of entrepreneurial competences among high school students. The documents analyzed were selected according to clear criteria: thematic relevance, level of applicability, timeliness, and type of source.

Thematic relevance refers to strategic documents, school curricula, and practical guides that explicitly address entrepreneurship education and sustainable development in the context of managerial innovation and curricular transformation. The degree to which the documents apply to secondary education determined their inclusion based on relevance and recency. The types of sources include ministerial policies, educational resources, and institutional materials used in educational initiatives such as Junior Achievement Romania and Moldova, or local projects funded through Erasmus+.

The research process began by identifying meaningful and comparable sources in the two national contexts (Romania and the Republic of Moldova). The key themes explored include the vision of sustainability in entrepreneurship, the proposal of an appropriate curricular structure, the importance of educational leadership, and the role of institutional collaboration at both intra- and extracurricular levels.

5. Results and Discussion

This study focuses on the comparative analysis of official documents and curricular programs from Romania and the Republic of Moldova. In order to ensure theoretical consistency and contextual relevance, an in-depth examination was conducted on educational policies and curriculum-related documents published between 2015 and the present. In both Romania and the Republic of Moldova, sustainable development strategies for education are reflected in programs that support the development of entrepreneurial skills and critical thinking. These documents emphasize the importance of developing entrepreneurial skills and promoting sustainability, but their implementation varies depending on the capacity of educational establishments. The curriculum for the optional subject "Economic and Entrepreneurship Education", validated in 2019, offers a flexible framework, intended for practical application. The Junior Achievement Moldova organization extends valuable learning opportunities through European projects such as Erasmus + ReSTART. Speaking of inequalities in access to resources, especially in rural areas, it can be said that initiatives can only be partially increased or are not supported where their presence is most wanted. Clear differences between the pace and institutional support in the two contexts can be perceived (Figure 3).

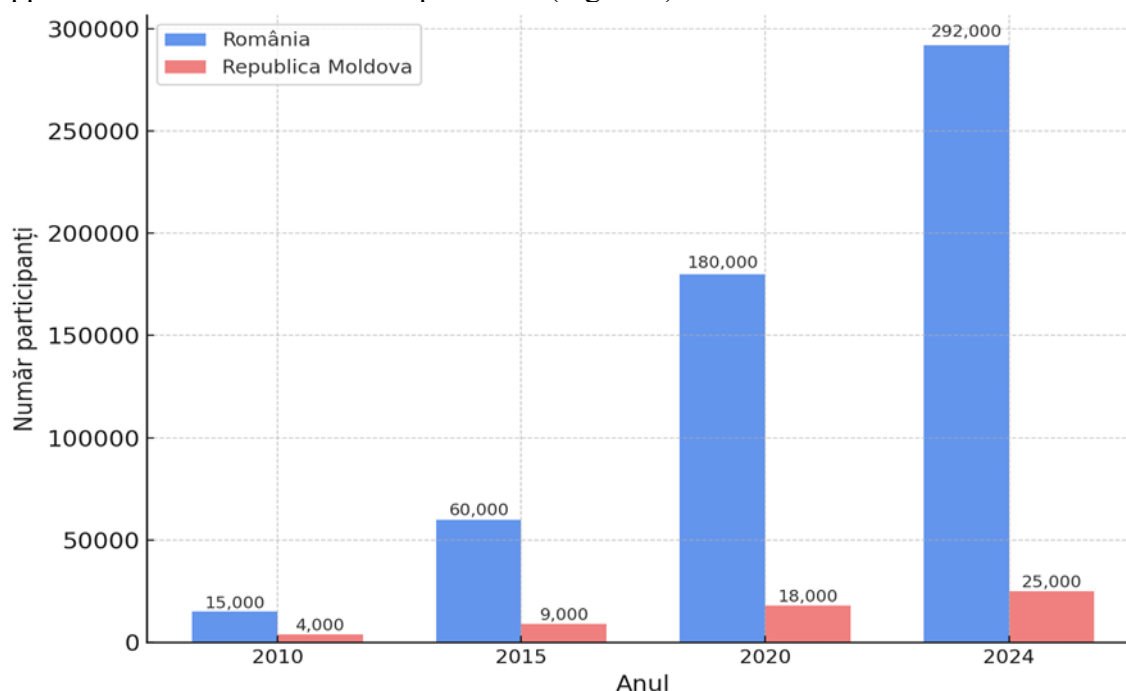


Figure 3. Evolution of Participation in Junior Achievement Programs in Romania and the Republic of Moldova (2010–2024)

Source: developed by the author

In Romania, there is a strong institutional structure that facilitates the integration of entrepreneurial education into secondary schools, supported by strategies consistently aligned with European objectives and the active involvement of schools in educational projects. The role of educational leadership is essential in this context, as it promotes and sustains partnerships and fosters an organizational culture that values innovation and collaboration. Training programs for school managers further support this goal by enabling the dissemination of effective practices.

In the Republic of Moldova, although some schools have made notable progress in certain educational areas, a unified educational framework is lacking, and there is no consistent and coherent implementation of optional curricula. This inconsistency limits the positive impact of innovative approaches within the national education system. Many of the initiatives are the result of international cooperation and individual efforts by teachers and school principals. However, the participation of

students in JA educational programs and the openness of teachers to modern methods highlight the possibilities for change in the education system, provided there is clear support from policymakers and sustainable educational resources. In a general comparison, the two education systems have a similar vision on the importance of sustainability and the development of skills necessary for everyday life. However, discrepancies arise when it comes to the implementation of policies and managerial skills for the effective and coherent implementation of reforms (Figure 4).

The argument of this context supports the importance of developing an integrated educational vision that matches the curriculum with professional training for teachers and the school leadership structure. Leadership in education, the key element in transforming the school into an environment for promoting a sustainable entrepreneurial mindset focused on social responsibility and strategic innovation. By meeting a proactive attitude in both the Romanian and Moldovan educational systems, significant transformations are generated by creating conducive environments that stimulate the development of a set of sustainable entrepreneurial skills. The participation of students in JA educational programs and the openness of teachers to modern methods highlight the possibilities of changes in the educational system, provided there is clear support from political decision-makers and sustainable educational resources.

6. Conclusions

The results of this study highlight the critical importance of integrating sustainable entrepreneurship education into secondary education as a means to prepare young people for the economic, social, and environmental challenges of the 21st century. Romania benefits from a robust institutional framework, complemented by strategic partnerships and modern educational resources that facilitate the integration of sustainability principles into the school curriculum. In contrast, in the Republic of Moldova, this process is still in its early stages, marked by recent curricular reforms and an increasing alignment with international standards. The documents examined reflect initiatives to insert education into sustainability principles, but their implementation is nevertheless influenced by the specific local environment, institutional capacity and the involvement of external partners. The comprehensive approach promoted through educational projects, especially in Romania, contributes to the consolidation of an organizational culture conducive to innovation and collaboration. Problems and obstacles encountered consisted of unequal access to updated teaching materials, differences between announced national policies and the way they are put into practice in educational institutions, the absence of a unitary and consistent system of continuous training for teachers to integrate the principles of sustainable entrepreneurship, the absence of a standardized way for monitoring and evaluating the impact of entrepreneurship education at the high school level.

This study underscores the pivotal role of leadership and managerial innovation in fostering a school environment conducive to the cultivation of sustainable entrepreneurial competencies. Within this framework, education assumes a strategic function, extending beyond the professional training of students to encompass the establishment of an ethical and responsible outlook on both individual and societal development.

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EMPLOYEE PERFORMANCE AS A STRATEGIC PILLAR OF COMPETITIVE ADVANTAGE IN OIL COMPANIES IN THE REPUBLIC OF MOLDOVA

DOI: <https://doi.org/10.53486/dri2025.16>
UDC: [005.962.13:005.332.1]:665.6/7(478)

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Abstract: *Employee performance is a strategic research topic, intensively addressed in the international literature over the last decades. A bibliometric analysis of 2,672 relevant publications from the last 10 years reveals close links between this theme and several Sustainable Development Goals, in particular SDG 09 (Industry, innovation and infrastructure), SDG 03 (Health and well-being) and SDG 04 (Quality education). This multidimensional focus reflects the fact that employee performance is perceived not only as an operational component, but also as a driver of sustainability and competitive advantage. In the Republic of Moldova, the petroleum products market is dominated by a small number of companies operating in a highly regulated and volatile economic environment. In such a context, where price differentiation is limited, the ability to strategically capitalize on human resources becomes a key factor for resilience and competitiveness. Against this backdrop, this article explores how oil companies in the Republic of Moldova approach human resource performance as a strategic pillar of their market positioning by analyzing public documents available on institutional websites.*

Keywords: *employees' performance; competitive advantage; strategic human resources management; oil industry; Republic of Moldova; organizational sustainability; documentary analysis.*

JEL: M12, L71, O15

1. Introduction

In today's context of accelerated economic transformation and intensifying competition in global markets, employee performance has become a key strategic element to strengthen the position of organizations in critical sectors such as the oil and gas industry. In an industry characterized by capital intensity, technological complexity and stringent regulations, human capital plays a central role in ensuring operational efficiency, safety and innovation. Thus, understanding how employee performance can be cultivated and leveraged not just as an operational objective, but as a strategic pillar of competitive advantage, becomes a necessity for organizations in the sector.

In the Republic of Moldova, the retail fuel distribution sector is dominated by a small number of companies, which outlines an oligopolistic market environment. According to data for 2023 (source: <https://www.data2b.md/ro/companies>), Lukoil Moldova has a market share of 45.8%, followed by Petrom-Moldova with 19.8% and Vento Retail S.R.L. with 10.1%. Together, these entities account for more than 75% of total fuel sales volume, which limits price differentiation and emphasizes operational efficiency and the quality of human capital. In this context, employee performance becomes a strategic resource for maintaining market share, optimizing service and increasing competitive advantage.

Moreover, the recent fuel price dynamics reflect the high level of volatility in the oil industry. According to the data published by the National Bureau of Statistics, fuel prices in 2022 saw an annual increase of 47.5%, followed by a slight decrease in 2023. These variations were influenced by global geopolitical and economic factors and created a climate of operational uncertainty for companies in the industry. In such a context, maintaining employee performance and organizational adaptability become strategic tools for resilience and competitiveness, able to offset external pressures through internal efficiency and responsiveness.

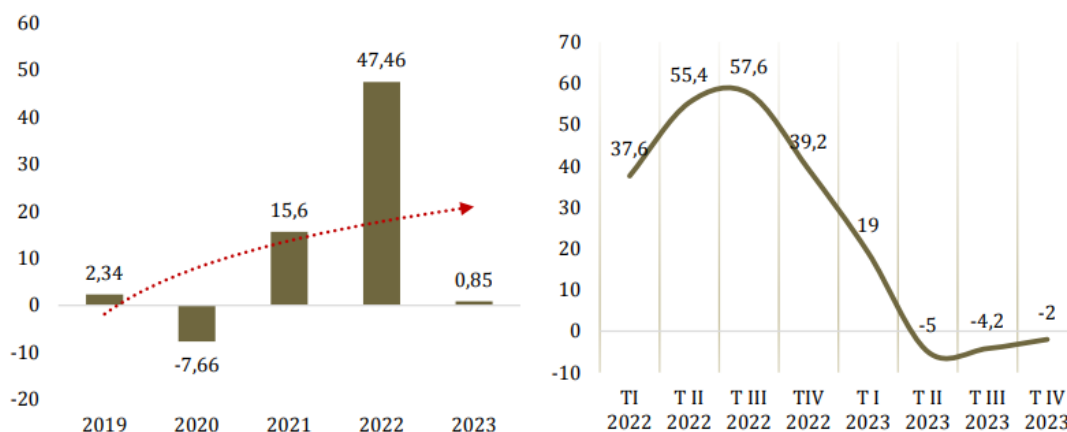


Figure 1. Annual and quarterly evolution of fuel prices in the Republic of Moldova (2019-2023), % (2019-2023)

Source: taken by the author from Tendințe în economia Moldovei, no. 50/2024

The relevance of the topic stems from the need to correlate individual and team performance with the managerial, cultural and leadership processes that define the organizational climate. The motivation for the choice of the topic lies in the absence of applied research that analyzes this phenomenon in oil companies in the Republic of Moldova, given that employee performance is often approached in isolation, without a strategic contextualization.

In this context, the recent statistical data confirm the importance of the oil sector in the national economy: in 2023, the volume of imported petroleum products reached a new historical high of 907.9 thousand tons, with a dominant share of standard diesel. The positive dynamics of domestic consumption and the high level of competition on the distribution market - reflected by the number of licensed operators - consolidate the idea that the success of these entities depends on the ability to efficiently leverage human capital (ANRE Activity Report, 2023).

The main aim of the research is to identify and analyze the conceptual and managerial dimensions through which employee performance contributes to gaining and maintaining competitive advantage in oil entities. To achieve this goal, international and national literature sources, empirical studies and public documents were analyzed, with a focus on how human resource policies, leadership styles, organizational culture, innovativeness and intellectual capital are reflected.

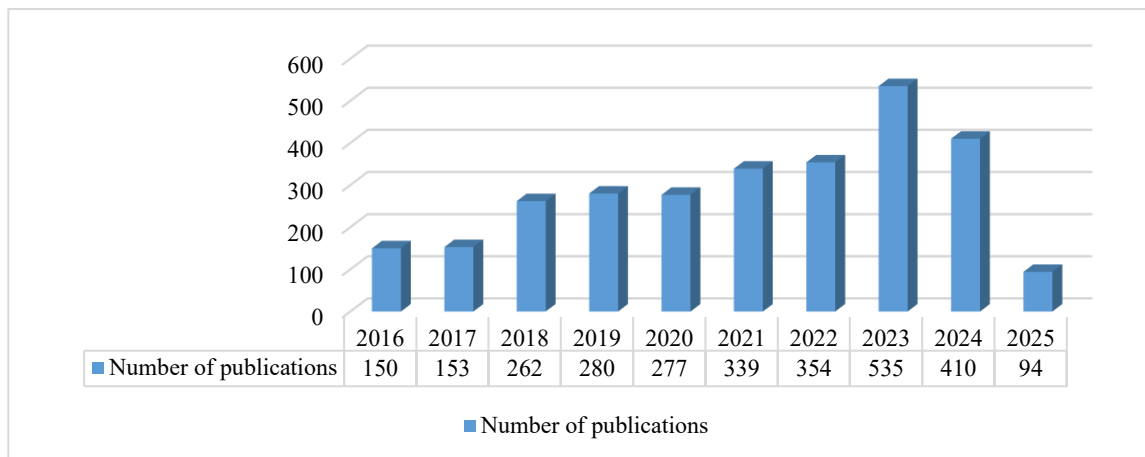
The research methodology is qualitative, based on content analysis of public documents available on the websites of relevant oil companies in the Republic of Moldova. In parallel, a bibliometric analysis of the international scientific literature published in the last 10 years (2016-2025), extracted from established databases (Web of Science), was carried out in order to outline the dominant thematic directions and position the topic in the global context.

The literature review phase revealed a significant diversity of approaches: from research highlighting the influence of democratic leadership, motivation and organizational discipline, to studies that look at performance from the perspective of internal branding, intellectual capital, organizational culture, collective learning, and the emotional and spiritual dimensions of employees. Overall, recent literature supports the idea that employee performance is a result of the interaction between individual, organizational and strategic factors, which justifies the integrative approach proposed in this paper.

2. Literature review

To substantiate the analytical approach applied to oil companies in the Republic of Moldova, an exploration of how employee performance has been researched internationally over the last decade is required. Thus, between 2016 and 2024, employee performance research has seen a steady increase

from 150 publications in 2016 to a peak of 410 in 2024, Figure 1. This development reflects not only the expansion of theoretical interest in the topic, but also its integration into multiple practical contexts, from digital transformation and teleworking to organizational sustainability and equity. The year 2020 marked a relative stagnation, explicable by the redirection of research towards emerging themes in the context of the COVID-19 pandemic, but the post-pandemic period (2021-2024) brought a visible revival and consolidation. In 2025, the lower number of papers (94) probably reflects the fact that data are still in the process of being finalized for the full calendar year.



Graph 1. Dynamics of international scientific publications on employee performance in the period 2016-2025

Source: author based on Web of Schience

The analysis of the 2672 international publications indexed over the last 10 years, related to the theme of employee performance, shows a strong association of research with several Sustainable Development Goals. Thus, SDG 09 (Industry, Innovation and Infrastructure) and SDG 03 (Health and Well-being) are the most frequently encountered, suggesting that employee performance is addressed in a multidimensional framework that goes beyond the boundaries of traditional human resource management. At the same time, the significant presence of SDGs 05 (Gender Equality), 10 (Reducing Inequalities) and 04 (Quality Education) reflects the researchers' interest in integrating equity and training issues in the analysis of individual and organizational performance.

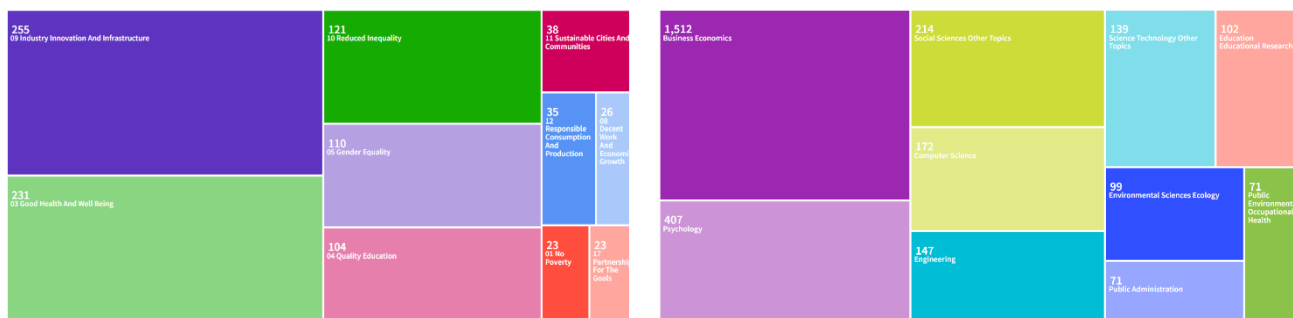


Figure 2. Breakdown of international publications on employee performance by Sustainable Development Goals and Web of Science categories

Source: author based on Web of Schience

The publications analyzed according to the Web of Science categories confirm the transdisciplinary character of the topic “employee performance”. The Business & Economics domain concentrates over 1500 papers, reflecting the central theoretical positioning of the topic within strategic management, competitiveness and labor economics. Also, the strong presence of organizational psychology (407

papers), social sciences and education shows that performance research has evolved towards a holistic approach, where motivational, formative and health factors are integrated in the assessment of employees' contribution to organizational success. This substantiation supports the relevance and complexity of the analysis applied in oil companies in the Republic of Moldova.

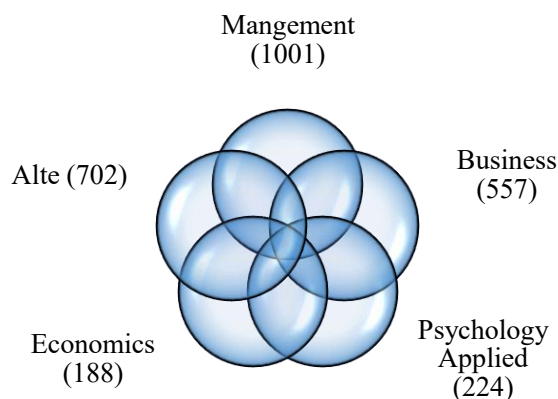


Figure 3. Distribution of international publications on employee performance according to Web of Science subdomains

Source: author based on Web of Science

The breakdown by scientific field shows that the topic of employee performance is deeply represented in economics and management sciences, with a significant number of papers published in the “Management” (1,001 articles) and “Business” (557) areas. Relevant contributions also come from applied psychology (224), industrial relations and labor (111), but also from education and tourism, indicating a diversity of perspectives and contexts of application. This distribution reflects the deeply interdisciplinary nature of the research, supporting the integrative approach adopted in the present study.

In order to gain a deeper understanding of the development directions of the scientific literature on employee performance, it is essential to move from a simple quantitative analysis of the evolution of the number of publications to an examination of the thematic content of the research carried out. Thus, recent literature highlights a wide range of organizational, behavioural and strategic factors that influence the level of staff performance, depending on the operational context, management style, internal culture or intangible resources.

First, applied research indicates that leadership style, motivation and discipline are factors with a direct impact on employee performance. For example, studies investigating these dimensions have concluded that discipline, as an expression of a well-structured organizational framework, has the strongest influence, especially in sectors such as the oil sector, characterized by operational complexity and strict regulations. These findings support the idea that employee performance is not an accidental outcome, but the effect of a coherent and strategically oriented managerial system (Sinaga et al., 2022).

Further, other papers approach employee performance from the perspective of innovative leadership, highlighting its ability to mobilize teams towards superior results. Analytical studies based on literature reviews confirm that leadership oriented towards innovation and adaptability contributes to the creation of a favorable environment for employee engagement, and this mechanism is transferable also in critical industries such as aviation or oil industry (Ly et al., 2021).

In the same vein, a study applied in Tenaga Nasional Berhad utility company shows that different forms of innovation (product, process, technological and organizational) positively influence employee performance, except for the variable “attitude”. This finding highlights the importance of well-implemented innovative systems in organizational strategies (Osman et al., 2016).

In addition to the strictly managerial or technological aspects, the literature also brings to the forefront identity-related factors, such as internal brand culture. Research focused on this topic demonstrates that internal branding, through mechanisms such as employee identification with organizational values (EBI), brand citizenship behaviors (BCB) and customer orientation (COB), can be important levers for enhancing employee performance, including in industrial sectors (Ngo et al., 2020).

An interesting perspective is also provided by studies that analyze group identity and performance reporting as interrelated factors. Thus, the degree of transparency of managerial appraisal systems can transform collective identity into a performance enabler or, conversely, into a driver of conformity and plateauing (Shang et al., 2020).

Also, research investigating the relationship between leadership style, organizational culture and employee performance shows that these dimensions are closely correlated. Specifically, democratic leadership supported by a supportive organizational culture leads to higher levels of engagement and outcomes, both individually and collectively - a conclusion with applicative value also in corporate environments in the energy sector (Diana et al, 2021).

Another relevant area of research is that of intellectual capital, analyzed in relation to employee performance through the lens of organizational learning. Thus, human, relational and structural capital contribute to the generation of performance to the extent that the organization actively capitalizes on accumulated knowledge (Al-Husseini, 2023).

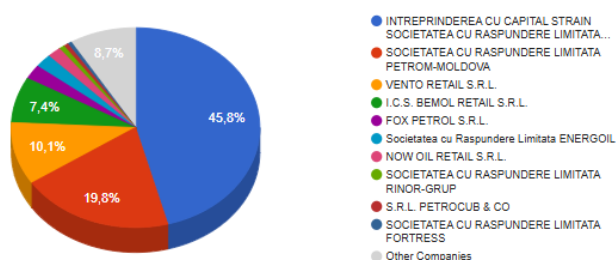
Finally, recent literature also integrates affective and value dimensions of HR, such as emotional intelligence, spiritual intelligence and communication competence. Studies show that these components significantly influence employee performance, especially in industries in which teamwork, adaptation to change and human interaction play a central role - aspects found also in the oil sector (Rahmawaty et al., 2021).

Therefore, the thematic diversity of the research highlights the complexity of the analyzed phenomenon and justifies the approach of employee performance from an integrative, strategic and contextualized perspective, with direct applicability in the analysis of oil companies in the Republic of Moldova.

3. Positioning of the oil sector in the national economy

The oil sector in the Republic of Moldova occupies a strategic place in the national economic architecture, having a direct impact on transportation, agriculture, trade and consumer prices. According to the ANRE report (2023), 100% of the oil products market is supplied by imports, which makes the stability of supply and domestic competitiveness significantly dependent on the efficiency of local players. In 2023, the total volume of imported petroleum products amounted to 907.9 thousand tons, marking an increase compared to the previous year. Their distribution is carried out through an extensive network of more than 500 filling stations managed by 80 licensed operators, which indicates a high degree of fragmentation and competitive pressure (ANRE Activity Report, 2023).

At the same time, the oligopolistic market structure, dominated by a few companies (Lukoil Moldova-45.8%, Petrom-Moldova -19.8%, Vento Retail -10.1%), emphasizes the importance of human capital as a strategic differentiator. In an environment where price differentiation is regulated and trade margins are controlled, operational efficiency, service quality and employee performance become critical factors for consolidating market share and increasing competitive advantage. Also, international price volatility, reflected in local dynamics (e.g. +47.5%



in 2022, decreases in 2023), requires increased internal organizational adaptability and resilience. Therefore, the oil sector in the Republic of Moldova provides a pertinent analytical framework for investigating how human resource performance is used as a strategic pillar, not only in relation to operational objectives, but also in response to macroeconomic challenges, stringent regulation and increasingly sophisticated market demands.

4. Core content

In order to observe how employee performance is reflected in the organizational reality of oil companies in the Republic of Moldova, the analysis focuses on the most important market players, starting with Lukoil-Moldova - an entity with a dominant market share (45.8%) and extensive institutional communication.

Lukoil-Moldova, market leader in fuel distribution in the Republic of Moldova, provides an example of an integrated strategic approach to employee performance. In the absence of an annual public report dedicated to human resources, the company nevertheless clearly communicates key elements of continuous development, job security, social protection and recognition of the value of human capital. Regular training, educational incentives, partnerships with academia and the presence of an active trade union structure confirm the existence of an organizational culture geared towards sustainability and stability, which are fundamental to employee performance and to strengthening competitive advantage in a regulated and volatile sector (<https://lucoil.md/ro>). The Lukoil-Moldova case suggests that, in the absence of formal HR reporting mechanisms, employee performance can nevertheless be inferred from visible and consistent organizational practices. This indirect but consistent approach indicates a strategic assumption of the role of human capital that can serve as a model for other companies in the sector.

Another example of a strategic reflection of employee performance is provided by Petrom-Moldova, part of the international OMV group, with more than two decades of experience in the local market. In its public communication (<https://www.petrom.md/ro-md>), the company emphasizes that its success is due not only to the quality of its products, but also to the high standards implemented at the "People" level. This formulation is not metaphorical, but supported by clear and constant initiatives in the field of human resources management. Petrom-Moldova promotes an organizational culture based on continuous development, transparency and work-life balance, reflected in bonus systems and performance plans; training programs and e-learning platforms (Digital Academy), leadership development and training for students, participative internal communication, recognition and excellence programs. Moreover, the public recognition of the company among the top best employers in the Republic of Moldova (2013-2024), according to Axa Management Consulting, confirms the validity of these practices and their impact on social perception and internal stability. In this perspective, Petrom-Moldova becomes a concrete example of leveraging employee performance as a competitive resource, not only through financial motivation, but also by building an organizational climate conducive to involvement, innovation and retention.

A third example of the reflection of employee performance in the local oil sector is provided by Vento Retail (<https://vento-moldova.md/>), one of the largest gas station networks in Moldova. With over 900 employees, the company promotes a culture of individual performance, where the level of income is directly linked to the results achieved. Through a system of promotion based on merit and efficiency, Vento encourages professional autonomy and responsibility for the quality of work. At the same time, the company invests in process automation, which allows employees to work efficiently, reducing operational pressure and increasing productivity. Organizational communication makes direct reference to continuous professional development, innovation, original thinking and support for initiative, reinforcing the image of an entity that values its human resource not only as a workforce, but as a strategic partner in development.

From the comparative analysis of the three major oil companies in the Republic of Moldova: Lukoil-

Moldova, Petrom-Moldova and Vento Retail, it is noticeable that there are no official public reports on employee performance, and the relevant information is fragmented, dispersed in overview or corporate marketing sections. Communication on human resources varies significantly in the level of detail and depth, without outlining a formalized and strategic approach. Against this background, the following general research hypothesis is formulated:

H1 In oil companies in the Republic of Moldova, employee performance is reflected fragmentarily and predominantly at the operational level, without a systemic integration into strategic communication oriented towards competitive advantage.

5. Results and discussion

In order to understand how employee performance is integrated into the organizational reality of oil companies in the Republic of Moldova, three major operators were analyzed: Lukoil-Moldova, Petrom-Moldova and Vento Retail. Data on sales revenue, net profit and number of employees for the period 2021-2023 were examined based on publicly available information (<https://www.data2b.md/ro/companies>).

Table 1. Comparative development of economic indicators and personnel structure in oil companies in the Republic of Moldova (2021-2023)

Nr.crt.	Entity	Year	Sales revenue (million MDL)	Net profit (million MDL)	Number of employees
1.	Vento Retail	2021	1602.6	36.0	799
		2022	2164.2	21.3	858
		2023	1924.4	25.7	850
2.	Lukoil-Moldova	2021	5519.0	70.7	217
		2022	8977.7	86.6	211
		2023	8691.5	73.9	218
3.	Petrom-Moldova	2021	2524.5	41.9	53
		2022	4059.2	87.5	53
		2023	3755.5	76.4	48

Source: Data taken from the companies' public communication on the official website: www.data2b.md. Units expressed in millions of MDL, excluding number of employees.

The analysis of the evolution of performance indicators for the period 2021-2023 highlights distinct but revealing trajectories for understanding how human resources contribute to competitive advantage in oil companies. All three entities show significant increases in revenues in 2022, reflecting the effects of economic recovery and changes in international fuel prices. However, a moderate adjustment in revenues is observed in 2023, not directly correlated with a decline in overall performance, but rather with a structural recalibration of the market.

Lukoil-Moldova remains the undisputed leader in terms of sales volumes, operating with a relatively small team, suggesting high operational efficiency, likely supported by investments in training, strict safety standards and a centralized coordination model. Similarly, Petrom-Moldova, despite operating with only 48 employees, has seen a spectacular doubling of profits in 2022 and a maintenance of high profits in 2023. This result indicates exceptional productivity per employee and a systemic approach to human resources, supported by the leadership, training and motivation initiatives described in the company's corporate communication.

In contrast, Vento Retail, despite having the most extensive network and the largest number of employees, has more modest revenues and net profits in relation to the resources involved. This may reflect an operating model oriented towards volume and accessibility, but with challenges in terms of economic efficiency per employee and return on investment in human capital. The company's strategy, focused on expansion and affordability, imposes the need to optimize staff motivation, appraisal and development systems in order to turn team size into a real competitive advantage.

Overall, the data analyzed support the conclusion that team size does not automatically guarantee superior financial performance. On the contrary, the effectiveness and impact of human capital depends on how it is strategically integrated into decision-making and managerial processes. Thus, employee performance only becomes a real competitive pillar when it is supported by coherent development, motivation and valorization policies.

Given the dynamics observed in the 2021-2023 period, a comparative analysis on the performance recorded exclusively for 2023 is relevant to capture the current positioning of each company. Table 2 presents this summary.

Table 2. Comparison of financial performance and personnel structure in oil companies in the Republic of Moldova in 2023

Entity	No. employees 2023	Revenue 2023 (MDL)	Revenue 2023 (MDL)	Revenue/employee	Profit/employee
Lukoil-Moldova	218	8,69 mld	73,86 mil	~39,8 mil	~339 k
Vento Retail	850	1,92 mld	25,72 mil	~2,26 mil	~30,3 k
Petrom-Moldova	48	3,76 mld	76,45 mil	~78,3 mil	~1,59 mil

Source: Data taken from the companies' public communication on the official website: www.data2b.md

The comparative analysis of the three oil companies reveals significant differences in the way of organization, financial performance and human resource reporting. Petrom-Moldova, in spite of the smallest number of employees, has a remarkable economic efficiency per employee, suggesting either a high level of automation and specialization or a centralized corporate structure influenced by the integration into the international OMV group.

At the same time, Lukoil-Moldova maintains a notable balance between sales volume, profitability and human resource size, which may indicate an efficient and well-balanced business model based on operational efficiency, organizational stability and rigorous cost control.

On the other hand, Vento Retail operates with a substantially larger team and an extensive network, but with a more modest profit to revenue to staff ratio. This suggests a model geared towards expansion and volume, but with the need to optimize employee performance and leverage human resources strategically.

These financial conclusions can be nuanced by a qualitative analysis of institutional communication. Thus, Lukoil-Moldova focuses on job security, continuous training and social stability, Petrom-Moldova emphasizes professional development, participative leadership and work-life balance, and Vento promotes meritocracy, automation and individual efficiency.

From the perspective of the research, it emerges that employee performance is not just an operational function, but is closely related to the managerial philosophy and organizational culture of each entity. Thus, the competitive advantage derived from the human resource is manifested both in the economic results and in the internal communication and valorization of human capital.

In this context, the general hypothesis of the research is confirmed: in oil companies in the Republic of Moldova, employee performance is reflected fragmented, in the absence of formal reporting mechanisms, which limits its strategic visibility. This contrasts with international trends, where non-financial reporting increasingly integrates human capital indicators as a key pillar of sustainability and competitiveness.

6. Conclusion

The research aimed to identify how employee performance is perceived and communicated within oil companies in the Republic of Moldova, emphasizing the strategic dimension of human resources in relation to competitive advantage. The quantitative analysis of economic indicators (revenues, net profit, number of employees) for the period 2021-2023, coupled with a qualitative assessment of

organizational communication, allowed to outline significant trends in indirect reporting of employee performance.

In the absence of official HR reports or standardized internal performance indicators, the research focused on publicly available sources on the websites of the main operators. This approach revealed notable discrepancies between economic efficiency and the way employee performance is publicly recognized and valued. For example, Petrom-Moldova, with the smallest number of employees among the three entities analyzed, has achieved remarkable financial productivity, suggesting a well-structured internal system based on merit, leadership and continuous training.

In contrast, Vento Retail, with a significantly larger team and extensive presence, demonstrated lower efficiency per employee without clear strategic communication of performance policies. Lukoil-Moldova, on the other hand, is distinguished by a balanced positioning, where operational stability and continuous training seem to be prioritized.

The findings obtained support the hypothesis formulated in the research: employee performance, although evoked in institutional communication, is not systematically addressed as a strategic resource for competitiveness, and the lack of transparency in human capital reporting limits its integration into public positioning strategies. Thus, employee performance can become a real competitive pillar only to the extent that it is underpinned by coherent policies, investment in professional development and institutional practices of recognition and motivation.

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DIRECTIONS FOR STRENGTHENING PERSONNEL POLICIES TO INCREASE JOB SATISFACTION IN PUBLIC INSTITUTIONS IN THE REPUBLIC OF MOLDOVA

DOI: <https://doi.org/10.53486/dri2025.17>
UDC: 331.101.32:351(478)

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Abstract: *In a context marked by increasing pressures on public administration, this research analyzes the strengthening of personnel policies as a strategic premise for increasing job satisfaction in public institutions in the Republic of Moldova. The study has a theoretical-applicative character and uses the multiple case study methodology, based on the documentary analysis of the audit reports of the Court of Accounts on a representative sample of ministries. The results highlight a common set of structural dysfunctions, such as: planning insufficiently linked to institutional objectives, uneven application of evaluation criteria and salary incentives, limited functionality of internal audit and a low degree of digitalization in human resources processes. Based on these findings, an integrated application model for personnel policy reform has been developed, structured around three pillars: proactive HR policies, supportive organizational environment and monitoring and adjustment tools. Each pillar is associated with measurable strategic directions, linked to performance indicators and expected outcomes. The research supports the idea that job satisfaction can be treated as an institutional objective, measurable and integrable into the public management decision-making cycle. Personnel policies therefore become not just an administrative mechanism, but a vector of institutional coherence, efficiency and organizational resilience.*

Keywords: *personnel policies, job satisfaction, public administration, Republic of Moldova, human resources.*

JEL: J28, J45, H83

1. Introduction

In the context of a public administration under multiple pressures: economic, social and demographic, personnel policies play a strategic role in ensuring the functionality and sustainability of public institutions. Moldova is facing a systemic shortage of qualified human resources in the public sector, exacerbated by the migration of specialists, the demotivation of staff and persistent budgetary constraints. In this context, professional satisfaction can no longer be treated as a secondary issue, but must be addressed as an essential component of efficient public governance. The relevance of the topic stems from the increasingly pronounced discrepancy between the complexity of administrative demands and institutional capacity to attract, retain and motivate qualified and engaged employees. In the absence of an integrated vision of personnel policies, discontinuities and managerial deficiencies are perpetuated, as well as fluctuating professional commitment. These issues are reflected objectively in recent reports by the Court of Accounts (<https://ccrm.md/ro>). The present research aims to identify and justify the directions for strengthening personnel policies in the public sector, with a focus on those measures that can contribute to increasing professional satisfaction and improving the organisational climate. The study adopts a theoretical and applied approach, structured around multiple case studies, focusing on relevant ministries within the national public administration structure, for which official documentation is available regarding human resources, institutional performance and current personnel challenges. The research methodology is based on qualitative analysis of official audit reports, critical interpretation of institutional internal policies and extrapolation of strategic reform directions based on international best practices. By integrating a systemic perspective and correlating the dimension of satisfaction with human resource management mechanisms, the study contributes to the development of the theoretical and practical framework regarding the professionalisation of the public administration in the Republic of Moldova.

2. Research methodology

The present research adopts a theoretical-applied approach, focusing on the qualitative analysis of personnel policies and their impact on professional satisfaction in the public sector in the Republic of Moldova. The methodological structure is based on a multiple case study, applied to representative ministries in the architecture of the central public administration, selected on the basis of their functional relevance, the volume of personnel managed, and the availability of documentation on personnel policies and institutional performance. The selection of ministries as units of analysis in the study is justified by their central role in shaping and implementing public policies, the significant volume of human resources managed, and the advanced level of institutional formalisation. The ministries represent key links in the central public administration, where personnel policies directly influence operational efficiency, service quality and the level of professional satisfaction among employees. In addition, these institutions have relevant public audit reports and official documents available, which allow for a documented, comparative and contextualised analysis of structural disfunctions and institutional improvement opportunities.

The methodological tools used include:

Documentary analysis of public audit reports (Court of Audit, 2025), institutional activity reports and the current legal framework (Law no. 158/2008, Labour Code);

- Comparative analysis between ministries, focusing on human resource management practices, evaluation systems and organisational climate;
- Modelarea aplicativă, prin propunerea unui cadru conceptual integrat de reformă bazat pe piloni strategici și indicatori măsurabili ai satisfacției profesionale.

The research is qualitative and exploratory, and the results obtained focus more on formulating strategic directions and intervention models than on testing statistical hypotheses. Additionally, triangulation of official, theoretical and institutional sources is employed to ensure the validity of interpretations and conclusions. The chosen methodology allows for the identification of systemic issues and provides a coherent framework for developing personnel policies centred on employee satisfaction and the efficiency of public administration.

3. Theoretical basis of personnel policies in the public sector

Human resource policies define the set of rules, principles and institutional instruments through which human resources are managed in a coherent, efficient and adaptable manner. In public administration, they acquire a strategic dimension, since the quality of services offered to society depends directly on the competencies, motivation and professional satisfaction of employees (Perry & Wise, 1990; OECD, 2021). The literature on the subject provides a deep understanding of motivation in the public sector, which differs from that in the private sector. Perry and Wise (1990) propose an innovative conceptual framework – Public Service Motivation (PSM) – which highlights three fundamental dimensions of commitment to public service: rational motivation (interest in public policies), normative motivation (the desire to contribute to the public good) and affective motivation (based on empathy and social identification). The authors argue that individuals with a high level of PSM are more likely to opt for a career in the public sector. They are also more likely to demonstrate institutional loyalty and perform well in environments where these intrinsic motivations are supported by leadership and organisational culture.

In addition, Houston's (2000) study, based on data from the General Social Survey, confirms that public sector employees tend to value intrinsic rewards such as the meaning of work, social contribution and personal fulfilment – in contrast to those in the private sector, who place greater importance on extrinsic rewards such as salary and flexible working hours. These findings support the idea that job satisfaction in administration should be understood beyond the salary component and treated as an integral part of personnel policy. In the public sector, satisfaction is not influenced exclusively by the salary component, but also by factors such as decision-making autonomy,

professional development opportunities, merit recognition and organisational climate (Houston, 2000; Baird & Wang, 2010).

In a broader approach to public organisations, Rainey (2009) shows that they operate within a much more complex framework than private entities, being subject to political pressures, multiple objectives and specific bureaucratic constraints. In this context, professional satisfaction cannot be analysed in isolation, but must be correlated with leadership style, institutional design and organisational climate. Rainey emphasises that personnel policies must be contextualised and developed based on public service values, supporting systemic interventions that include participatory leadership, clarifying objectives and encouraging employee involvement.

At the national level, Cornea and Filipov (2009) highlight the need for a coherent personnel policy in the public administration of the Republic of Moldova, based on professionalism, meritocracy and continuous improvement. They emphasise the absence of an integrated system for motivating and evaluating public servants, which negatively affects the satisfaction of employees and the performance of institutions.

Recent contributions, such as those of Boghian (2022), highlight the importance of aligning personnel policies in the Republic of Moldova with European standards. In his analysis, the author highlights the need to reconceptualise human resource policies not just as administrative tools, but as drivers of institutional reform capable of attracting, developing and retaining competent staff. The integration of European principles of flexibility, competency-based orientation and adaptability is presented as a key element for modernising public administration.

This direction is also supported by Dulschi and Boghian (2021), who, in a comparative study of human resource management strategies in the Romanian public administration, highlight transferable good practices for the Moldovan context. Although the contexts are different, the recommendations regarding the digitalisation of HR processes, the professionalisation of HR services and the involvement of officials in decision-making processes are perfectly applicable in institutions in the Republic of Moldova, which are in a continuous reform process.

In addition to these approaches, Soroka (2019) proposes a systemic model for the development of human resource policies, based on a logical structure consisting of three stages: standardisation, programming and monitoring. This model involves hierarchising human resource objectives, aligning management mechanisms with organisational dynamics and respecting the principle of balance between economic and social interests. The relevance of the proposal lies in its adaptability to public institutions characterised by procedural rigidity and a lack of participatory culture, offering a framework for systemic reform of personnel policies.

In summary, the literature on the subject suggests that personnel policies in the public sector must move beyond the traditional administrative logic and be based on principles such as: value-based orientation, employee involvement in decision-making, intrinsic motivation support, professionalisation of civil servants and continuous performance evaluation. Strengthening these policies is not only an internal efficiency measure, but also an essential condition for improving governance quality and developing a modern and resilient public administration.

4. Basic content

The national legal framework for human resources in the public sector is defined by a diverse body of legislation with general or specific applicability.

An analysis of the provisions of Law No. 158/2008 on public office and the status of public officials reveals a complex and structured legislative vision of human resource management in the public sector. The law establishes essential principles such as legality, transparency, stability, professionalism and non-discrimination, emphasising the central role of the public servant in achieving the public interest and exercising public authority. The relevance of this legislation to our research is significant, as it provides both the theoretical framework and the normative support for evaluating the impact of

personnel policies on professional satisfaction. The law not only establishes institutional obligations regarding the recruitment, evaluation, professional development and motivation of public officials, but also introduces monitoring and reward mechanisms that, if applied efficiently, can generate a positive organisational climate and stimulate individual performance. Furthermore, the regulations relating to performance evaluation, continuous training, remuneration, social guarantees and functional mobility reflect a modern understanding of human resources as a strategic element of good governance. However, the research highlights that the implementation of these provisions often remains formal or inconsistent between different public authorities, which limits their real impact on employee satisfaction and administrative efficiency. Therefore, the fundamental conclusion is that Law No. 158/2008 provides a solid normative framework, but requires strengthening in terms of implementation, through integrated, contextualised and results-oriented personnel policies. Only in this way can the stated objective of the law be achieved: the creation of a stable, professional and motivated public service, in which the satisfaction of civil servants becomes a real and measurable institutional priority.

The Labour Code of the Republic of Moldova (Law No. 154/2003) regulates the contractual aspects and working conditions applicable to all employees. In addition, autonomous institutions have internal regulations regarding performance evaluation, promotion, sanctioning and motivating staff, aspects that are often not harmonised inter-institutionally.

At an international level, the directions promoted by the Organisation for Economic Co-operation and Development (OECD, 2021) and the European Commission (2020) encourage governments to adopt human resource models based on competence, adaptability and performance orientation. Additionally, contemporary approaches emphasise the digitalisation of HR processes, the participatory evaluation of employee satisfaction and the flexibility of organisational structures, with the aim of attracting and retaining talent in public institutions.

Thus, the consolidation of personnel policies should not be viewed merely as a specific administrative intervention, but as an integrated institutional transformation process. In which professional satisfaction becomes both an indicator of the quality of governance and a condition for the efficiency of public services. Without a systemic approach, the fragmentation of measures, the lack of impact indicators and inefficiency in implementation risk perpetuating a rigid, demotivating and poorly adaptable system to societal changes.

5. Evaluation of the institutional context in the selected ministries of the Republic of Moldova

The evaluation of human resource policies in the central public administration requires a contextualised approach, based on documentary analysis, audit reports and existing institutional mechanisms. For this study, several Moldovan government ministries were selected based on data availability, access to Court of Accounts reports, and relevance to the human resources theme. These ministries reflect, in a differentiated manner, challenges related to strategic personnel planning, performance evaluation, managerial control and organisational climate. Their analysis provides an integrated framework for structural dysfunctions and a solid empirical foundation for formulating strategic directions for consolidating human resources policies in the Moldovan public sector. *The Court of Accounts Report No. 40*, dated 25 April 2025, provides valuable insights into the current human resource management challenges faced by the Ministry of Labour and Social Protection (<https://ccrm.md/ro>). It highlights several areas in need of improvement, including the requirement for integrated strategic HR planning, the consistent and well-founded use of salary incentives, and the stabilisation of managerial structures. These findings suggest that personnel policies are a key factor in the functionality of institutions and the professional satisfaction of public sector employees. Furthermore, the report emphasises the importance of consolidating evaluation, reward and organisational support mechanisms, including internal audit and managerial control. In this context, the report substantially contributes to our understanding of how to strengthen institutional capacity

and create a professional, performance-oriented and equitable environment that motivates employees. *Audit Report No. 38/2025*, prepared by the Court of Accounts, provides a detailed overview of the institutional challenges faced by the Ministry of Justice and its subordinate entities. It highlights procedural discrepancies and system limitations in the management of financial and property resources (<https://ccrm.md/ro>). The analysed issues include difficulties in recording cultural and patrimonial assets, coordinating capital investments, and ensuring the effective operation of internal control mechanisms and performance-based salary criteria. While some previous recommendations have been partially implemented, the report emphasises the ongoing need to consolidate administrative capacity and financial governance mechanisms. The report's relevance in the context of the research lies in highlighting the correlation between the functionality of the institutional system and the organisational climate. Factors such as the uneven distribution of performance bonuses or inadequate staffing of internal audits can impact employees' perceptions of fairness and professional recognition, affecting their motivation and commitment to public service. In this regard, the report provides an objective framework for analysing and recalibrating human resource policies.

The Court of Accounts Report No. 35/2025 confirms that, despite some irregularities, the consolidated financial statements of the Ministry of Environment provide, on the whole, a true and accurate picture in accordance with the accounting regulations applicable in the public sector (<https://ccrm.md/ro>). From the perspective of the present research, the relevance of this report goes beyond the strictly financial dimension, reflecting structural aspects relating to the management of human resources and institutional efficiency. Thus, the recommendations formulated by the external auditor emphasise:

- the need to consolidate inter-institutional coordination between the ministry and its subordinate entities, in order to strengthen administrative responsibility and rigorous asset management;
 - the importance of strategic planning of resources – both human and material – as demonstrated by the initiative to include the forestry fund in the accounts gradually;
 - the need to review the organisational structure and personnel policy, reflected in the adjustment of job descriptions and the updating of the staffing plan for 2025;
 - the institutional commitment to transparency, compliance and efficiency – dimensions that contribute directly to shaping the professional climate and the staff's perception of institutional integrity.
- Therefore, the report supports the research hypothesis that effective personnel policies are correlated with the level of administrative maturity and institutional governance. Consistent implementation of audit recommendations becomes not only an indicator of compliance, but also a tool for strengthening professional satisfaction in public institutions.

The Court of Accounts report no. 36 din 17 aprilie 2025, referitor la situațiile financiare consolidate ale Ministerului Sănătății, oferă o imagine amplă asupra gestionării patrimoniului public, a proceselor contabile, a controlului intern managerial, precum și a modului în care sunt folosite resursele financiare în entitățile din sectorul sănătății (<https://ccrm.md/ro>). From the perspective of research dedicated to consolidating personnel policies, the information presented highlights a series of systemic challenges with a direct impact on the organisational climate and the motivation of employees. Thus, the need for a strategic approach to human resource management emerges, with clear correlations between professional performance, continuous development and equitable resource allocation. Consolidarea politicilor de personal nu reprezintă doar un demers administrativ, ci devine o condiție esențială pentru sustenabilitatea instituțională. It promotes a culture of responsibility and transparency, and creates an environment conducive to the engagement and retention of qualified employees.

The Court of Accounts Report No. 33 of 15 April 2025 provides a comprehensive overview of the current level of institutional and financial governance in the defence sector (<https://ccrm.md/ro>). This report is relevant to the present research in that it highlights the relationship between institutional governance maturity and the efficiency of personnel policies. Operational limitations, a low level of digitalisation and difficulties in implementing audit recommendations can influence employees' perception of stability, recognition and development opportunities. In this context, the report supports

the idea that effective personnel policies must be analysed as part of an institutional ecosystem oriented towards performance and accountability.

The audit report no. 31 of 11 April 2025 on the Ministry of Economic Development and Digitalisation provides significant benchmarks for analysing institutional governance and financial management mechanisms in the public sector (<https://ccrm.md/ro>). From an integrative perspective, the report highlights aspects with the potential to impact the organisational climate: uneven application of accounting rules, absence of an updated accounting policy, difficulties in consolidating financial information, and a low level of functionality of control and internal audit mechanisms. These findings highlight the need for increased procedural coherence and institutional development oriented towards predictability and professional stability.

Addressing these challenges requires not only technical corrections, but also cultural changes in terms of transparency, accountability and organisational learning. In this sense, promoting performance-based personnel policies and organisational support becomes a strategic component of public governance reform. Thus, the report provides a valuable analytical framework for understanding the interdependencies between institutional efficiency, internal control and the professional satisfaction of public servants.

Recent external public audit reports by the Court of Accounts on the activities of key ministries in the Republic of Moldova reveal a common set of structural and operational challenges that directly affect the efficiency of personnel policies, the quality of institutional governance and the level of professional satisfaction of employees in public administration.

Table 1: Typology of structural dysfunctions in personnel policies: results from the analysis of audit reports on the ministries of the Republic of Moldova

Affected area	Common types of dysfunction
Human Resources Planning	<ul style="list-style-type: none"> - Lack of a coherent strategic vision. - Recruitment plans that are not updated or aligned with institutional needs.
Internal control and audit.	<ul style="list-style-type: none"> - Underdevelopment of internal audit structures; - Formal application of managerial control. - Lack of institutional self-regulation.
Performance evaluation	<ul style="list-style-type: none"> - Performance bonuses applied unevenly; - Criteria for evaluation that are unclear or insufficiently aligned with institutional objectives.
Inter-institutional coordination	<ul style="list-style-type: none"> - Poor communication between ministries and subordinate entities; - Processes that are fragmented.
Organisational culture	<ul style="list-style-type: none"> - A rigid institutional climate; - Perceptions of unfairness, instability and professional recognition.
Digitalisation and transparency	<ul style="list-style-type: none"> - Limited digitalisation of HR processes and financial records; - Limited transparency in the implementation of audit recommendations.

Source: prepared by the author

A transministerial analysis of structural dysfunctions in personnel policies highlights a systemic fragmentation of essential human resources functions, reflected by a lack of coherence in planning, evaluation, control and coordination. The absence of an integrated strategic approach, coupled with persistent vulnerabilities in organisational culture and digitalisation of processes, affects not only administrative efficiency, but also the internal professional climate. In this context, the identified dysfunctions cannot be treated as mere isolated deficiencies, but rather as signals of insufficient institutional maturity. Thus, the urgent need for coherent and interconnected strategic directions emerges, aimed at consolidating institutional capacity, professionalising human resources and creating an environment conducive to performance and professional satisfaction in the public sector.

6. Strategic directions for strengthening personnel policies in public institutions

This section aims to identify and formulate strategic directions for consolidating personnel policies, based on empirical findings highlighted in the financial, operational and compliance audits conducted in Moldovan ministries. The analysis is based on the premise that human resources are an essential factor in institutional performance, and that personnel policies must be approached not only as instruments of bureaucratic administration, but also as levers of structural and cultural transformation in the public sector.

Table 2: Strategic directions for strengthening personnel policies in public institutions

Adjusted strategic direction	What does it involve?	Implementation mechanisms:
Promoting the continuous professional development of public sector personnel.	It involves increasing the skills, adaptability and retention of employees.	These include programme development and implementation, budget allocation for human resources, partnership development with training institutions and the integration of post-training evaluation into human resource processes.
Review and operationalisation of human resource planning.	It also involves optimising the implementation of existing plans.	This includes annual evaluation of real needs, updating of staffing plans and integration of demographic and budgetary forecasts.
Consolidation of the functional audit and managerial control.	Making existing processes more efficient.	Responsibilities of audit structures are clarified, training staff is provided and the implementation of recommendations is monitored.
Improving performance evaluation mechanisms.	Aligning criteria with the realities of the activity.	Specific post-related indicators are being introduced, and managers are being trained in evaluation with direct correlation to the reward system.
Strengthening inter-institutional communication.	It also involves increasing decision-making coherence.	Procedures are being developed for common processes, digital reporting platforms, and periodic thematic meetings between structures.
Developing a proactive organisational culture.	Staff involvement and perceived equity.	Programmes of professional recognition and organisational climate evaluations are being introduced, as well as participatory leadership.
Accelerating the digitalisation of HR processes.	Reducing bureaucracy and increasing efficiency.	An integrated e-HR system is being implemented, staff are being trained and it is being integrated with performance evaluation.

Source: prepared by the author

By applying these strategic directions, public institutions in the Republic of Moldova can transition from a reactive and rigid administrative culture to one that is people-oriented, performance-driven and committed to institutional innovation. Thus, professional satisfaction will no longer be a by-product, but an explicit and measurable objective of modern governance.

7. Proposal for an applied model to strengthen personnel policies in the public sector.

Based on the previous findings and the proposed strategic directions, the need for an integrated, adaptable model is evident, tailored to the specific needs of public institutions in the Republic of Moldova. This model aims to transform personnel policies from formal administrative instruments into dynamic mechanisms oriented towards performance, equity and sustainability. The proposed model is based on a systemic approach, in which professional satisfaction results from the interaction between proactive HR policies, a favourable organisational environment and functional monitoring and adjustment mechanisms. The model is based on three interdependent pillars, as shown in Figure 1.

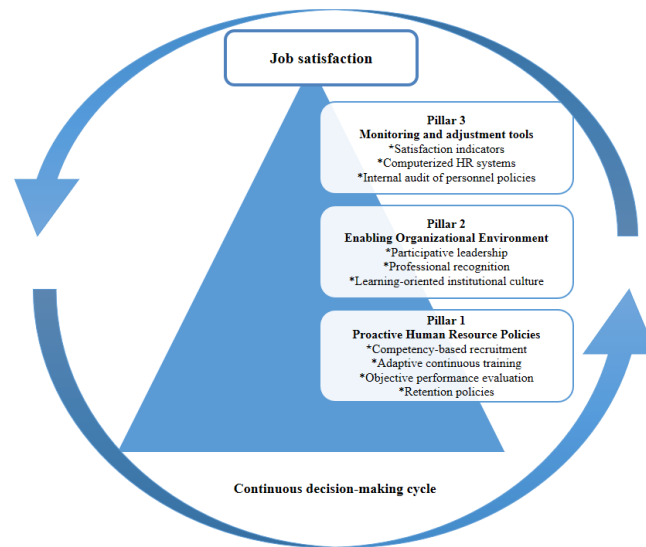


Figure 1. Integrated model for consolidating personnel policies in the public sector

Source: Author's own work

The figure illustrates a conceptual structure based on three interdependent pillars: proactive human resource policies, a favourable organisational environment and monitoring and adjustment tools. These pillars are integrated into a continuous decision-making cycle that ultimately increases the professional satisfaction of employees. The model proposes a systemic approach, in which human resources become a vector of institutional efficiency and organisational sustainability.

Based on the three conceptual pillars integrated in Figure 1, it is possible to operationalise strategic directions by associating them with measurable indicators and anticipated concrete effects. In this sense, a correlation matrix has been developed which details how human resource policies can be translated into monitorable actions, thereby contributing to the consolidation of institutional performance and professional satisfaction in the public sector.

Table 3: Matrix of correlation between pillar, directions, indicators and anticipated effects

Pilon correspondent (see Figure 1).	Strategic direction	Associated indicators:	Anticipated effects:
Pilonul 1	Continuous professional development	Number of training hours per employee per year	Increased competence and motivation.
Pilonul 1	Objective evaluation and recognition	Rate of employees promoted internally	Stimulating meritocracy and loyalty.
Pilonul 2	Participative organisational climate	Satisfaction score (internal questionnaire)	Greater commitment and reduced staff turnover.
Pilonul 1 and 3	Flexible and digitalised HR	Number of HR processes automated	Administrative efficiency and adaptability.
Pilonul 3	Measuring satisfaction and retention	Staff turnover rate (%)	Efficient personnel policy planning.

Source: prepared by the author

The strategic correlation between the intervention directions in personnel policies and the fundamental pillars of professional satisfaction highlights the need for an integrated, results-oriented approach. The proposed matrix demonstrates that proactive human resource policies, a favourable organisational climate and functional monitoring mechanisms can contribute synergistically to strengthening administrative capacity and stimulating professional engagement in the public sector. Consistent implementation of these strategies, supported by clear and quantifiable indicators, can transform professional satisfaction into a strategic objective, with a direct impact on the efficiency, stability and sustainability of public institutions in the Republic of Moldova.

The model can be applied gradually, starting with a pilot institution and subsequently extended to others, with adjustments specific to each context. It is essential that the process is supervised by an inter-institutional council for the development of human resources in the public sector, which will coordinate training, standardise the indicators and evaluate the impact.

8. Conclusions, limitations of the research and future directions

The personnel policies of the central public administration of the Republic of Moldova are increasingly emerging as a major influence on institutional capacity and the quality of services provided to citizens. The analysis of audit reports on a representative set of ministries highlights recurring challenges in human resource management, manifested by difficulties in strategic planning, uneven application of evaluation criteria, limited internal control, as well as variable levels of digitalisation and organisational coherence.

The results of the research support the idea of consolidating personnel policies through a systemic and continuous improvement-oriented approach. The proposed model, structured around three interdependent pillars, integrates proactive human resource policies, a favorable organisational environment, and functional monitoring mechanisms. This vision supports the transformation of professional satisfaction into a clearly defined objective of institutional policies, measurable and correlated with managerial efficiency.

Limitations of the research

The research relied primarily on the analysis of official documentation sources, which may limit the level of detail of internal and subjective perspectives of employees. Additionally, the institutional selection focused on a limited number of ministries, which requires caution when extending conclusions to the entire administrative system. Additionally, some dimensions such as organisational culture, perceived equity or degree of collective involvement require additional tools for a comprehensive evaluation.

Future research directions

To deepen understanding and validate the formulated hypotheses, the following areas of exploration are identified:

1. Using quantitative and qualitative instruments (questionnaires and interviews) to measure professional satisfaction among public officials;
2. Extending the institutional sample to include ministries with varied functional profiles;
3. Comparing personnel policies in Moldova with models from other European administrations to identify transferable good practices;
4. Developing a system of performance indicators in HR, calibrated to the specifics of the national public administration.

Strengthening personnel policies in the public sector is not just an administrative intervention, but a strategic opportunity for institutional development. Alinierea politicilor de resurse umane cu mecanismele de performanță, implicare și învățare organizațională poate contribui semnificativ la crearea unui climat profesional stabil, motivant și eficient, în linie cu obiectivele unei administrații moderne, transparente și orientate către cetățeni.

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IMPACT OF SUSTAINABLE DEVELOPMENT ON AGRICULTURAL COMPETITIVENESS: HOW MOLDOVAN AGRICULTURAL PRODUCTS CAN MAKE A DIFFERENCE ON THE EUROPEAN MARKET

DOI: <https://doi.org/10.53486/dri2025.18>

UDC: 338.43(478):061.1EU

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Abstract. European consumers are increasingly concerned about environmental challenges and, benefiting from a wide range of alternatives, they prefer to opt for those perceived to have the least negative impact on the environment or society in general. In this context, the main objective of this research was to examine the relationship between competitiveness and sustainable development, with particular emphasis on the aspects that need to be considered to increase the competitiveness of Moldovan agricultural products, which constitute a major component of the country's exports to the European Union. The research confirms the findings of other authors that there is a direct interdependence between competitiveness and sustainable development. Therefore, to reach a high competitiveness level for its agricultural products, the Republic of Moldova must implement measures that promote both environmentally sustainable and climate-smart agricultural practices, as well as better working conditions and a decent income for people involved in this branch of economy. This includes the adoption of advanced technologies such as precision agriculture, which can contribute to better products with less unwanted residues, at the same time helping to decrease the need for intensive manual labour, thereby lowering production costs and improving workers' wellbeing. Another important aspect to be considered is obtaining the necessary certifications that can confirm the adherence to good agricultural practices and social responsibility standards which are a crucial component expand the exports of Moldovan agricultural products to the EU market.

Keywords: competitiveness, sustainability, Moldovan agriculture, greening of agriculture, smart farming, climate smart agriculture, certifications in agriculture.

1. Introduction

The accession of the Republic of Moldova to the European Union opens huge opportunities for the domestic agricultural sector, which is one of the main pillars of the national economy, contributing to near half of the country's exports of goods.

The EU is one of the largest consumer markets globally: the constituting countries have a total population of about 450 million all of them characterised by high GDP per capita. On the other hand, the EU has a very competitive agricultural market, especially if to consider that its agricultural production is estimated at over 10% of the world's total, while just 5.5% of the world's population lives in the EU (Eurostat 2024).

Within the current context of abundant consumer goods and relatively stable income levels, European consumers have raised product standards to levels that surpass those observed in many other global regions. Given the extensive range of available options, purchasing decisions are increasingly based not only on the physical attributes of the goods but also on their associated or perceived social and environmental impacts. In this framework, contemporary European consumers tend to define product quality in terms of confirmable evidence that the product has been produced without imposing negative effects upon the environment, employees, or society as a whole.

This paradigm shift is also reflected in product labelling practices. In Western European retail environments, in addition to traditional labels emphasising sensory or organoleptic qualities (e.g., "Great Taste"), an expanding array of logos, such as the EU Ecolabel, Organic, Fair Trade, Rainforest Alliance Certified, among others, is prominently displayed. These labels serve as indicators that the products meet certain environmental or social benchmarks, thereby aligning with evolving consumer expectations.

Concurrently, heightened concern over climate change has been institutionalised within a specific

regulatory framework. The European Climate Law, which entered into force on 29 July 2021, mandates that the European Union achieve net-zero greenhouse gas emissions by 2050, with an interim objective of reducing emissions by at least 55% by 2030 relative to 1990 levels. This policy environment has encouraged numerous producers to pursue "net zero" operational targets, signalling their commitment to a more sustainable economic model and leveraging these achievements within their marketing strategies.

Another notable trend in Western markets is the growing scrutiny of natural resource efficiency. Beyond considerations of carbon footprint, consumers are increasingly attentive to factors such as the volume of water utilised in the production of agricultural goods when making purchasing decisions. Although the Common Agricultural Policy currently promotes sustainable water management practices in agriculture, it still does not require the indication of water usage metrics on product labels. Nonetheless, evolving market dynamics may well precipitate the future adoption of such requirements.

In contrast, the Moldovan agricultural sector faces significant challenges amidst these tightening European market requirements. Climate change in Moldova has intensified the need for effective irrigation practices, which must prioritise not only efficient water use but also the preservation of water quality to mitigate soil degradation – a concern that is further exacerbated by often feeble land management practices. Moreover, rural areas in Moldova are experiencing a pronounced labour shortage, stemming from both population aging and rural exodus. The delayed implementation of modern agricultural technologies has resulted in low labour productivity and reduced income levels, thereby diminishing the sector's appeal to younger people. Without an accelerated transition toward smart farming practices, the long-term prospects for Moldovan agriculture remain uncertain.

In light of these observations, the present study seeks to elucidate the relationship between sustainability and competitiveness in the context of Moldovan agricultural exports. The primary objective is to outline key strategic measures that can enhance the competitiveness of Moldovan agricultural products, thereby facilitating their continuous and successful marketing within the European Union.

2. The relationship between sustainability and competitiveness in economic theory

The analysis of the specialised literature on competitiveness reveals the definition of this term evolved in time. Classical theories viewed competitiveness mostly from the point of view of some tangible properties, which make one product sell better than another, one industry develop faster than another, one country be more prosperous than another, etc. Thus, Michael E. Porter believes that "The only significant concept of competitiveness at the national level is productivity" (Porter, 1990).

According to the above definition, it would appear that the Moldovan agricultural sector will be more competitive the more it can ensure a higher productivity. Despite the undoubtful validity of this statement, yet it does not reflect all the facets of competitiveness, which seems to be a much more complex subject, as it may be suggested by the introductory part of this article. Thus, it is important to also take into account the cost of ensuring this high productivity.

Competitiveness has a dynamic nature and to ensure a superior degree of competitiveness in long term, high productivity in agriculture should not lead to soil degradation, depletion of aquatic resources or any other damage caused to the environment. High competitiveness, likewise, cannot be a purpose in itself, but it have to result in certain benefits. In this context, Stephane Garelli offers a definition of competitiveness that also encompasses aspects related to sustainability: "The competitiveness of nations is a field of economic theory that analyses the facts and policies that shape the ability of a nation to create and maintain an environment that supports more value creation for businesses and more *prosperity for its people*" (Garelli, 2012). Garelli's definition also seems visionary from the point of view that it addresses not only environmental aspects, but also human well-being. High competitiveness level based on cheap labour, which keeps the country's population near the poverty line, just like the one obtained at the cost of resource depletion or environmental pollution, does not present too much value when viewed in the long term (Cimpoieş, 2024).

Competitiveness is important, but equally important is the sustainability of competitiveness. In this sense, stands out the slogan under which SolAbility, a consulting company specialised in the field of sustainability, publishes its Global Sustainable Competitiveness Index: "What is not sustainable is not competitive; What is not competitive is not sustainable." (SolAbility, 2024).

3. Strategic directions to reach a sustainable competitiveness of Moldovan agriculture **Greening agriculture and the transition to climate-smart agriculture**

The EU remains is one of the largest organic markets globally, following the USA and being ahead of China. In 2023, the European market for organic products (eco or bio, depending on the preferred term in a particular country) was estimated at around 46.5 million Euros, and the land under organic production amounted to 17.7 million hectares (IFOAM Organics Europe, 2025). According to forecasts, the growth rate on this market is expected to exceed 10% annually up to 2032, with Germany, France and Italy being the countries with the most significant development in the field (IMARC, 2024).

For the Republic of Moldova, which is striving towards EU integration, these trends could present considerable opportunities, but despite some momentum in the first decade of the millennium, Moldovan organic agriculture has entered a phase of stagnation. If in any Western supermarket there are specialised sections, or at least a clear distinction is made on the shelves for organic products, in the Republic of Moldova it is quite difficult to identify a certified organic product. Thus, we can see that organic products represent only an extremely narrow niche on the domestic market.

One of the reasons for stagnation in development in this area was that terms like "eco" or "ecological" have being used for ages in an arbitrary manner for uncertified products, what demotivated many producers to make additional expenses to obtain organic certification (AID, 2015). Unfortunately, the awareness of the general public about the true meaning of organic products remains low and under these conditions the market for certified organic products is not formed yet.

Another problem results from the shortage of inputs for organic agriculture, especially disease-resistant varieties. Therefore, Moldovan farmers produce organically either field crops and nuts that are intended for export, where this certification is required, or crops that by their nature do not require treatments with synthetic substances.

If organic farming can be considered a "desirable" option that can add value to local products on international markets, then the transition to climate-smart agriculture has already become a pressing necessity, as the country is already going through various climate challenges year after year (spring frosts, lack of precipitation, arid summers).

Climate-smart agriculture allows not only to adapt to environmental conditions that are constantly changing, but by adopting innovative practices and technologies that allow increasing the productivity and overall resilience of the sector, these practices also imply reducing greenhouse gas emissions, which naturally must slow down the progression of climate change.

Frost busters and heating elements powered by wind turbines already proved to be efficient in mitigating the risks related frost in several perennial plantations in Moldova. Therefore, to boost the adoption of these technologies, respective state policies should be elaborated, and government support is needed.

Another important aspect to be considered by Moldovan farmers is to improve the water management following the principle of "getting more crops from the same drops". In this regard, is important to use the most suitable irrigation systems for particular crop, focusing mainly on drip, sprinkler or subsurface irrigation and smart systems that would ensure the most efficient water usage. Similarly, rainwater collection and improved drainage systems can help reduce groundwater waste and optimise water use.

Adaptation strategies also entail changing crop mix and developing of new varieties with increased resistance to drought, pests and diseases. Such measures are particularly relevant in the Republic of Moldova, where increasing aridity, scarcity of precipitations, new diseases and reducing outturns of traditional crops require alternative options to maintain yield levels.

The transition to climate-smart agriculture further involves the implementation of conservation agricultural practices. For instance, no-till technology, contrary to conventional deep ploughing methods, minimises soil disturbance, thereby preserving soil structure, moisture, and organic matter content. Crop rotation, as another conservation technique, contributes to sustained soil health, mitigates erosion, and enhances carbon sequestration. Moreover, the integration of forest strips within agricultural landscapes serves to augment biodiversity, provide wind protection, and promote moisture retention, which collectively contribute to improved soil fertility.

Rotational grazing practices have been shown to produce higher-quality forage, leading to improved animal health and increased livestock productivity while simultaneously enhancing waste management and reducing emissions from livestock operations. The adoption of organic fertilisers and bio-pesticides within this framework not only improves soil quality but also reduces dependence on synthetic chemicals.

Finally, integrated pest management, which synergistically employs biological, mechanical, and chemical strategies, provides a sustainable method for pest control that minimises environmental impacts.

Collectively, these climate-smart agricultural strategies represent a cohesive approach to improving both the resilience and sustainability of agricultural systems in the face of changing environmental and climatic conditions.

Precision agriculture

The application of precision agriculture can also increase the sustainability of the sector. This approach is based on the use of various high-precision sensors, as well as data analysis tools that offer the possibility of automating processes and making informed decisions on the fly. Precision agriculture has a special role in streamlining the production process, saving time, effort and material resources through more efficient management of inputs (such as fertilisers and irrigation water, for example), but also a lower consumption of pesticides or other crop protection chemicals due to more exact application and a lower number of treatments, which implicitly leads to a cleaner, less polluted environment.

Precision agriculture can include intelligent variable-speed irrigation systems, which offer agricultural producers the automatic adjustment of water flow and pressure for each sprinkler or nozzle depending on soil moisture content, crop stage and weather conditions. The more advanced systems are able to do fertigation with intelligent adjustment of the doses of fertilisers dissolved in water taking into account the level of nutrients in the soil and the specific needs of the irrigated crops. These solutions are gaining increasing applications among Moldovan fruits producers and the most important now is to maintain this positive trend and extend the good practices to the entire agricultural sector and to as many processes as possible.

Precision planting allows seeds to be placed at optimal depths and distances, taking into account variations in soil quality and the requirements of the respective crop.

Yield monitoring allows data to be collected during harvest to evaluate variations in the quantities of product in the field, which can be integrated into an intelligent feedback system, thus better understanding how technologies could be adjusted to achieve optimal yield, including by the compensatory introduction of chemical elements extracted with harvest.

An increasing role in precision agriculture is played by drones that can be equipped with cameras and sensors that provide real-time data on crop health, pest infestations and field conditions, which allows monitoring of fields from a distance. Drones are also widely applied to treating plantations with various chemicals. In addition to saving resources and time, their use allows minimising contact with toxic substances for people, thus protecting their health and providing them with better working conditions (Cojocaru, 2024).

Mechanisation, automation and robotisation of agriculture

In context of urbanisation and loss of interest for certain agricultural works from the part of younger generations, the application of equipment that can replace labour or make it easier is becoming a necessity to ensure the economic sustainability of this sector. The depopulation trends registered in

Moldovan rural areas proved that the agricultural competitiveness based on cheap labour has no future. As minimal wages are indexed annually in the most of developed countries and labour is becoming more and more difficult to attract to the agricultural sector, the only way of keeping ensuring that the share of labour costs per unit of production is kept within reasonable limits is to increase the productivity of this factor. Thus, more productive, automated equipment and agricultural robots are gaining ground in modern agriculture.

Modern production technologies for most field crops already involve a high degree of mechanisation. However, the next step is to minimise implication of labour even more by using smart machineries, like driverless tractors or tractors equipped with advanced driver assistance systems. Moreover, various sensors, computer vision cameras in combination with AI algorithms can make the field works extremely efficient. For example, cameras attached to crop sprayers are "trained" to recognise weeds, which allows for the targeted application of herbicides, minimising losses and reducing the negative impact on the environment (Cojocaru, 2024).

A high degree of mechanisation and automation is also found in animal husbandry, especially in the western countries where meat, milk or egg production is very concentrated in order to take advantage of the scale economy. Unfortunately, this sector is less developed in the Republic of Moldova and apparently has less potential to attract private investments and benefit from more consistent government support.

By contrast, horticulture, is a key pillar of Moldovan agriculture, inclusively because this sector is still very dependant on manual labour, which in Moldova is still cheaper than in the most of European countries. However, this advantage is less likely to be sustainable in long term because automation and robotisation of processes can change the landscape in this area too. As we know, harvesting always was one of the most labour-intensive operations, requiring attention and precision. If nowadays the orchard owners in Moldova are happy to use harvesting platforms to increase labour productivity and just few of them use semi-automatic harvesting machines, in western countries these are already a norm. Moreover, it will not be long until the robots will do the harvesting with minimal involvement of humans, thus dismissing the impact of wage figures on total costs and therefore on competitiveness.

Another area requiring special attention is postharvest infrastructure. For example, if in Moldova the packing lines are usually semiautomatic, the larger specialised fruit or vegetable distributors from western Europe use high productive fully automated lines. The accession to EU of the Republic of Moldova will bring the advantage of being able to export considerably faster due to the opening of borders and much faster delivery possibilities. This will bring the possibility for Moldovan exporters to supply directly to retail chains, but for this the country will have to create the necessary packing infrastructure. This resumes the highest possible degree of automation of processes to ensure sufficient versatility for quickly switching to varying standards of different retail chains, usually translated to different labels and quantities in a pack, even if the product is still the same.

Quality and food safety standards and certification

The continuous growth of the global population and the boost of consumerism in 20th century pushed the agriculture to developed both extensively and intensively to satisfy not only the needs for more food, but also for raw materials for various other industries. This has led to deforestation, but also to the reduction of natural habitat areas of many plant and animal species in the most parts of the world. Considering that the intensive technologies often involve the use of synthetic preparations for plant protection or for maintaining animal health, at a certain point not only the reduction of biodiversity, but even the quality of food has become an increasing concern for people. Thus, most developed countries began to impose certain standards for the quality of agricultural products through legislation, especially residues of pesticides, antibiotics or other substances that could pose risks to human health.

An impetus in this regard was the creation in early November 1961 of the Codex Alimentarius Commission within the Food and Agriculture Organisation of the United Nations (FAO). The desire of consumers to have safe food products was also noted by the private sector. In 1997, several retail

chains in Europe, as well as their main suppliers, formed a working group with the task of harmonising their individual standards and procedures and developing a holistic independent certification system for good agricultural practices. This standard is seen as an opportunity to make a difference, promoting safe products while protecting workers and the environment. Being originally conceived for the European farmers, this certification system was initially called EurepGAP (GAP standing for Good Agricultural Practices). However, to reflect that this certification can be applied outside Europe as well, it was renamed as GlobalG.A.P. in September 2007 (EUREPGAP, 2005).

GlobalG.A.P. certification, although a voluntary private standard (being not mandatory by law) has over time become a crucial prerequisite for agricultural producers seeking to access major European retail chains. Thus, Moldovan producers wishing to see their products displayed inside the major European retail chains must implement this certification, which serves as an essential quality assurance mechanism.

Furthermore, in addition to GlobalG.A.P. certification, Western importers over the last decade started more often to require certifications related to employee welfare and corporate social responsibility. While Good Agricultural Practices are predominantly covered by GlobalG.A.P., there is a multitude of certification options to confirm social responsibility compliance. Most often importers and retailers ask for options like GRASP (GLOBALG.A.P. Risk Assessment on Social Practice), Sedex SMETA (Sedex Members Ethical Trade Audit), or Fairtrade certification administered by FLOCERT.

4. Conclusions

The analysis of diverse publications and online sources confirms a strong interrelationship between competitiveness and sustainability. When making their choice, modern consumers consider more and more often not just the inherent quality of products but also the methods by which these products were obtained. As result, the proof that products were obtained from sustainable sources can positively influence market competitiveness.

Climate change directly affects the Republic of Moldova, where drought has become an already common phenomenon. In this context, despite that compensatory measures may offer some temporary relief for agricultural producers confronting various calamities, such reactive approaches are insufficient for securing long-term business sustainability. Instead, the adoption of preventive strategies, despite demanding higher upfront investments, can facilitate a more rapid transition toward climate-smart agriculture. This evolution is essential for ensuring the long-term sustainability of the agricultural sector, provided that all stakeholders, from governmental agencies to producers, input suppliers, and academic researchers, recognise and support these measures.

Adjusting crop assortments and developing cultivars with enhanced resistance to drought, pests, and diseases constitute priority research and investment areas. However, the progress in selecting and breeding varieties adapted to Moldova's changing climatic conditions has been modest. This shortfall in resilient cultivar development also impedes the broader advancement of organic agriculture, which currently remains confined to niche markets. Strategic initiatives aimed at promoting the consumption of healthy, organic products; increasing public understanding of organic practices; encouraging commercial networks; and extending support to producers transitioning to organic methods could collectively stimulate demand and market growth in this domain.

In the context of positive trends regarding the environmental awareness among European consumers and a potential increase in demand for organic products, Moldovan producers can reach more competitive advantage through innovative and eco-friendly agricultural practices. Considering that implementing organic agriculture all at once may be more challenging for agricultural entrepreneurs in the Republic of Moldova, the first recommended step at the initial stage would be to pursue compliance with good agricultural practices and obtain Global GAP certification. The availability of the necessary certification infrastructure, including accredited certification bodies, support organizations that provide guidance and technical assistance, and government subsidies, is an important prerequisite for the greening of Moldovan agriculture, providing clear prospects for the country's products to find their way to the main retail chains in Western Europe.

The conservation agricultural practices, such as no-till farming, are gaining ground in the Republic of Moldova. However, it is too early to conclude that there is already an irreversible trend in this regard and that these practices are being adopted on a massive scale. This field still requires substantial state support, that may result in establishing of the desired climate-smart agricultural framework.

A significant challenge consists in the waning interest in agricultural professions among younger generations. Reversing this trend is imperative to maintain the sector's vitality and sustainability. Enhancing the prestige of agricultural careers through improved working conditions, increased productivity, and better incomes is essential to attract more young people into professions related to farming. A larger application of robotics, artificial intelligence and automation of processes can optimise labour utilisation, boost productivity and protect employees' working conditions and wellbeing. At the same time, improving the living conditions in rural areas is critical, necessitating a coordinated analysis of both agricultural development and rural socio-economic development.

To bolster the competitiveness of Moldovan agricultural products within the European Union market, export-oriented companies should secure certifications that confirm compliance with both good agricultural practices and social standards. Furthermore, in light of the European Union's commitment to achieving climate neutrality by 2050, Moldovan producers should consider adopting net-zero operational strategies, thereby aligning with the practices of the leading European food suppliers.

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THE EVOLUTION OF FOREIGN TRADE WITH CREATIVE GOODS AND SERVICES OF THE EUROPEAN UNION AND THE REPUBLIC OF MOLDOVA - AS A FUTURE MEMBER OF THE COMMUNITY

DOI: <https://doi.org/10.53486/dri2025.19>

UDC: 339.56(478:061.1EU)

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Abstract: *The study is based on tracking the evolution of the notion of creative industries from its appearance so far and the connection with other industries, such as cultural and digital. Continuous research with the exposure of one of the most popular classification of creative industries, identified based on their "usefulness"; as well as, the analysis of the evolution of foreign trade in creative goods and services (the value of foreign trade with creative goods / services, the average annual rate of increase of foreign trade with creative goods / services, the share of foreign trade with creative goods / services in the total trade of goods / services, the weight in the world trade of creative goods, the structure of creative goods) of the European Union and of the Republic of Moldova. The results of the study demonstrate the resilience and sustainability of creative industries during the periods of economic crises and confirm the importance of implementing the policies promoting creative industries. At the same time, the presence of fluctuations was identified, both during the 2015-2023 analysis period and within the EU community, demonstrating that, despite the stimulation and investments available at community level, not all countries show a major interest in increasing creative industries. The research ends with the formulation of conclusions regarding the evolution of foreign trade in creative goods and services during 2015-2023, and recommendations at the level of the Republic of Moldova, EU, the governments of the interested countries and the community.*

Keywords: *creative industries, creative goods, creative services, foreign trade, EU accession.*

JEL: F15, O14, O52

1. Introduction

In recent decades, technological and digital changes have reached an accelerated pace. Both in Europe and other regions of the world, the quick introduction of new technologies and the growth of globalisation have led to a radical transition from traditional production and innovation processes. Gradually, creative communities replacing classic factories that have imagination and the ability to innovate as raw materials. The ability to create experiences and social networks is currently a competitive factor (European Commission, 2010).

Nations around the world reassess their own approach to cultural policies, how creative industries are positioned and supported, moving from the typical approach - culture for economic growth and competitiveness, to more progressive approach - culture for sustainable development, stability and inclusive growth. This fact is also due to the Covid-19 pandemic, as well as to the Ukraine war, which have brutally unmasked the structural fragility of creative culture and industries, while demonstrating, how important these sectors are for the well-being, identity and security of a society. In addition, during this period of uncertainty and crisis, new valuables and proposals are required for the role of these sectors in society; respectively, it is necessary to reconceptualise a different type of economy and society that appreciates culture and creative industries as part of its foundation, with an essential status for its resistance. This is an economy that supports various creative talents to prosper and, therefore, encourages the creation of values and innovations in terms of health and well-being, community and locality, sustainable development (Government Decision no. 187, 2024).

The European Union wants to remain competitive in this changing global context, which is why it must create necessary conditions for innovation and creativity to develop within an entrepreneurial culture.

This research aims to compare analysis of foreign trade in creative goods and services of the European Union (EU) and the Republic of Moldova (R. Moldova, RM) and identifying directions to take over the good practices of accelerating the local creative economy.

In the context of the National Action Plan for EU accession, research includes several objectives: identifying categories and subcategories of creative industries, recognised at the EU level, by exposing the most important notions; classifying creative industries; dealing of the evolution trends of the volume of foreign trade in creative goods and services, the rates of external trade, the share of foreign trade in the world trade with creative goods and services of the EU and the Republic of Moldova, the disintegration of foreign trade on subcategories. In order to reach the proposed purpose, qualitative research methods were used, such as observation, document analysis, synthesis, deduction, and quantitative methods, such as quantitative analysis, comparative statistics, etc. The basic sources served the statistical databases of UNCTAD, BNS of Moldova, UNESCO, Eurostat.

2. Basic content

The notion of "**creative industries**" was first used at an official level in 1994 in the Australian Report, entitled "Creative Nation", with the mention that this cultural policy is also an economic policy, and that culture creates wealth. Australian cultural industries generated at that time 13 billion dollars per year, 336 thousand Australians were employed in industries related to creativity and culture, which made an essential contribution to innovation, marketing and design, attracted tourists and students, and was essential to the economic success of the creative country (Sanchez Serra, 2015; Commonwealth of Australia, 1994).

The UK Labour government presented one of the most popular definitions in 1998, in the set of "Creative Industries Mapping" documents, which focus on describing the Creative Industries as a set of economic bodies that employ creativity, skills and personal talents to create wealth and jobs (Creative Industries Mapping Documents, 1998). The set consists of 13 creative industry mapping documents (Advertising, Antiques, Architecture, Crafts, Design, Fashion, Film, Leisure Software, Music, Visual Arts, Publishing, Software, TV and Radio) and aims to raise awareness of the industries, their contribution to the economy and the issues they face.

The definition of „creative industries” remains a matter of considerable inconsistency and disagreement in academic literature and policymaking environment, especially regarding the parallel concept of „cultural industries”. Sometimes a distinction is made between creative and cultural industries, sometimes the two terms are used interchangeably. In addition, due to the importance of digital content and online services in the creative sector of the economy, the term „creative and digital industries” is increasingly used. For example, the digital sector is one of the fastest growing industries internationally. Both theoretically and practically, it is quite easy to confuse the creative economy with the digital or cultural economy. Equally, it is almost impossible to separate them, as in many ways they depend on each other. The most recent notion, appreciated worldwide, was formulated in 2013 by Felipe Buitrago Restrepo and Iván Duque, authors of the book “The Orange Economy, an Infinite Opportunity” and reads as follows: “Creative industries refer to a series of economic activities that are concerned with the generation or exploitation of knowledge and information. They can also be variously called cultural industries (especially in Europe) or creative economy and most recently in Latin America and the Caribbean have been called Orange Economy (Economía Naranja)”. They explain that orange, a pigment used in ancient Egypt to decorate the tombs of the pharaohs, is the dominant colour for culture, creativity and identity (Buitrago Restrepo and Duque Márquez, 2013; Parrish).

Globally, creativity and culture account for 3.1% of global Gross Domestic Product (GDP) and 6.2% of total employment. Exports of cultural goods and services have doubled in value since 2005, reaching US\$ 389.1 billion in 2019 (UNESCO, 2022). In 2022, the creative industries generated an estimated annual global value of US\$ 4.3 trillion (UNESCO, 2023), provide almost 50 million jobs worldwide and employ more people aged 15-29 than any other sector. In the countries where they are most developed, the creative industries often generate 2-7% of GDP, in some countries reaching the

10% threshold of national GDP, and are an important driver of economic growth as governments increase their focus on the sector (UNESCO, 2019).

Since the emergence of the concept of „creative industries”, experts in the field (scientists and government bodies) have tried to classify them. There are numerous classifications, adapted according to the particularities and priorities of the regions. More usable, however, are those proposed by the United Nations Conference on Trade and Development (UNCTAD) in 2008, which was then adapted in 2022 (Figure 1).

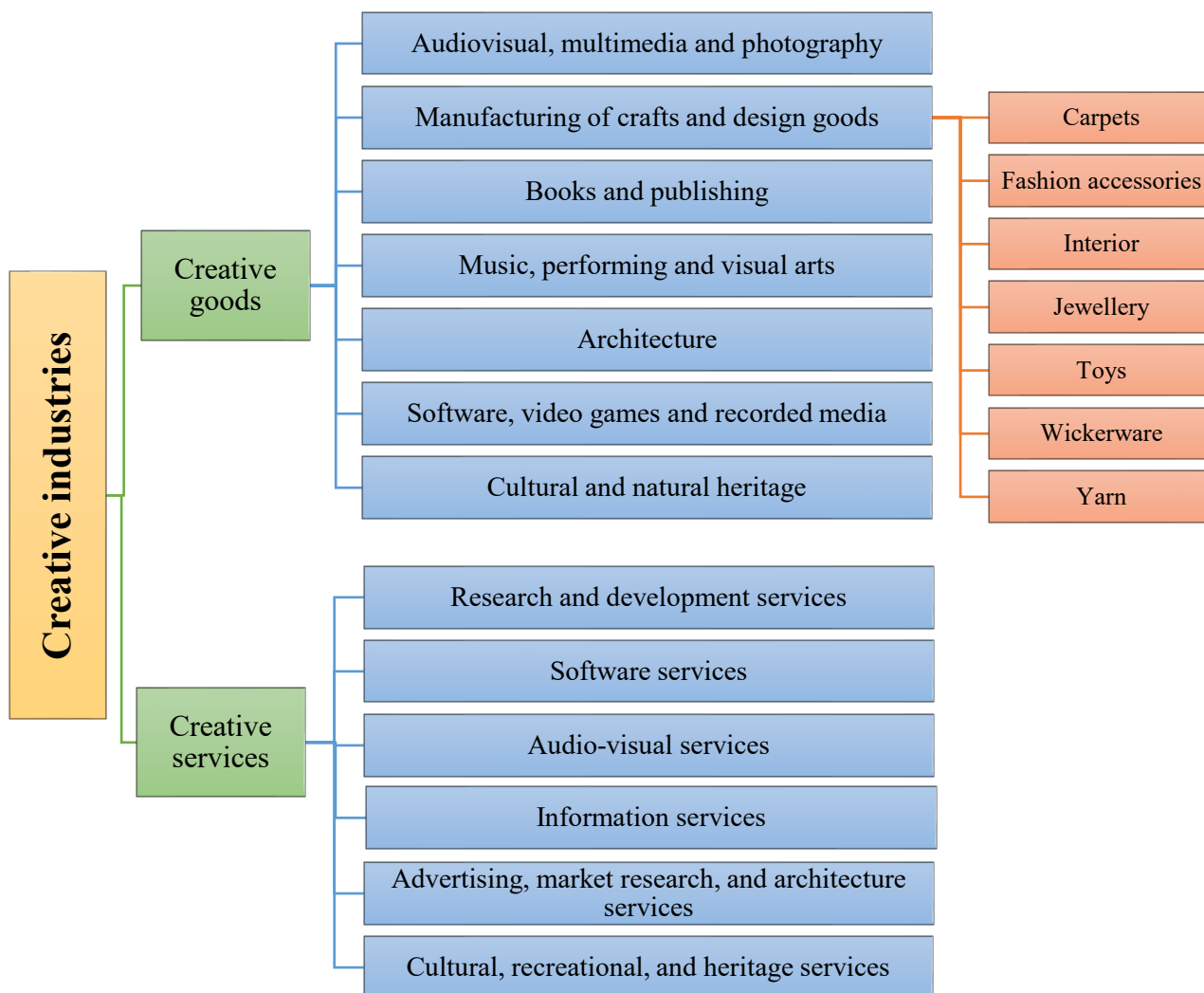
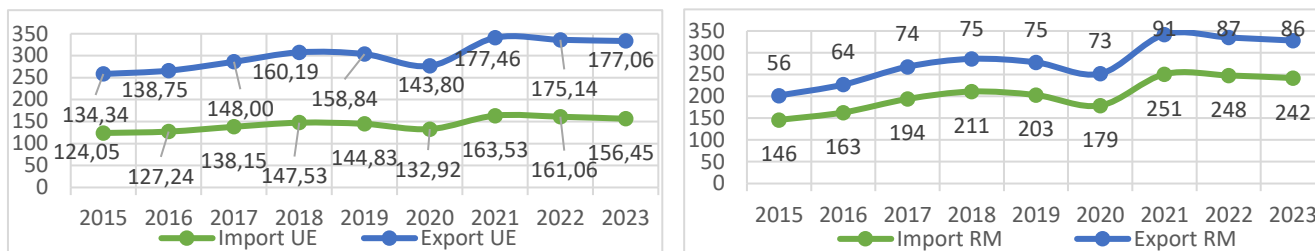


Figure 1. Classification of Creative Industries according to the UNCTAD, 2022

Source: developed by the author based on UNCTAD Creative goods matrix [11] and Creative services exports [12].

According to Eurostat, in 2019, there were around 7.3 million people working in the cultural and creative sectors in the EU-27, around 3.7% of total employment. In addition, the sector attracts women, as they constitute the vast majority of students in all cultural fields. Women make up 47.7% of employment in the cultural sector, compared to 45.9% in the total economy, and the majority have attained a tertiary level of education, higher than the number of people in non-cultural occupations. The evolution of foreign trade in creative goods and services was carried out based on statistical data provided by UNCTAD, the only database that measures progress through the Sustainable Development Goals, as established in the 2030 Agenda, which serves citizens, through the governments of the 195 countries that make up the organisation.



**Figure 2. Foreign trade in creative goods, 2015-2023,
 EU in billion US\$ and R.Moldova in million US\$**

Source: developed by the author based on UNCTAD data [11].

In Figure 2, we can notice that during the analysis period, the EU's imports and exports of creative goods recorded close values, with a slight prevalence of exports. However, the evolution was not stable, recording decreases in both flows in 2019 and 2020, which respectively led to the total decrease in foreign trade in creative goods. In 2021, the EU records a sudden evolution of foreign trade in creative goods, as do the global values, which, however, gradually decrease in 2022 and 2023. In 2023, foreign trade in creative goods and services continues to show its resilience and sustainability both at the global level and at the EU level, as well as in the Republic of Moldova. At the community level, foreign trade in creative goods recorded a positive trade balance (US\$ +20.6 billion), or an increase in exports by +1%, with a decrease in imports of almost 3%, compared to the previous year. During the period 2015-2023, the Republic of Moldova's foreign trade in creative goods recorded quite small values, compared to the leading countries in this regard (Figure 3), but increased from US\$ 202 million in 2015 to US\$ 335 million in 2022, with a slight decrease in 2023. Both the trend of exports and imports repeats the development course of EU foreign trade, which show a relevance of development, under the influence of local and international economic, political and social factors. The value of external trade in creative goods of the EU by country and the Republic of Moldova in 2023 is presented in Figure 3.

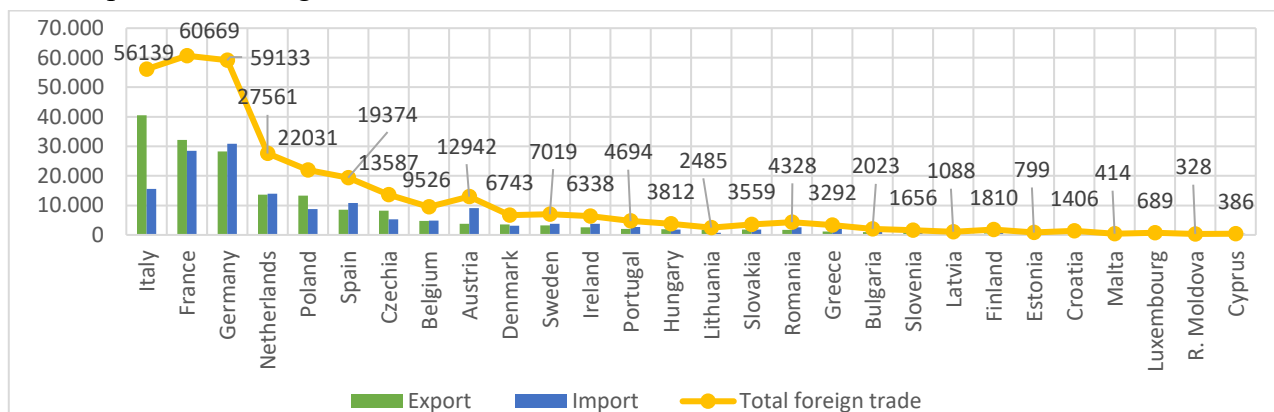


Figure 3. Foreign trade of EU and R. Moldova in creative goods by country, 2023, US\$ million

Source: developed by the author based on UNCTAD data [11].

In terms of the value of foreign trade in creative goods, France (60,669) ranked first, followed by Germany (59,133) and Italy (56,139), being the undisputed leaders in relation to the results of the other countries. If the Republic of Moldova (328) was a member of the EU, would have ranked last in the community, preceded by Cyprus (386) and Malta (414).

In terms of the value of exports of creative goods, the same countries made up the top of the leaders, but placed in other way. Italy (40,512), France (32,187) and Germany (28,318) were in the lead. Of the three leading countries, Italy (+24,885) and France (+3,705) have a positive trade balance, while Germany's trade balance is negative (-2,497).

If in 2023 the Republic of Moldova had been a member state of the European Union, in terms of

export flow (US\$ 86 million) it would have ranked 27th out of 28, surpassing only Cyprus (US\$ 27 million) and would have been placed after Luxembourg (US\$ 99 million) and Malta (US\$ 154 million). In terms of import flow, the Republic of Moldova would have recorded the lowest value (US\$ 242 million), and would have been surpassed by Malta (US\$ 260 million) and Cyprus (US\$ 359 million).

In a global context, Moldova's position remains stable throughout the analysis period (Figure 4).

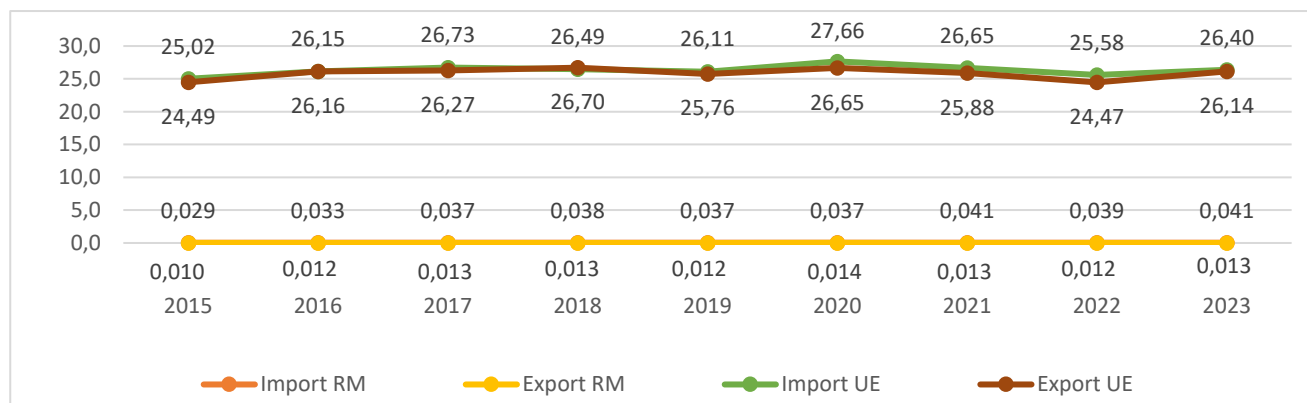


Figure 4. Share of the R. Moldova and the EU in world trade in creative goods, 2015-2023, %

Source: developed by the author based on UNCTAD data [11].

The contribution of the Republic of Moldova to trade in creative goods is minor, marking an average share of 0.01% in global exports and 0.03% in global imports of creative goods throughout the analysis period. Despite the negative evolution of the value of foreign trade by US\$ 7 million or - 2.4%, the share of the Republic of Moldova in foreign trade increased on average by 0.01 percentage points, which indirectly shows an involution of trade in creative goods at the global level, which regressed by 6%, and in the EU -3%.

In 2020, which was a year of global economic crisis, and all continents recorded negative developments in foreign trade (UNCTAD), the EU was less affected, and its share in world trade recorded the highest value in the analysis period – 27.16%, indirectly indicating that it was among the first regions to start recovering after the crisis. In 2022, the share of EU trade in creative goods with the rest of the world is approximately at the same level as in 2015 – 25%. These results are the most unsatisfactory in the analysis period. Even during the economic downturn that affected the EU in 2019, the EU share was 26%. These results placed the EU in a less favorable position for potential entrepreneurs who wanted to develop their start-ups and businesses with creative goods. In 2023, the EU share in world trade in creative goods records an increase again. This is not due to the evolution of the value of trade, but rather to the global crisis that has hit Asia and America harder. On the other hand, previous results indicate the EU's ability to gain trade ground, through policies supporting creative, cultural and digital businesses.

The favourable results in the EU's foreign trade in creative goods are not limited to the positive trade balance, but also to an average share of over 26% in the value of world trade in creative goods. However, within the EU, the trend is not positive for all countries, including the Republic of Moldova. Figure 6 presents the average annual growth rates of external trade.

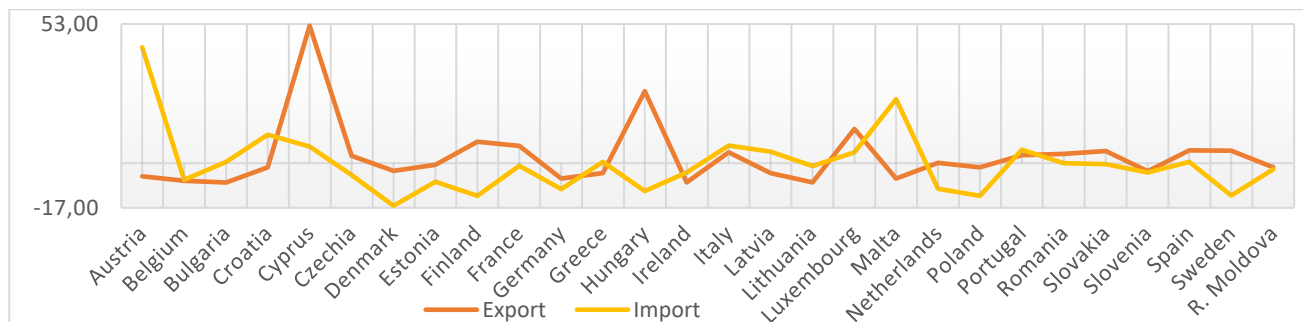


Figure 5. Average annual growth rate of foreign trade in creative goods of the EU and the Republic of Moldova, 2023, %

Source: developed by the author based on UNCTAD data [13].

Thus, it was identified that in 2023, at regional level (EU, continents, world) some indicators of foreign trade in creative goods recorded lower values than in previous years, however, some countries recorded important developments. Following Figure 5, presented above, we conclude that the economic and political crisis in 2022 generally affected foreign trade in creative goods. However, some EU states have implemented various policies to promote creative industries and have made considerable efforts to promote the export (Cyprus, Hungary, Luxembourg) and import (Austria, Malta, Croatia) of creative goods. However, based on the experiences of the economic crises of 2008-2009 and 2019-2020, fast post-crisis progress is expected in 2024-2025, which would cover the involutions but also the modest evolutions in 2023. Moreover, the crisis in 2022 affected trade in general goods largely than trade in creative goods. Thus, at the global level, the share of trade in creative goods in total trade in goods increased from 3.04% in 2022 to 3.06% in 2023; in the EU from 2.58% to 2.61%; and in the Republic of Moldova from 2.01% in 2022 to 2.11% in 2023.

Countries like: Italy, France, Lithuania, Malta, Poland, Czech Republic, in 2023, promoted the export of creative goods, bringing added value to the EU budget, and Austria, France, Malta, Moldova, Spain, Poland, and others promote cultural values by promoting the import of creative goods.

Given the increased value of trade in creative goods, but also the fluctuations in times of crisis, an important aspect is the distribution of creative goods by subcategories.

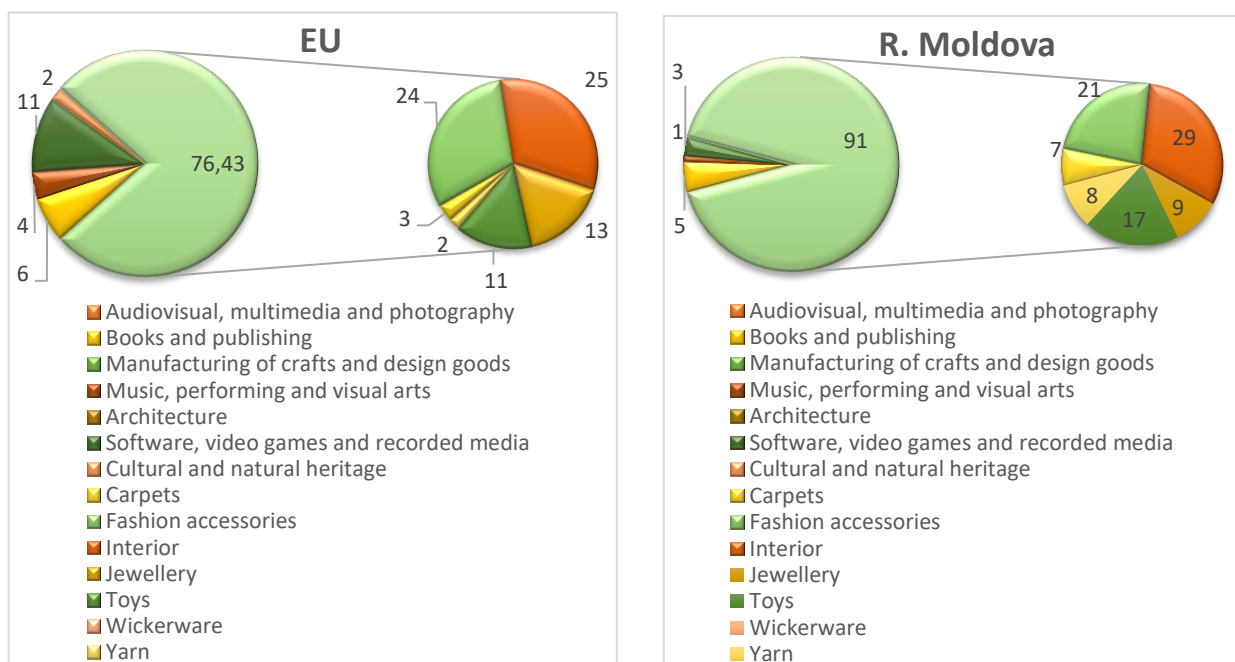


Figure 6. Structure of foreign trade in creative goods, by subcategories, EU and the Republic of Moldova, 2023, %

Source: developed by the author based on UNCTAD data [11], [13].

In Figure 6, we see that the structure of external trade in creative goods in the EU and the Republic of Moldova was distributed differently. In the Republic of Moldova, the main source of external trade in creative goods is the subcategory of Manufacturing of Crafts and Design Items (91), dominated by the commodity groups Interior items (29), Fashion accessories (21), Toys (17). In the EU, the same subcategory accounts for 76%, dominated by the commodity groups Interior items (25), Fashion accessories (24), Jewellery (13). Compared to the Republic of Moldova, the EU has the advantage of a more diverse structure of foreign trade in creative goods, in which, in addition to the presence of the Toys group (11), an important share is occupied by the subcategory Software, video games and recorded media (11).

Entrepreneurs who want to develop their business with these types of goods are advised to study in more depth the evolution of their interest group, as well as to research target markets.

In comparison, foreign trade in creative goods and services has recorded different flows development. In recent years, the Republic of Moldova has benefited from numerous projects to stimulate businesses in the creative industries. These efforts should be noticed in the evolution of statistical results. Below, it is presented the analysis of international trade in creative services.

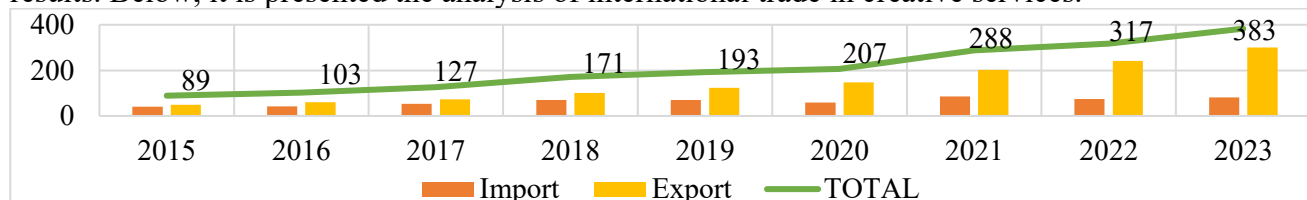


Figure 7. Foreign trade in creative services of the Republic of Moldova, US\$ million

Source: developed by the author based on UNCTAD data [12].

Following the general trend of international trade in creative services, during the analysis period, the Republic of Moldova reported continuous growth, even in the years of global crises – 2020 and 2022. When analysing import and export flows separately, we notice decreasing import trends in 2020 and 2022, which, were successfully covered by continuously increasing export values. The reported results confirm the government's efforts to attract investments in the sector and promote creative industries.

At the EU level, foreign trade in creative services has developed unevenly. Ireland is extremely successful; it dominates the export flow, which is an economic advantage, thus becoming a world leader. In external trade in creative services, it has accumulated 39.3% of the EU's external trade, or 16.91% of world trade in creative services.

Germany, the Netherlands and France were in the next positions; these countries are exporters, but also consumers of imported creative services, so they have the potential to develop local services for domestic consumption.

If in 2023 the Republic of Moldova had been a member of the EU, it would have been ranked 26th out of 28.

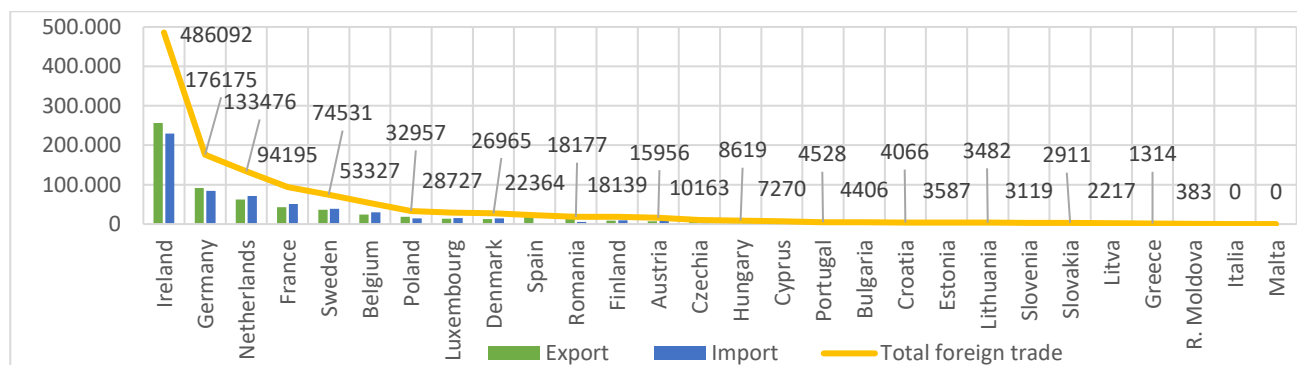


Figure 8. Foreign trade of EU and R. Moldova in creative services by country, 2023, US\$ million

Source: developed by the author based on UNCTAD data [12].

Unfortunately, this result does not indicate the successes of the Republic of Moldova in the export or import of creative services, but rather the inconvenience of the classification systems of creative industries, which have caused inaccuracies in the National Classifiers of Creative Industries Codes, the National Classifiers of Economic Activities, the Nomenclatures of Goods and Services. Thus, relying on national classifiers, Italy and Malta did not present statistical data on foreign trade in creative services. In addition, Spain and Greece did not report statistical data on the import of creative services, which further distorts the overall situation. Possibly, due to the different classifications used, these countries have cumulated their results of trade in creative services, in the category of creative goods. The Republic of Moldova is preceded by Greece (1 314), Latvia (2 217), Slovakia (2 911). In addition to the minor impact of creative services on the foreign market, the Republic of Moldova also faces continuous fluctuations (Figure 9).

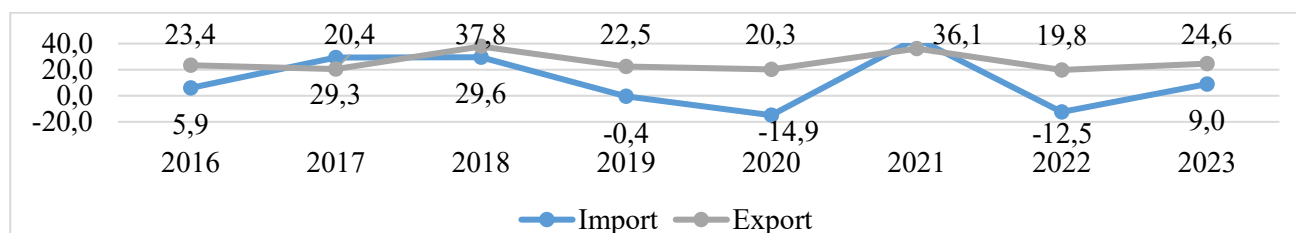


Figure 9. Average annual growth rate of foreign trade in creative services, R. Moldova, %
 Source: developed by the author based on UNCTAD data [14].

Fluctuations in the rates of evolution of the import and export of creative services denote instability for businesses that carry out activities of importing creative services, and relative stability for businesses whose core activity is the export of creative services.

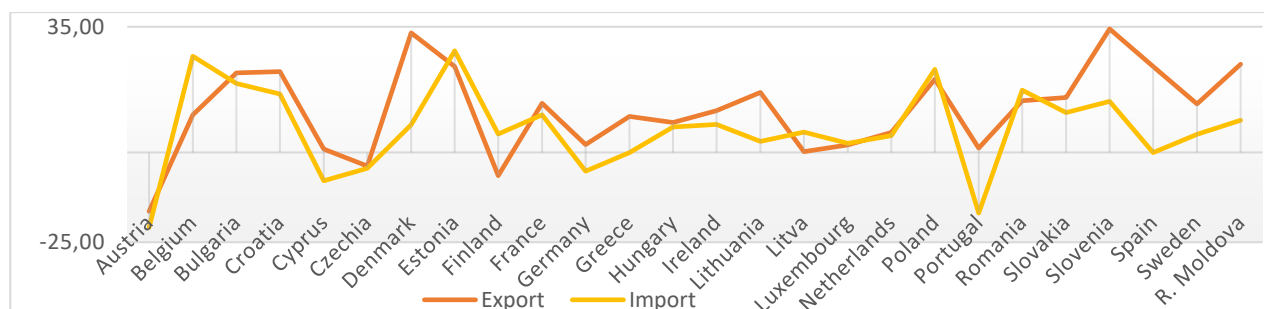


Figure 10. Annual average growth rate of foreign trade in creative services of the EU and the Republic of Moldova, 2023, %
 Source: developed by the author based on UNCTAD data [14].

Despite the incentive policies and funding available at EU level, the results in Figure 10 indicate an uneven evolution of foreign trade in creative services in 2023. These results repeatedly confirm that the EU (as a single entity) is not involved in promoting creative industries at country level, but only provides resources and monitors developments. Country governments are responsible for promoting local creative industries. Despite all the efforts of the government, the share of the Republic of Moldova in global exports of creative services has registered a slight increase, as shown in Figure 11.

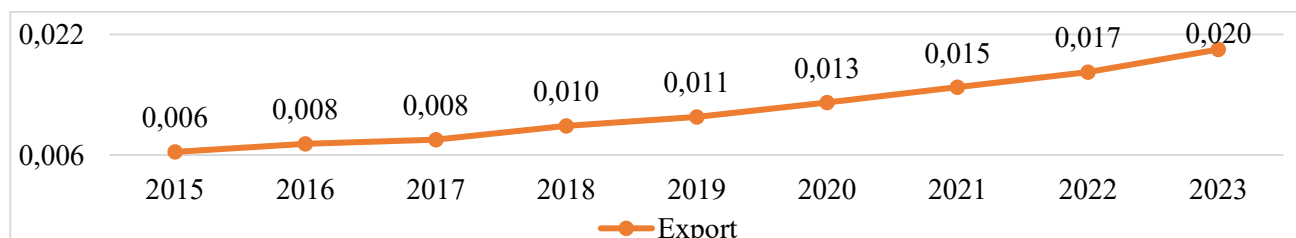


Figure 11. Share of the Republic of Moldova in global creative services exports, 2015-2023, %
 Source: developed by the author based on UNCTAD data [12].

Thus, in Figure 11 we see that the share of Moldova's exports in world trade in creative services increased from 0.006% in 2015 to 0.020% in 2023. The increase in the share is insignificant, but against the background of the global increase from 766 billion to 1 519 billion (almost 2 times), the increase in the value of the Republic of Moldova by more than 6 times cannot be ignored.

During the analysis period, the share of trade in creative services in total services in the Republic of Moldova recorded strong fluctuations. If in 2020 we notice a major increase in the share of exports (also confirmed by the increase in value from US\$ 123 to 148 million), then in 2022 a visible involution was recorded, which in 2023 was continued for the flow of imports, and recovered for the flow of exports. Given that in value, trade in creative services recorded positive trends in 2022-2023, we conclude that there was a stimulus on the general services export market that prevailed in the stimulation of creative services.

By fiscal value, the top sectors of the Moldovan creative industries in 2021, from an economic point of view, were the activities of advertising agencies (US\$ 74,47 million), computer game publishing activities (US\$ 14,53 million) and architecture firms (US\$ 14,301 million). These 3 top economic activities by sales value represented 69% of total creative industry sales in 2021. From 2015 to 2021, 36% of creative industry economic activities recorded an average annual reduction in fiscal value. The largest decrease was recorded for audio recording and music editing activities (-39%), other editing activities (-13%), and media representation services (-13%). At the same time, by far the most spectacular increase in sales was recorded in computer game publishing activities (+116%), the same economic activity registering, in 2019-2020, a sales increase of +520%, which makes it the most profitable creative sector in Moldova, which also records the highest sales growth (although the number of enterprises remains low). Other industries that recorded an increase in sales include artistic creation activities (+29%), cinematographic, video and TV post-production activities (+24%), specialized design activities (+23%) (Government Decision no. 187, 2024).

3. Conclusions

Based on the research results, were formulated the following conclusions:

- In the analysis period 2015-2023, the foreign trade of the EU and the Republic of Moldova recorded strong fluctuations, which indicates instability caused by external factors such as economic, political, social crises. However, looking back at the post-crisis developments of the creative industries, we expect an accelerated economic recovery in the coming years;
- In 2023, compared to 2015, the foreign trade in creative goods of the Republic of Moldova increased by 62%. In the EU, in the same period, foreign trade in creative goods increased by about 30%. France, Germany and Italy were leaders in foreign trade in 2023;
- The category of creative services is more resilient to economic crises than the category of creative goods, fluctuations being less variable, both in the EU and in the Republic of Moldova. In the EU, the contribution of foreign trade in services exceeds that of creative goods by approximately 4 times. This result is due to Ireland, which is a world leader. The Government of the Republic of Moldova continuously invests in the development of creative industries businesses, in the period 2015-2023, recording an evolution of foreign trade by over 330%. In a community or global context, these values are minuscule, but for the Republic of Moldova, they should not be ignored.

We mention the most important recommendations:

- Popularising the UNCTAD 2022 classification, and adapting it to local specificities. This component would provide access to comparable statistical data, and would increase the capacity to process them;
- Spreading cultural concepts and reflections that culture and creativity can generate wealth and developed countries are recommended to diversify production and cooperation agreements with developing countries, which will allow, on the one hand, access to original and cheap creative goods and services, and on the other hand, the possibility of integration into a large market with purchasing power.

The concepts of creative industries represent an infinite source of ideas, which aim, in addition to generating income, to promote cultural values, peace, social inclusion, equality, etc. The fundamental raw material (creative ideas) are renewable and can be addressed and promoted by all states of the world, to contribute to the reduction of social differences and represent opportunities for economic development for both developed and developing countries. Creative industries, like general industries, are influenced by a number of factors, and encounter similar problems in starting and developing businesses. At the same time, creative and cultural industries represent areas that facilitate the inclusion of women, young people and people with disabilities.

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ORGANIZATIONAL INSTITUTIONALIZATIONS OF THE CONSUMER MARKET

DOI: <https://doi.org/10.53486/dri2025.20>

UDC: 366.12:005.52

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Abstract: *In recent decades, there has been a tendency towards the formation and development of the era of consumer economy. Therefore, special attention is paid to the problems and prospects for the development of behavioral economics. This is primarily due to the fact that the share of consumer spending is more than half of the gross domestic product. It is precisely this significant role that consumer spending plays in the economy that determines the importance of analyzing consumer behaviour and the need to determine the factors that influence this behaviour. It should be noted that consumer society forms various institutional traps for consumers. They are mainly social in nature and are associated with the psychology of consumers. One of these traps is the passion for status things with a high income level. This requires a constant increase in labour efforts, and income growth is directed mainly at demonstrative consumption. Another institutional trap is associated with the consumption of subjects who are forced, out of fear of appearing "black sheep" against the background of general consumer prosperity, and who acquire expensive and widely advertised goods more often than the wealthy strata. Thus, in the context of transformational changes in society and economic systems over the past decades, serious qualitative and quantitative changes in the economic behaviour of consumers have occurred, which require further scientific research and development. In this regard, this article examines the theoretical provisions of the organizational institutionalization of the consumer market.*

Key words: *consumer economics, behavioral economics, consumer analysis, consumer psychology, consumer market, institutionalization.*

JEL: D11, D12, D18, D23, D40

1. Introduction.

In the modern economy, the role of consumers is particularly emphasized, since the share of consumer spending is more than half of the gross domestic product. It is precisely this significant role that consumer spending plays in the modern economic system that determines the importance of analyzing consumer behaviour and the need to determine the factors that influence this behaviour. In the context of economic transformation in recent decades, serious qualitative and quantitative changes in the economic behaviour of consumers have occurred (Kwilinski et al., 2022, 2023).

In connection with this key trend in the development of society, a consumer economy has been recognized, which is understood as a system of economic relations based on general consumption and derivatives of other phases of reproduction, based on the principle of permanent individual consumption (Trushkina & Patlachuk, 2024a). All this forms a special system of values and attitudes both at the microeconomic and macroeconomic levels in general.

The consumer economy is based on certain institutions and institutes (rules of the game), the key ones of which are demonstrative consumption and the boom in consumer lending; the emergence and total spread of network retailers; the associated shopping (unmotivated constant acquisition of goods) as an end in itself and the organization of leisure, etc.

Consumer economy from the position of macroeconomic approach is more costly and less efficient, but from the position of microeconomic approach, at the level of enterprises-producers of certain goods, consumer goods, numerous intermediaries, various trade and marketing structures, this type of economy appears from a different perspective, contributing to obtaining a high level of income. From other positions, consumer economy is perceived at the level of the consumer, since it allows

not only to satisfy constantly growing needs, but also to do it in a personalized way (Trushkina & Patlachuk, 2024b).

Several groups of megatrends can be distinguished that shape the long-term contours and priorities of economic development of most countries of the world from the standpoint of the consumer economy: globalization; formation of a knowledge economy and increasing importance of innovations as the basis for sustainable development of national economies; development of digital (Kwilinski, 2023; Trushkina & Patlachuk, 2023), bio- and nanotechnologies – convergence of technologies; increasing importance of new energy sources, energy and resource supply; climate and environmental change; achieving a new quality of life; formation of a personnel training system as a determining factor of competitive advantage, increasing the level of their mobility; individualization of consumption and cultural diversity; struggle for global leadership. These global megatrends have many effects, therefore they will affect both the economies of developed countries and the future positions of the national economy of Ukraine to varying degrees.

In view of this, the features and organizational principles of institutionalization of the consumer market require further research.

2. Basic content.

In addition to the organizational institutionalization of the consumer market in the form of the creation of retail trade networks, there is a multifaceted institutionalization of consumer preferences. This is associated, on the one hand, with consumerism, and on the other – with the VS (Voluntary Simplicity) movement. Consumerism is an organized consumer movement for the expansion and protection of their rights, as well as increasing the influence of consumers' producers and sellers. The main areas of activity within consumerism are as follows: consumer education; independent examination of goods; filing claims for low-quality goods. Consumerism as a movement accumulates three main groups:

- 1) consumer-oriented groups, concerned primarily with the growth of consumer consciousness and providing consumers with information for a more informed choice;
- 2) the state, exercising legislative and regulatory functions;
- 3) business, acting through competition and self-regulation in the interests of consumers.

Consumerism contributed to raising the level of ethics in the organization of sales of goods and services. Firms cannot ignore certain institutions generated by this movement, such as the International Confederation of Consumer Societies.

Along with consumerism, there is the VS movement – Voluntary Simplicity. This movement fights consumerism. The principles of VS are simple and boil down to anti-branding: buy things, not brands; buy only what you need; buy used when possible; don't buy at all if possible. The VS movement itself has become a successful brand, a symbol – the slogan "how to make life easier". This movement reflects the situation in an overdeveloped market, a market of abundance of goods and services. In Ukraine, where the consumer is highly susceptible to the "crowd effect" and the "branding effect", this movement does not yet exist.

The crowd effect that occurs in consumers under the influence of retail chains has a number of features. This allows us to talk about it as the consumer crowd effect.

1. This effect is associated with the consumer preferences of individuals and their consumer choice. Any consumer who becomes dependent on the huge variety of goods, the new products offered, experiences a state of involvement in this world of goods and a real chance to become the owner of some part of it. The movement of the consumer along the numerous shelves in the largest supermarkets resembles a conveyor system. Gradually, they are all drawn into the general flow; a crowd of consumers is actually formed, endowed with uniform thoughts and emotions of a consumer nature with all the ensuing consequences.

2. The crowd effect is not spontaneous and is formed quite calmly among consumers in appropriate conditions – when visiting large shopping malls, supermarkets and hypermarkets. In specialized

stores where a limited range of goods is sold, this effect is not observed due to the absence of a crowd of consumers as such, and a more personalized nature of their preferences.

3. The leaders of the crowd of consumers are those who can purchase the maximum possible and varied number of goods. This is informal leadership, since in principle none of the consumers explicitly point to the leader-consumers, they are not elected by the majority, and do not call for any actions. This is an example of silent collusion, when these consumer-leaders of the crowd of consumers quite clearly stand out from it and "set" the tone for other consumer groups with their behaviour. Most consumers also fall under the basket effect – after visiting a retail outlet, it must be filled with goods, since an empty basket is returned as an attribute of consumer failure.

4. This effect is provoked by various presentations of new products, advertising both in the media and in trade structures, provision of discount cards by that system of discounts. The effect of the consumer crowd can be assessed in two ways. From the side of consumers who fall under the influence of this effect, it is assessed by them not at that moment, but after some time, when the consumer finds a lot of unnecessary goods at home. These purchases made by him under the influence of the consumer crowd, on the one hand, satisfy his consumer demand (otherwise he would not have bought them), on the other hand, they can exceed the reasonable limits of his needs. You can also ask buyers – what they wanted to buy and what they actually bought in stores. We believe that more often the second component will be greater. Such spending reduces the savings rate, and accordingly increases the consumption rate. The crowd effect can provoke rush consumer demand, which in turn can contribute to the emergence of demand inflation. In reality, such processes are observed quite often.

On the part of sellers of goods and services organized in the form of network retail structures, the crowd effect should be primarily assessed positively. The more goods sold, the greater the revenue and profit of these structures, the opportunities for further development.

It is impossible not to note any problems of trade structures connected to the effect of consumer crowd. This is connected with the necessity of equipping large-scale sales areas, providing a significant assortment variety of goods of due quality, its constant updating, availability of qualified personnel, which requires corresponding expenses (financial, material, labour). The system of management of goods flows should be effectively organized, an operational monitoring system should be created, allowing tracking the dynamics of consumer demand. In addition, the negative effect of scale of production, in this case – trade activity, is dangerous here, and manifested in decrease of efficiency due to complexity of management of gigantic grown trade structures. We consider the effect of consumer crowd as one of the factors of institutional order, really and significantly influencing the consumer, his demand, first of all, in network retail structures. The following testifies to its institutional nature.

1. If we consider the institutional factor as a factor accumulating socio-economic, socio-cultural, psychological aspects of activity of individuals as consumers, then the effect of consumer crowd is closely connected with these processes. The psychological side of the crowd effect is obvious; the socio-economic side is connected with consumer choice, oriented towards the absolute majority.

2. The institutional factor by its nature should form some attitudes, habits in the consumer, gradually turning into the norm, rules of his activity, life support. The consumer crowd effect accordingly forms such norms in the consumer as identification of his consumer choice with the choice of the crowd, the desire to realize himself at the level of the aggregated set of consumers (and the implementation of this), in other words, to be no worse than others, to keep up with everyone and try, if possible, to get ahead of the crowd in something, becoming its informal leader.

3. The institutional factor is closely related to and derived from the existing system of formal and informal institutions. In relation to the consumer, his choice, informal institutions are more likely to work than formal ones (laws, for example, on the protection of consumer rights, established property rights, formed organizational structures). Global consumers can also be classified as new type consumers. It is believed that in the conditions of the post-industrial economy, global consumer demand is formed, personified by global consumers. Global consumers are consumers from different

countries or regions of the world, who have similar needs and are looking for similar consumer benefits and properties of goods. They form the "backbone" of the consumer Internet community – a set of entities that communicate with each other via the Internet based on common interests in terms of obtaining information about certain specific aspects of the acquisition process.

3. Conclusions.

The modern world is gradually transformed into a single space where goods, services, capital, and labour move freely, where ideas are freely distributed and their bearers move. The increasing degree of interconnectedness of national economies is accompanied by universalization and homogenization of the life the subjects as a whole: under the influence of exchanges of goods, services, information, and technologies, interaction of cultures occurs, the world gravitates toward uniform standards, principles, and values.

Thus, conducting economic activity on a global scale removes national, social, cultural, state, and other restrictions on consumer behaviour, which is determined by the reduction in the role of the state and national cultures as a set of norms and values. Globalization leads not only to the economic convergence of consumers, but also to the standardization of the main stereotypes of perception and models of their behaviour. The development of mass production and the emergence of large corporations create opportunities for a consumer lifestyle throughout the world; the price for this is de-individualized labour and de-individualized consumption of standard (with apparent diversity) products. In the conditions of abundance of goods and constant shortage of time, the „globalized” person faces the problem of choice: brand „A” or brand „B”, and often does not have the opportunity to make a decision based on objective, rational reasons. Companies involve psychologists in creating advertising, which does not so much reflect the actual characteristics of the product, but rather on a subconscious level should win over the potential consumer and cause an irresistible desire to purchase the advertised product.

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BUSINESS ANTIFRAGILITY STRATEGIES IN THE COSMETICS INDUSTRY: MODELING DECISION-MAKING UNDER UNCERTAINTY

DOI: <https://doi.org/10.53486/dri2025.21>
UDC: 687.5:338.34.053.2(478)

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Abstract: *This paper investigates how antifragility strategies can be developed and applied within the cosmetics industry to turn volatility into a driver of growth. The aim is to provide a structured antifragility model for firms in emerging markets, particularly Moldova. The study draws on secondary data and cross-case analysis of international companies such as L'Oréal, Estée Lauder, Shiseido, and Coty, examining their responses to crises like the COVID-19 pandemic. Methodologically, the paper employs comparative synthesis and scenario-based evaluation to identify common resilience and transformation patterns. The proposed model integrates digital transformation, diversification, supply chain redundancy, and real-time consumer feedback. Findings reveal that antifragile firms do not merely recover from disruption, they strengthen their position by institutionalizing adaptability, stakeholder learning loops, and proactive innovation. For cosmetics businesses in developing economies, the model offers actionable guidance for embedding antifragility into strategy and operations. It supports decision-making under uncertainty by offering flexible tools that align with resource constraints, enabling sustainable growth in a turbulent global environment.*

Key words: *antifragility, decision-making, uncertainty, cosmetics industry, digital transformation*

JEL: M10, L21, O31, Q01

1. Introduction

The cosmetics industry operates at the intersection of innovation, consumer behavior, and economic turbulence. As one of the most brand-sensitive and rapidly evolving global sectors, it is continuously influenced by shifting consumer preferences, regulatory developments, and technological advances. The COVID-19 pandemic further intensified these dynamics, forcing companies to reassess their operational strategies, value chains, and engagement models.

Leading firms such as L'Oréal and Shiseido not only resisted the disruptive impacts of the crisis but exemplified antifragility by leveraging uncertainty as a platform for strategic reinvention (Ivașenco, 2022; Ivașenco, 2025). Their adoption of AI-based skincare diagnostics, virtual beauty consultations, and direct-to-consumer channels set new standards for agility and innovation.

This paper builds on the concept of antifragility, as articulated by Taleb (2012), and further supported by research into antifragility in Moldovan business conditions (Ivașenco, 2023). Unlike traditional resilience, which focuses on survival and recovery, antifragility suggests that organizations can thrive through stressors and volatility, evolving into more adaptive and robust systems. The paper positions antifragility as a superior strategic orientation, especially in turbulent markets where linear growth trajectories are rare and disruption is constant.

This research aims to develop a sector-specific antifragility model for the cosmetics industry and adapt it for practical implementation in emerging markets. The specific objectives are: to identify strategic responses to uncertainty among leading global cosmetics firms, to construct a four-layer antifragility model, and to explore its applicability for SMEs in Moldova through tailored recommendations.

2. Antifragile Business Design

2.1 Foundations of Antifragile Business Design

The proposed framework for antifragile strategy in the cosmetics industry stems from three mutually reinforcing domains: strategic agility, sustainability-driven innovation, and uncertainty-oriented

decision-making systems. Strategic agility denotes a firm's ability to reallocate resources swiftly, pivot marketing approaches, and reconfigure supply chains in response to market shocks. This agility is not merely operational but deeply embedded into corporate culture, supported by leadership that embraces experimentation and rapid response mechanisms (Taleb, 2012).

Sustainability, once considered a branding advantage, is now integral to long-term competitiveness. Antifragile firms embed environmental, social, and governance (ESG) principles directly into their product design and supply network architecture. Brands like Shiseido have pioneered biomaterial packaging and clean product formulas not simply to comply with regulatory expectations, but to capture shifting consumer sentiment toward ethical consumption (Estée Lauder Companies, 2021; L'Oréal, 2021).

Table 1. Strategic Responses of Four Global Cosmetics Companies

Company	Agility Practices	Sustainability Initiatives	Crisis Responses (2020–2023)
L'Oréal	Fast digital product rollouts	Refillable packaging	Regionalized manufacturing
Estée Lauder	Agile team restructuring	ESG-integrated R&D	Home-care product pivot
Coty	Influencer-led testing	Circular economy initiatives	Streamlined supply networks
Shiseido	AI-powered diagnostics	Biomaterial innovation	Localized brand storytelling

Source: elaborated by the author.

Decision-making under uncertainty, the third pillar, involves cultivating a culture of iterative feedback and scenario testing. Rather than rely on rigid, long-range forecasts, antifragile companies incorporate adaptive intelligence: real-time analytics, micro-testing of marketing campaigns, and predictive modeling that accounts for multiple possible futures. These systems position companies not to avoid volatility, but to profit from it by moving faster than the competition when the landscape shifts (Taleb, 2012).

2.2 The Author's Model of Antifragility in Cosmetics

Drawing on a thematic synthesis of strategic responses employed by L'Oréal, Estée Lauder, Coty, and Shiseido (for more details, see Table 1), a comprehensive, four-layered antifragility framework has been developed. This model integrates functional, structural, and strategic mechanisms that allow cosmetics firms not just to endure crises, but to systematically grow stronger as a result of volatility. Each layer functions as a dynamic capability that enhances organizational adaptability and innovation capacity, particularly in complex, uncertain environments.

Layer 1. Core Capabilities. This foundational layer refers to the internal competencies that enable agile responses to market shifts. These include agile leadership, defined by distributed decision-making, rapid communication flows, and crisis-responsive vision. Modular product development is another essential element, allowing companies to iterate quickly, swap components in response to supply issues, and align products with emergent trends. For example, Estée Lauder rapidly shifted its R&D focus toward skincare and wellness during the COVID-19 pandemic, responding to increased consumer demand for home-based self-care solutions. In this model, core capabilities also extend to data-driven marketing and cross-functional collaboration, enhancing a firm's reflexes in times of turbulence.

Layer 2. External Sensing. This layer is concerned with the capacity to identify, interpret, and act upon early signals from the external environment. External sensing encompasses environmental scanning, AI-enhanced trend monitoring, and social listening across platforms like TikTok, Instagram, and YouTube. Shiseido, for instance, invests heavily in real-time consumer analytics and

ethnographic insights to detect shifting beauty norms, particularly among Gen Z in East Asia. Regulatory sensing is also a key function, companies must stay ahead of evolving legislation in areas like microplastic bans, animal testing regulations, and carbon disclosures. This layer correlates to “peripheral visioning,” a strategic foresight capability essential for pre-emptive adaptation. When functioning effectively, this layer ensures firms are not reactive but are proactively aligning with the direction of macro, meso, and micro changes.

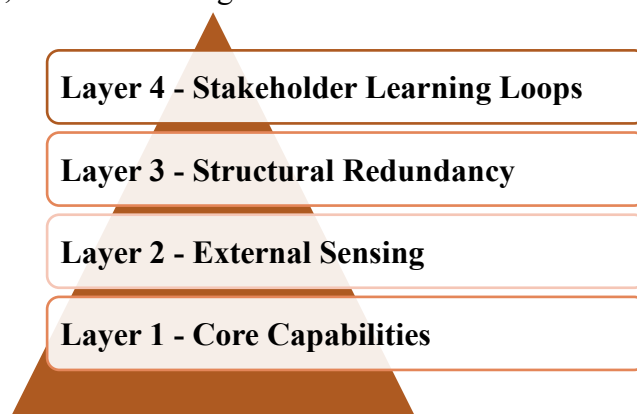


Figure 1. Four-Layer Antifragility Model for Cosmetics Firms

Source: elaborated by the author.

Layer 3. Structural Redundancy. Structural redundancy refers to a firm's built-in capacity buffers and system redundancies that allow it to withstand shocks without operational paralysis. These include diversification of product lines (e.g., expanding from color cosmetics to wellness supplements), cross-regional supply hubs, multiple sourcing options, and flexible logistics arrangements. L'Oréal and Coty have adopted this approach through multisite manufacturing and dual-supplier strategies, thereby mitigating regional disruptions like Brexit or pandemic-related lockdowns. In antifragility theory, this layer maps to “redundant optionality,” which prioritizes robustness through parallel resources and decentralized infrastructures. It serves as the mechanical backbone of the antifragile enterprise, absorbing shocks and redistributing capacity in real-time.

Layer 4. Stakeholder Learning Loops. The final and most integrative layer involves embedding learning mechanisms within and across stakeholder networks. This encompasses real-time consumer feedback loops, post-crisis reviews, ecosystem mapping, and co-creation initiatives with suppliers, customers, and even competitors. Coty, for example, uses digital dashboards to track customer sentiment and influencer resonance on a weekly basis, adjusting messaging and product emphasis accordingly. Furthermore, learning is not limited to external audiences; internal learning, via team debriefs, employee suggestion systems, and training during crises, is equally important. This layer operationalizes the “iterative resilience engine”, where antifragility is achieved through continuous improvement and feedback-informed recalibration. It transforms turbulence into insight and insight into capability.

Collectively, these four layers form an interdependent architecture that allows firms to not merely bounce back but bounce forward. Volatility is not treated as an anomaly but as a developmental input. This antifragile model aligns with the core premise that learning, optionality, sensing, and adaptability should not exist in isolation, but be systemically embedded into the firm's strategic DNA. This integration makes the organization more flexible, faster, and better equipped to turn each disruption into an innovation inflection point (Procter & Gamble, 2022).

2.3 Decision-Making Under Uncertainty

Traditional models of corporate planning assume a relatively stable environment with linear growth, gradual shifts in consumer demand, and relatively predictable supply chains. However, in the modern global economy, shaped by geopolitical uncertainty, rapid technological evolution, and volatile

consumer behavior, this assumption no longer holds. Decision-making processes that rely heavily on long-term forecasting and centralized authority can become bottlenecks during fast-evolving crises. Consequently, antifragile organizations adopt a fundamentally different mindset: one that embraces uncertainty not as a risk to be minimized but as a resource for strategic advantage (Taleb, 2012).

Antifragile decision-making begins with the cultivation of probabilistic thinking and scenario analysis. Rather than adhering to a single strategic plan, firms prepare for multiple plausible futures. This involves developing contingency plans, stress-testing strategies under extreme scenarios, and building dynamic response frameworks. L'Oréal, for example, used multi-scenario planning during the COVID-19 pandemic to address disruptions in retail, logistics, and global supply chains (L'Oréal, 2021). These included digital acceleration initiatives, reallocation of marketing budgets, and regionalized production adjustments.

Another pillar of antifragile decision-making is strategic optionality. This involves maintaining a portfolio of options, parallel suppliers, diversified sales platforms (brick-and-mortar, direct-to-consumer, third-party marketplaces), and modular product configurations, that can be activated as conditions change. This principle has been embedded in operations at firms like Procter & Gamble, which strategically decentralizes manufacturing and logistics capabilities to allow swift pivoting in the face of disruption (Procter & Gamble, 2022).

Importantly, decision-making speed and accuracy are amplified through real-time intelligence. Companies increasingly rely on digital dashboards, predictive analytics, and AI-powered tools to monitor key performance indicators, market sentiment, and external risks. These digital capabilities shorten decision cycles and support timely interventions, transforming reactive decision-making into anticipatory, data-informed actions. Internally, these tools allow leaders to visualize the health of their operations at a granular level and test small-scale interventions before scaling them.

Organizational culture plays a defining role in how uncertainty is addressed. Firms that reward initiative, tolerate intelligent failure, and encourage experimentation are better equipped to navigate complexity. This adaptive culture empowers local teams to respond directly to changing circumstances without waiting for approval from the top, reducing inertia. Estée Lauder, for instance, created agile response teams during the pandemic to handle region-specific issues independently, improving responsiveness and resilience.

Moreover, antifragile decision-making is inherently iterative. It thrives on feedback loops and learning from action. Firms must institutionalize post-crisis reviews, operational retrospectives, and real-time feedback systems to refine their responses over time. This process not only builds decision-making capacity but enhances the firm's memory of past shocks, enabling it to recognize patterns and react more quickly in the future.

Ultimately, antifragile decision-making combines strategic foresight, structural flexibility, data-driven responsiveness, and a supportive organizational culture. It is not a fixed set of policies but a living system that evolves through continuous learning and adaptation. In volatile and resource-constrained contexts such as the Republic of Moldova, this approach is particularly vital, it allows firms to be small but smart, constrained but creative, and unstable yet steadily improving.

2.4 Practical Implications for Emerging Markets

Emerging markets like the Republic of Moldova face a complex interplay of structural constraints and developmental opportunities. Unlike developed economies, where organizations typically have access to stable infrastructures and robust institutional support, businesses in emerging markets often must navigate regulatory uncertainty, capital scarcity, underdeveloped digital ecosystems, and skill gaps. In such an environment, antifragility offers a powerful lens through which to reframe these challenges as potential strengths. By embedding adaptability, innovation, and decentralization into business strategies, cosmetic firms can convert environmental volatility into a driver of growth.

Antifragility in emerging economies begins with contextual awareness. For Moldovan firms, this means aligning business models with national development strategies, leveraging local biodiversity

for raw materials, and tapping into regional trade agreements for export diversification. Practical implications are explored below across several critical domains.

Digital Transformation as a Low-Cost Antifragility Lever. Contrary to popular belief, digitalization does not always require massive capital investments. Moldovan SMEs can deploy cloud-based platforms, no-code websites, AI-driven social media tools, and customer relationship management (CRM) software at very low cost. Platforms such as Shopify, WhatsApp Business, and Canva offer affordable, scalable solutions that allow real-time communication with customers, rapid deployment of promotions, and personalized engagement. In addition to e-commerce, digitalization also supports antifragility by enabling remote team collaboration, inventory tracking, and customer analytics, all of which reduce the business's dependence on physical infrastructure and increase its strategic optionality (International Trade Centre, 2022).

Diversification of Revenue Streams and Product Portfolios. In resource-constrained environments, diversifying product offerings allows firms to hedge against unpredictable demand. Moldovan cosmetic firms can experiment with expanding into adjacent markets such as herbal remedies, aromatherapy, or skincare for different age groups and skin types. Local climate and soil conditions provide access to unique botanical ingredients (e.g., lavender, honey, rosehip oil) that can be positioned for both mass-market and premium segments. Furthermore, diversification in packaging formats (e.g., travel-size products, refill stations) creates optionality in consumer behavior and distribution strategies. Resilience grows as firms reduce reliance on any single product, market, or season.

Sustainability as Strategic Differentiator. Sustainability is no longer a niche expectation; it is a core competitive requirement. Moldovan cosmetic businesses can build antifragility by embedding sustainability across their value chain. This includes sourcing from local regenerative farms, adopting biodegradable packaging, reducing water usage in formulations, and participating in circular economy practices. These initiatives not only reduce operational risks from future regulation but also open new consumer segments aligned with ethical consumption. As the clean beauty trend continues to grow, firms that embed environmental and social governance early will be better positioned for future scale and export readiness (NielsenIQ, 2023).

Localization of Value Chains and Supplier Redundancy. Localizing inputs provides firms with greater control over their operations, while also building economic resilience within their communities. By identifying multiple local or regional suppliers for key ingredients and packaging materials, companies can reduce vulnerability to international shipping delays or currency fluctuations. Establishing relationships with agricultural cooperatives and rural processing facilities enables dual benefits: stabilizing rural incomes and reducing firms' own exposure to upstream disruptions. Moreover, firms that maintain short supply chains benefit from faster lead times and enhanced traceability, both valued by modern consumers and regulators alike (GIZ, 2023).

Access to Finance and Alternative Capital Models. Given that traditional bank loans often remain inaccessible to SMEs in Moldova, antifragility demands experimentation with alternative financing mechanisms. Blended finance, crowdfunding, and microfinancing platforms provide ways to raise funds while building community buy-in. For instance, pre-sales through Kickstarter campaigns or local gifting cooperatives not only generate capital but validate market demand before scaling. Firms can also engage with impact investors, diaspora networks, or development partners like the EBRD and EU4Business, which offer grants for digital and green innovation (EBRD, 2020).

Workforce Upskilling and Talent Adaptability. Antifragile firms prioritize workforce resilience. In Moldova, this means upskilling employees not only in product formulation or sales, but in digital literacy, sustainability compliance, and crisis response. Modular training programs, offered in partnership with vocational schools or online platforms, can provide practical skills for content creation, customer service automation, or e-commerce operations. Investing in people generates agility: employees who can pivot roles, generate ideas, and troubleshoot are essential assets during volatile periods. This human capital flexibility mirrors the adaptive business structures at the core of antifragility theory.

Public-Private Collaboration and Policy Engagement. A critical yet underutilized strategy in emerging markets is proactive policy collaboration. Firms that engage in shaping local regulations, through chambers of commerce, innovation clusters, or export alliances, gain foresight and influence over the frameworks that govern their operations. They also gain early access to support instruments, such as tax incentives, grants, and technical assistance. Countries like Romania and Estonia have demonstrated that coordinated innovation hubs (e.g., bioeconomy parks, digital accelerators) can catalyze SME growth. Moldova can replicate these models with public-private investments in R&D labs, co-manufacturing spaces, and clean technology zones.

Consumer Co-Creation and Cultural Alignment. In an era of fragmented attention and identity-driven consumption, co-creating products with users generates relevance, loyalty, and resilience. Moldovan brands can integrate customer feedback through online polls, open test panels, or participatory social campaigns that invite customers to suggest ingredients, names, or packaging. This also enables continuous adaptation, every product becomes an experiment, every launch an opportunity for learning. Cultural alignment further enhances brand value: by incorporating traditional motifs, historical remedies, or regional languages into branding, companies anchor their identity in local pride while offering authenticity to foreign buyers. Such deep cultural resonance creates emotional antifragility, fostering community defense against market or reputational shocks. The application of antifragility principles in emerging markets is not an abstract ideal—it is a pragmatic roadmap for firms operating with constraints. Moldovan cosmetic companies can build agile, resilient, and adaptive businesses by integrating digital tools, diversifying their offers, localizing operations, embracing sustainability, and investing in human capital.

Table 2. Practical Antifragility Tools for Moldovan SMEs

Category	Tool/Strategy	Cost Impact	Resilience Benefit
Digitalization	WhatsApp Business, Canva, Google Workspace, Zoho CRM, AI-assisted product testing	Low	Rapid feedback, workflow automation
Finance	Crowdfunding (Seedrs, Kickstarter), EU4Business, blended finance, micro-loans	Medium	Diversified capital access, cash flow stability
Supply chain	Local ingredient sourcing, dual suppliers, regional packaging providers	Low-medium	Supply continuity, import independence
Workforce	Online upskilling (Coursera, Udemy), cross-functional training, agile teams	Low	Increased flexibility, rapid role reallocation
Product development	Modular formulations, low-batch production, open innovation with users	Low-medium	Rapid iteration, market-responsive innovation
Marketing	Influencer micro-campaigns, TikTok/Instagram reels, co-created branding	Low	Adaptive consumer engagement strategies
Distribution	Multichannel retail (own e-shop, marketplaces, offline pop-ups)	Medium	Sales channel redundancy
Policy and networks	Chamber of commerce partnerships, innovation hubs, public-private clusters	Low	Early policy adaptation, collective advocacy

Source: elaborated by the author.

When these strategies are supported by smart finance and public-private collaboration, even micro-enterprises can respond creatively to volatility. In doing so, they not only secure their position in the domestic market but evolve into regional innovation leaders, using every disruption as a catalyst for long-term transformation.

3. Conclusions

This paper contributes to the growing literature on antifragility by applying its core principles within the high-volatility environment of the global cosmetics industry. Through analysis of four multinational firms and the design of a layered model, we find that antifragility is not only achievable but essential in consumer-driven, innovation-sensitive sectors.

The model provides a practical foundation for SMEs in Moldova to rethink how they prepare for, absorb, and ultimately benefit from disruption. Antifragile thinking reframes resource constraints as innovation catalysts and enables companies to design organizations that learn faster, respond earlier, and adapt continuously.

Practical Recommendations for Moldovan SMEs: begin with low-cost digital tools to build consumer feedback loops (e.g., Instagram, Canva); partner with agricultural co-ops to source resilient, local ingredients; explore non-traditional funding such as diaspora support or blended finance grants; train employees in multiple roles to increase internal flexibility; engage with policymakers via business associations to co-create supportive innovation policies.

These recommendations demonstrate that antifragility is not reserved for large corporations—it is an accessible and scalable mindset that can empower even micro-enterprises to thrive through uncertainty.

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MANAGER-EMPLOYEE INTERACTION IN THE AGE OF DIGITAL TRANSFORMATION

DOI: <https://doi.org/10.53486/dri2025.22>

UDC: 005.96:004.7(498)

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Abstract: *The increasing integration of digital technologies within organizations has inevitably brought changes in the interactions between managers and employees, thus modifying the classic ways in which they interacted within the framework of employment relationships and beyond. Therefore, in the context of these transformations, a series of questions arise, assumptions appear and a comparative line is created between the two methods of interacting, respectively the classic and the digital one. Precisely for this reason and in light of these considerations, this paper aims to identify the implications of these new ways of collaborating and to determine how they are perceived among employees in Romania. Thus, in order to consolidate the study and as a chosen research methodology, the paper focuses on the use of a questionnaire as a tool for collecting relevant data, which is also necessary to validate the hypotheses proposed by the paper, namely the high dimension of the digitalization of manager-employee interactions and the advantage it brings; completing the specialized literature with a topical approach. The research results thus bring a significant contribution to the field, both for the general area and for studies focused on Romania, while also marking the importance of the attention dedicated to this field of research and its significance in practice.*

Key words: *decision making, digital, manager, employee, interaction*

JEL: M0, M1, O0, O3

Introduction

The way in which interactions and communications take place in the workplace is changing every day; the innovations brought by the digital age are reshaping the way in which employees and managers relate within the framework of employment relationships, thus emerging new ways of communicating, of transposing decisions, as well as new blockages or new risks. Therefore, due to the degree of novelty that digitalization still implies for many organizations, this area remains an unexplored one that offers relevant research opportunities for both literature and practitioners. Hence, an important aspect that deserves to be analyzed is how the interaction between managers and employees is presented in the context of these organizational transformations. This perspective not only allows an analysis that helps determine the existence of such interactions, but also extends to a research of their specific characteristics, distinct elements such as the sphere in which the greatest digital interaction takes place and its frequency.

In this sense, the present paper aims to analyze the manager-employee interaction in the era of digital transformation, in order to determine where it is found in the context of the organization and, at the same time, what is the perception of employees regarding its usefulness. Furthermore, in order to achieve the proposed objective, the study focuses on a quantitative research methodology, namely on the use of the questionnaire as a tool for collecting data relevant to the chosen research topic. Through the chosen study approach, the research will bring a significant contribution to the subject, exposing the current situation of digital interaction between employees and managers within organizations in Romania; thus consolidating the scientific literature and being able to be used as a guide for practitioners.

1. Literature review

The digital era has brought with it a series of changes to the classic interactions between employees and managers and one of the most important questions that should arise in this context is closely related to how employees cope with this change or whether they accept this way of digital communication; in the literature, some authors have highlighted this aspect and have taken into account the fact that a lot of attention is paid to the expectations of adapting to technological changes, but less consideration is given to the acceptance of these changes (Tkalac Verčič et al., 2025). There is practically an unwritten rule that employees must be open to new methods of interaction, but there is little concern about their willingness to accept them. Also from a similar perspective, in a study conducted using a survey, the emphasis was placed on the possible effects of the digitalization of labor relations, and among the most significant concerns of the respondents are discrimination as a consequence of weaker digital skills and benefits that appear only in favor of employers (Gurova et al., 2020). Other authors note that digital changes in the workplace also imply a relearning of interactions, noting that these changes not only come with benefits but also with obstacles in terms of collaboration and not only (Högberg and Willermark, 2024).

Additionally, in terms of negative aspects, some research have also analyzed the work-life balance, thus determining that by its extensive nature, the digitalization of interactions between employees and managers could lead to divergences between private and work life, as digital technologies allow work to find its place in life outside the office (Wright et al., 2014), (Obushenkova et al., 2018). A relevant approach in the literature is also given by the fact that regarding the relationships between employees and managers, there is a discrepancy between the way the latter understand and behave in the context of these changes, which may have an effect on the way employees value trust in the workplace (Mackenzie, 2010). Moreover, the very broad frontiers of digital technologies impact interactions within organizations also through the phenomenon of social media surveillance, with some authors believing that through the possibilities offered by the digital environment, managerial control can be extended outside the workplace, but also that this aspect can be reciprocal, the activity through which employees also monitor their managers (Taylor and Dobbins, 2021), considerations that can have a strong effect on employment relationships.

Regarding the positive aspects of the digitalization of labor relations, there are also a number of advantages; among these are the benefits that digital communication brings in terms of work performance, precisely because it is easier for employees to ask for and receive help through digital communication (Karhapää et al., 2023), practically when it comes to interactions necessary to perform work tasks, a digital interaction is much more useful and facilitates the resolution of work. Another advantage brought by digital interaction is also found in situations related to employee medical problems, some managers being of the opinion that a digital communication with employees who have health problems facilitates the organization in such situations (Sondell et al., 2025), in practical terms, not only can they learn about the situation much more quickly, but they can also prevent those situations in which the organization's activity is affected by the unexpected absence of an employee.

With the advent of changes imposed by digitalization, the prerogative of digital leadership also appeared within organizations (Sağbaşı and Erdoğan, 2022), or a management focused on digitalization also has its implications in the interactions that managers have with employees and among the benefits brought by this organizational change is also the much more active involvement of employees (Li et al., 2024). Additionally, in the context of digital leadership, the literature also highlights the positive effects it has on commitment to the organization (Qiao et al., 2024).

2. Research methodology.

The research methodology used for this study focuses on the analysis of quantitative data collected through a questionnaire. The collection instrument was disseminated among the active population in Romania, namely people who are currently employed and who have expressly given their consent to

complete it (198 people). In terms of structure, it was built on 5 questions whose configuration was divided into 3 sections, of which 2 questions are binary and 3 are built on a Likert scale. In this regard, question no. 1 from the first section aims to determine whether employees interact digitally with managers when performing their work tasks and the second question determines the size of this interaction. In the case of the second section, the structure is similar, the difference being that in this case the element pursued is not that of work tasks but of interactions related to absences, vacations and leave. The last section and the last question is a concise one and analyzes the quality of both interactions in the perception of the respondents, respectively whether it is seen as effective or not. Through statistical interpretation of the data, the aim is to validate a series of theories, namely, the existence of these digital interactions, the high frequency of their use and the positive perception of employees towards the use of the digital environment in interacting with managers.

3. Results and discussion

Initially, the statistical analysis focused on interpreting the data collected from the two binary questions, namely the first question from section 1 and the one from section 2. Therefore, regarding whether employees use the digital environment both for completing work tasks and for taking leave, a Chi-Square Test analysis was applied to determine if there is a strong association between the two questions (see Table 1).

Table 1. Chi-square test for binary question association

Chi-Squared Test

	Value	df	p
X ²	17.018	1	< .001
N	199		

Source: Authors' own research

H₀: The null hypothesis is rejected, as the p-value is less than 0.05.

H₁: According to the test, there is a significant association between the two questions, with the p-value indicating a strong link between the use of the digital environment for work tasks and its use for taking leave. Next, in order to determine the correlation between the use of the digital environment for completing work tasks and the frequency of use, a cross-tabulation was used in combination with a Chi-square test (see Table 2).

Table 2. Chi-square test for Section 1

Chi-Squared Tests

	Value	df	p
X ²	83.297	4	< .001
N	198		

Source: Authors' own research

The results of the analysis thus confirm the validity of the study; the null hypothesis (H₀) is rejected, and H₁ is accepted, indicating that the responses to the two questions in section 1 are correlated, with a significant relationship between the use of the digital environment for work-related tasks and the frequency of its use.

The same analysis was then applied to the second section (see Table 3).

Table 3. Chi-square test for Section 2

<i>Chi-Squared Tests</i>			
	Value	df	p
X ²	102.740	4	< .001
N	198		

Source: Authors' own research

The null hypothesis is also rejected in this case, with the high X² value indicating a large degree of deviation and the p-value indicating a strong association between the two variables analyzed. Therefore, in the case of the second section it can be concluded that there is a strong relationship between the use of the digital environment for interactions related to leaves, vacations, and absences and the frequency with which it is used.

Furthermore, the distribution of responses to the two binary questions was examined to determine where is the higher concentration of digital environment use; specifically for work tasks or for leave (see Table 4).

Table 4. Prevalence of the digital environment – binary questions

<i>Descriptive Statistics</i>		
	Labor relations	Time off
Valid	198	198
Missing	1	1
Mean	4.162	3.596
Std. Deviation	0.926	1.242
Minimum	1.000	1.000
Maximum	5.000	5.000

Source: Authors' own research

The main trend according to the analysis is the more frequent use of the digital environment in interactions related to completing work tasks than in those related to leave requests; the much smaller standard deviation of the first section confirms the homogeneity of the responses.

Regarding the frequency of using the digital environment for both sections, a Paired Samples T-test was applied to determine whether there is a significant difference between the two contexts (see Table 5).

Table 5. Paired Samples test

Paired Samples T-Test

Measure 1	Measure 2	t	df	p	Cohen's d	SE Cohen's d
Labor relations	- Time off	7.133	196	< .001	0.508	0.074

Note. Student's t-test.

Source: Authors' own research

Thus, the null hypothesis, which assumes that the frequency of digital environment usage is equal in both contexts, is rejected and the hypothesis stating that there is a difference between the two is accepted, though it is a moderate one and that is in accordance with the average effect given by Cohen's *d*, which is 0.508.

As a final analysis, a hypothesis was tested to determine whether more frequent use of the digital environment in both contexts leads to a more positive or negative perception of using the digital environment in interactions in general. Therefore, a Spearman correlation was applied (see Table 6).

Table 6. Frequency and satisfaction correlation

Spearman's Correlations

Variable		Labor relations		Time off		Satisfaction
1. Labor relations	Spearman's rho	—				
	p-value	—				
2. Time off	Spearman's rho	0.568	***	—		
	p-value	< .001		—		
3. Satisfaction	Spearman's rho	0.507	***	0.438	***	—
	p-value	< .001		< .001		—

* $p < .05$, ** $p < .01$, *** $p < .001$

Source: Authors' own research

The resulting data confirms that the more frequently the digital environment is used in work-related interactions, the more it will also be used for leave requests. Regarding the strength of correlations with satisfaction/opinion about using the digital environment, there is a moderate connection, which is higher for the use of the digital environment in work-related interactions. However, overall the relationship is positive, indicating that regarding employees' satisfaction with the use of the digital environment in interactions with managers, there may be other factors influencing it.

Conclusions

The research findings highlight the high importance placed on the use of digital technologies within organizations, particularly regarding interactions between employees and managers. It is emphasized that these technologies are used not only for work-related tasks but also for leave requests. Regarding the frequency of these interactions, it is noted that it is higher for work tasks and lower for leave requests, as such interactions are generally less frequent in practice.

Concerning respondents' perceptions of the effectiveness of these technologies, the study's findings indicate that the level of usage has a moderately significant impact on it, but not exclusively. This suggests that not only frequent use of the digital environment but also other factors contribute to increasing employee satisfaction with digital interactions with managers. In conclusion, the study presents both the growing trend of digital technology integration within organizations (through high levels of digital interaction) and an overall picture of this trend for the research field, particularly in Romania.

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THEORETICAL-CONCEPTUAL ASPECTS OF CUSTOMER-ORIENTED BUSINESS ORGANIZATION

DOI: <https://doi.org/10.53486/dri2025.23>

UDC: [658.818:005.21]:004.7

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Abstract: *This paper analyzes the strategic role of Customer Relationship Management (CRM) systems in enhancing business performance. The aim is to show how CRM supports customer loyalty, automates processes, and improves decision-making. Using qualitative analysis and segmentation models such as ABC and XYZ, the study outlines CRM as both a technological solution and a business strategy. CRM centralizes customer data, integrates sales and marketing activities, and ensures consistent communication. Key features—such as contact management, task automation, and reporting—improve workflow and offer better control to managers. The findings show that even small businesses benefit from CRM by increasing efficiency, personalizing interactions, and boosting retention. CRM systems also support segmentation and prioritization of clients, which directly impacts profitability. In conclusion, CRM is more than a tool—it is a strategic asset that helps companies remain competitive in customer-centric markets.*

Key words: *CRM systems, customer retention, sales automation, segmentation models, business strategy, data-driven decisions*

JEL: M14, M21, M31

1. Introduction

In today's competitive and digital-driven market, building strong, long-term customer relationships is essential for business success. Customer Relationship Management (CRM) has evolved from a simple sales tool into a strategic system that combines technology, processes, and business philosophy to manage and enhance customer interactions.

Modern CRM systems allow companies to automate key tasks, centralize customer data, personalize communication, and align sales, marketing, and service efforts. This integrated approach improves customer retention, increases efficiency, and drives profitability.

This paper explores the concept, features, and benefits of CRM systems in modern companies, showing how they contribute to better customer understanding, smarter decision-making, and sustainable growth.

2. Basic content.

Concept, characteristics and advantages of CRM configuration in companies. Customer Relationship Management has taken hold of company management, creating the foundation for long-term success. The distinctive feature of modern business is the leading role of Information Technology (IT) in the process of forming and managing customer relations. The use of IT allows automating the execution of many tasks in the business process.

In the conditions of similar information growth without a clearly structured, well-thought-out system, including a database with the most complete and detailed information about customers, as well as the tools for analyzing and planning customer relations, the task of customer retention becomes practically unfeasible.

Nowadays, consumers research products before making a purchase, but there are also impatient people who choose the first one they see or catch their eye.

The internet today can be seen as the 'lifeline', with the multitude of possibilities it offers. Thus, there are a lot of topics you can read about or turn to, such as: CRM applications, sales software, marketing software, contact management systems, etc. Also, information is another possibility you can turn to,

i.e. you talk to people you know and see their recommendations or what they say about the product or company offering it. In this respect, companies can develop actions, but the most effective and popular one is currently customer relationship management (CRM or CRM) software. This will generally include some form of customer management system, sales automation software and sales database software, as well as a competitive strategy.

Thus, according to this strategy, the company should be guided not by the desire to close a single transaction, which will bring a short-term result, but to strive to establish a relationship with the consumer that is profitable in the long term.

The essence of the CRM approach is as follows: acquire, retain and develop customers, know your customers' needs, prioritize relationships over product. However, there is currently no strict definition of CRM. The most authoritative views are that CRM means a combination of strategies, software and business processes that help create long-term relationships between companies and their customers.

The most characteristic definitions of CRM and its applications can be systematized as we can see based on the expert sources:

1.CRM is a clearly structured business strategy for creating and maintaining profitable and long-term relationships with customers. CRM technology is a critical factor that ensures the implementation of processes necessary to transform a strategy into real business results.

2.CRM is an enterprise strategy for selecting and managing customer information to optimize long-term profitability.

4.a) A management philosophy that a company's objectives can best be achieved by identifying and satisfying the stated and unstated needs and wants of customers.

b) A computerized system for identifying, targeting, acquiring and retaining the best mix of customers.

5.CRM is a combination of business strategies, software and processes that help build long-term relationships between companies and customers.

6.CRM as Strategy: This is a business' philosophy on how to manage relationships with customers and prospects. CRM as Technology: This is a technology product, often in the cloud, that teams use to record, report, and analyze interactions between the company and users. This is also called a CRM system or solution.

7.CRM is a combination of practices, strategies and technologies that companies use to manage and analyze customer interactions and data throughout the customer lifecycle to improve customer service relationships and assist in retaining customers and driving sales growth.

8.CRM is an approach to managing a company's interaction with current and potential customers. It uses analyzing data about a company's customer history with a company to improve business relationships with customers, focusing specifically on retaining customers and ultimately driving sales growth. An important aspect of the CRM approach is CRM systems that compile data from a number of different communication channels, including a company's website, telephone, email, live chat, marketing materials and more recently, social media.

9.Customer relationship management (CRM) is a business strategy that optimizes revenue and profitability while promoting customer satisfaction and loyalty. CRM technologies make it possible to develop the strategy as well as identify and manage relationships with customers, in person or virtually. CRM software provides business functionality across four segments: sales, marketing, customer service and digital commerce.

10.CRM is a strategic approach concerned with creating superior shareholder value by developing appropriate relationships with key customers and customer segments. CRM unites the potential of IT and relationship marketing strategies to deliver long-term profitable relationships. Importantly, CRM offers increased opportunities to use data and insights to both understand customers and better implement relationship marketing strategies. This requires a cross-functional integration of human resources, operations, processes and marketing that is powered by information, technology and applications.

In recent years, Customer Relationship Management (CRM for short) systems have become a strategic foundation for various companies and an important factor in their success. More and more

businesses and companies are increasing their profits and developing their competitiveness by strengthening relationships with existing customers and making them more attractive to new ones. Advanced CRM technologies have taken the contemporary market by storm, driving the long-term success of a growing number of companies in almost all branches of the economy. The CRM approach is based on the use of advanced management and information technologies (IT), whereby an economic agent collects information about customers at all stages of their business cycle, processes it and then utilizes it by building mutually beneficial relationships. The use of IT enables the automation of many tasks in the business process.

However, effective CRM implementation is not an easy process, requiring thorough preparation and well-thought-out solutions. The unsatisfactory results of many CRM implementation projects are often associated with the lack of sufficient methodological materials in the field. Organizational and structural changes are necessary for CRM system implementation at all levels of the company (strategic, organizational structure, operational activity and personnel). When selecting a CRM system, it is very important that it has all the functions that the user needs.

CRM (Customer Relationship Management) means a software solution used for customer relationship management by the sales team. CRM software is, in practice, the sales representatives' electronic address book, in which they write down and store all the essential information about their sales activity: customers, customer contacts, discussions, offers, proposals, invoices, etc. For management, CRM systems provide sales reports, which can be used to make the best decisions in the sales strategy.

Key system features:

1. The CRM software is the single source of all customer interactions, from request for quotation to invoices issued (going through customer quotations, orders, visits, proposals, communication). Everything related to customer or partner relations is recorded in the CRM and thus kept track of forever.
2. The CRM software becomes the central place, the company's single database, for all the natural and legal persons with whom the company interacts. Any contact information obtained by a sales agent, for example, is added to the CRM software.
3. Organizing, segmenting and managing your customer and sales database is possible with CRM software. Thanks to the wealth of information stored in the CRM software about companies or individuals, you can divide your customers into segments, relevant according to the field of activity (turnover, sales volume, type, delivery, etc.).
4. All sales and marketing documents, with financial or non-financial impact, are stored in the CRM software: offers, contracts, orders, invoices, receipts, sketches. Thus, in the "customer file" in the CRM system, sales representatives will have access to all the key information about their business relations with customers, which will help them to run their business successfully.
5. With CRM software, companies also solve their document management problem. Issued sales documents can be stored in electronic (scanned) form in the CRM application. Based on access rights to document types, the security of confidential documents is ensured.
6. The CRM software makes it possible to impose clear sales procedures within companies. Questions such as "Who approves discounts?", "Who sends the offer?", "How long does it take to call a customer back?", "What functions do we use telesales for?", "What brochures are used in sales meetings?" will be answered with CRM software, which helps to impose a clear way of working.
7. For managers, CRM software is a tool for control and reporting. With sales reps filling in CRM on a daily basis, managers will have a clear picture of visits, enquiries, quotations, offers, invoices, receipts - the sales pipeline.
8. For sales managers, CRM software is the tool for coordinating sales representatives. Dividing customers into portfolios and assigning them to agents, imposing targets, scheduling weekly presentations - these are just some of the activities that sales managers manage with CRM.

9. The success of marketing campaigns to attract leads and orders is tracked from CRM software. By implementing CRM-generated contact forms on the website, customers thus get traceability on leads from the time of inquiry through to sales and invoicing.

10. CRM software functions as a technology platform integrated with various effective marketing tools: software for sending newsletters (integration with mailChimp and others), software for monitoring lead activity on Facebook, software for sending SMS, call centers, etc.

The customer base is a company's most valuable asset — and it must be managed accordingly. Without proper maintenance, businesses risk losing both profit and growth potential. CRM systems ensure that no customer is forgotten, enabling consistent communication, better service, and smarter sales strategies. Selling to existing customers is significantly easier than attracting new ones, and techniques like upselling and cross-selling can boost revenue by up to 27%.

A well-maintained customer base supports ongoing marketing efforts, reactivation campaigns, and helps tailor offers to real needs. It also increases a company's value in the eyes of investors or buyers. Loyalty today is driven less by price and more by experience, service, and personalization. Excel spreadsheets may suffice in the beginning, but for real security and scalability, a CRM system is essential. In today's competitive market, it's not just about gaining customers, but keeping and understanding them.

The system is able to:

- ✓ Keep a history of relationships with thousands of customers. If the sales manager quit or got sick, his absence will not affect the quality of work with the customer;

- ✓ It protects the customer base against withdrawal. To delete and download the database from the CRM system, you must have special rights that are not available to ordinary users;

- ✓ Set up system actions for communicating with the customer: reactivation, resuscitation, after-sales work etc.;

- ✓ Improves the quality of customer work and service. This will make customers more loyal; you emphasize reputation and profitability;

- ✓ Collect contacts at all points of customer interaction. The customer database should be regularly replenished. You need to continue to work with old customers and regularly attract new ones. Even those who called the office and asked about the cost of the product should be contacts in the CRM. These are potential company customers who have said;

- ✓ Business automation per every customer action in the company.

Thus, the CRM system:

- is a customer relationship management system;
- aims to build long-term customer relationships;
- accumulates information about past interactions
- builds customer loyalty by personalizing work;
- thereby increasing company profitability.

✓The role and importance of the customer base I related above. It is important to at least somewhat manage this base. But it is more effective to manage it according to certain rules. One of them is database segmentation. Customer base segmentation is the division of your customer base into groups, which are based on some criterion. The most common segmentations are ABC and XYZ segmentation and their synthesis. ABC segmentation divides customers according to purchase volume. So A is the largest customers, B is medium and C is small. XYZ segmentation is based on frequency of purchases. X are regular customers; Y are occasional customers and Z are one-time customers. The Pareto 20/80 rule also works in business. Accordingly, customers A and X represent 20% of the base, which gives 80% of sales.

Segmentation of the database is important for proper organization of customer work and a more accurate understanding of customer needs. Obviously, working with large A customers should be of a higher level than with C customers. Consequently, the manager should spend less time and effort to work with some and more to work with other customers. Depending on the segmentation class

determines the regularity of meetings, frequency of calls, etc.

A small company with a relatively small number of customers, a sales department of only a few people. It seems that even without a CRM system, controlling customer work is as easy as peeling pears. Actually, it isn't. Very soon after the introduction of an automated system, a large number of shortcomings are revealed, and the efficiency of the sales department increases significantly.

3. Conclusion

In today's competitive business environment, especially within small and medium-sized enterprises, implementing a CRM system is not just a technological upgrade—it is a strategic necessity. By centralizing customer interactions, ensuring no potential client is lost, standardizing employee workflows, and enabling data-driven decision-making, a CRM system enhances the overall efficiency and effectiveness of a company's operations. Furthermore, the built-in tools and integrations within modern CRM solutions offer a structured starting point for business owners who may lack expertise in sales process management. Ultimately, adopting a CRM system supports sustainable growth, improved customer relationships, and a more professional approach to sales and service.

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NEUROMARKETING IN THE BANKING INDUSTRY: NEW APPROACHES TO ENHANCING PRODUCT ATTRACTIVENESS

DOI: <https://doi.org/10.53486/dri2025.24>
UDC: [339.138:004.8]:336.71

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Abstract: *This article investigates the application of neuromarketing technologies as a strategic approach to increasing the attractiveness of banking products and services. Due to the intangible and complex nature of financial offerings — often perceived as risky or difficult to understand — consumers frequently experience hesitation and distrust. Traditional marketing methods overlook the subconscious emotional and cognitive drivers that significantly influence decision-making. Neuromarketing leverages advanced techniques such as EEG, eye-tracking, and facial coding to uncover these hidden responses, providing deeper insight into consumer behavior. When incorporated into the 7P marketing mix, neuromarketing allows banks to enhance product appeal, reshape price perception, optimize service channels, refine promotional messages, and improve customer experience. International case studies illustrate how neuromarketing contributes to building trust, reducing perceived risk, and creating personalized, emotionally engaging customer journeys. The findings confirm that neuromarketing is not simply a complementary tool but a powerful strategic resource for modern financial marketing*

Key words: *neuromarketing, banking services marketing, trust, customer experience, banking products*

JEL: M31

1. Introduction

In the context of high competition and a wide variety of offerings in the banking services market, key success factors include providing advantageous, comfortable solutions and a personalized approach developed through a deep understanding of customers.

Currently, banking services are widely used and accessible; however, despite this, many consumers experience caution or even fear. This stems from the nature of these services, which complicates customer perception and decision-making.

Banking services are intangible; the client receives not a physical product but a promise of future benefits, which creates a sense of uncertainty (Ennew, C., Waite, N., 2013).

Another important aspect is complexity and information asymmetry. Banking products usually involve numerous conditions, professional terminology, and hidden risks. Without specialized knowledge, clients are often unable to fully assess the benefits of the offered service or compare it with competitors. This complexity generates a fear of making a mistake and ending up with an unprofitable decision, potentially leading to financial losses (Estelami, H., 2015).

In addition, banking activities involve a high degree of responsibility, as clients entrust the bank not only with their funds but also with personal data, expecting security and confidentiality.

Given these factors, trust becomes a key element in the relationship between the bank and the client. In their study, James F. Devlin, Christine T. Ennew, and Harjit S. Sekhon conducted a comprehensive analysis of consumer trust in financial services (Devlin, J. F., Ennew, C. T., Sekhon, H., 2015), identifying several components that influence customer trust:

- Cognitive trust: based on a rational assessment of the institution's competence and reliability.
- Affective trust: based on emotional connection and perceived goodwill from the organization.
- Perceived fairness: the sense of honesty and transparency in client relationships.

Thus, trust building and management become essential tasks for financial services marketing, requiring integration into all elements of the marketing mix. Establishing a trusting relationship is impossible without marketing research and a deep understanding of decision-making mechanisms and the factors influencing customer choice.

2. Irrational Consumer Behavior and the Limitations of Traditional Marketing Research

Traditional marketing research methods, such as surveys, focus groups, and interviews, have long been regarded as primary tools for understanding consumer behavior. However, these methods have significant limitations, as they fail to account for subconscious factors that influence consumer decision-making.

According to Professor Gerald Zaltman, "95% of our purchase decisions occur in the subconscious," meaning that people are often unaware of why they make certain choices and cannot accurately explain their motivations. Respondents tend to give answers that sound "correct" or socially acceptable rather than reflecting their genuine emotions or motivations (Zaltman, G., 2003).

Traditional marketing research assumes that consumers make decisions rationally and consciously. Yet decades of research in psychology and neuroscience, especially the works of Daniel Kahneman and Amos Tversky, prove that most decisions are made on a subconscious level — automatically, intuitively, and emotionally (Kahneman, D., Tversky, A., 1979).

In his well-known dual-system theory, Kahneman identifies two types of thinking: System 1 (fast, automatic, emotional) and System 2 (slow, logical, effortful). Most consumer decisions — including those involving financial products — are influenced by System 1, often before System 2 is even activated. This explains why clients may reject objectively advantageous offers due to emotional biases such as trust, fear, or discomfort.

In the financial domain, loss aversion, as described in Prospect Theory, plays a critical role: clients are highly sensitive to even potential losses and tend to overestimate low-probability risks.

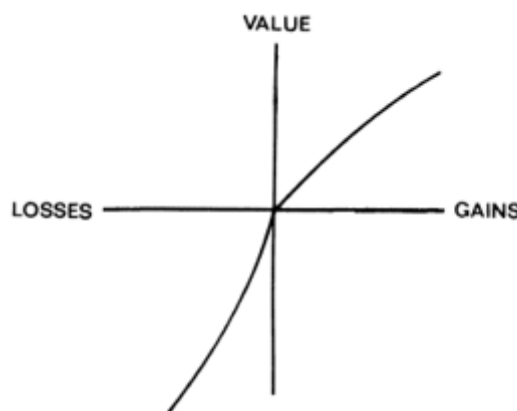


Figure 1. A hypothetical value function

Source: Kahneman, D., Tversky, A., 1979

The iceberg metaphor is a popular illustration that clearly demonstrates the essence of the modern consumer behavior model: the conscious mind is just the tip of the iceberg, while decisions are often made under the influence of subconscious factors (Ramsøy, T. Z., 2015).

Consumer decisions are shaped not only through logic and rational analysis (the "above water" portion) but also by emotions, impulses, associations, and fears hidden "beneath the surface." These subconscious influences, activated by Kahneman's System 1, exert a powerful impact on brand perception, trust in financial products, and purchase motivation. For example, a person may reject a bank offer not because it is objectively unfavorable, but because the color, font, or face in the advertisement triggered a subconscious sense of distrust.

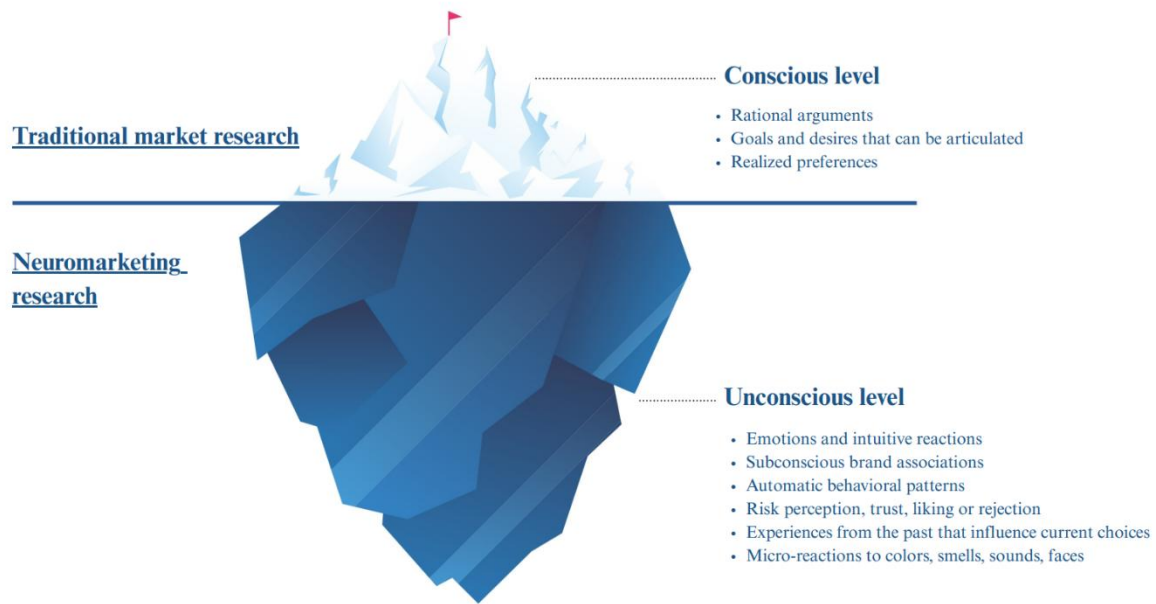


Figure 2. Consumer Behavior Model: Conscious and Subconscious Levels

Traditional marketing research provides valuable data but, without considering subconscious influences, cannot fully explain or predict consumer behavior. As a result, neuromarketing is becoming an increasingly in-demand tool for more accurate analysis and prediction of consumer preferences (Harris, J., Ciorciari, J., Gountas, J., 2018).

3. Neuromarketing: Understanding Consumer Response Through Neuroscience

Neuromarketing research is based on the application of neuroscience theories, concepts, and methods to study brain and nervous system activity for a deeper understanding of consumer behavior. These studies aim to identify both conscious and unconscious cognitive and emotional responses to various marketing stimuli (Lim, W. M., 2018).

One definition of neuroscience is the study of the nervous system aimed at understanding the biological foundations of human behavior. In this context, neuromarketing is the practical application of neuroscience in marketing to understand how and why consumers make decisions, what they feel, and what motivates them (Plassmann, H., Ramsøy, T. Z., Milosavljevic, M., 2012).

Neuromarketing methods allow researchers to observe consumers' psychophysiological responses in real time, analyzing how the brain and body react to different marketing stimuli. Neuromarketing encompasses both neurophysiological and biometric approaches to study cognitive (thought-related) and affective (emotional) processes.

Neurophysiological methods measure brain activity — either electrical or metabolic — in response to marketing stimuli. The most well-known methods for recording neural electrical activity include electroencephalography (EEG) and magnetoencephalography (MEG). Common techniques for measuring metabolic brain activity include functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) (Camerer, C., Yoon, C., 2015).

Biometric methods record autonomic and behavioral reactions accompanying stimulus perception: galvanic skin response (GSR), electrocardiography (ECG), eye-tracking, and facial electromyography (EMG) (Tirandazi, P., Bamakan, S. M. H., Togholjerdi, A.).

By combining both approaches, companies can obtain a more complete picture of product perception — what draws attention, what emotions are triggered, and what decisions are formed on a subconscious level (Muñoz-Leiva, F., Hernández-Méndez, J., Gómez-Carmon, L., 2019).

4. Using Neuromarketing to Develop an Effective Marketing Mix

The 7P model represents an extended marketing mix that is particularly relevant to the service sector. It includes product, price, place, promotion, people, process, and physical evidence. Since banking services are intangible, all of these elements contribute to shaping how the product is perceived by clients and to building trust in the bank itself.

Neuromarketing research provides deeper insight into how consumers subconsciously respond to each component of the marketing mix.

Product

Banking services deal directly with intangible assets (i.e., money). The term 'banking product' broadly refers to a wide range of services tailored to diverse client needs. Typically, banking services require formal (contractual) relationships between the commercial bank and the client (Ennew, C., Waite, N., 2013).

A defining characteristic of banking products is their intangibility, which influences the nature of all other marketing mix elements.

Banking services are generally inseparable from their source, and they often require a higher degree of customer involvement than physical goods. Additionally, the quality of these services can be inconsistent, as customer service representatives are subject to the same range of emotions and moods as anyone else (Afsar, B., 2014).

Customers assess the quality and reliability of banking products not only by their functional attributes but also through the lens of brand perception. In this context, the brand becomes an integral part of the product itself, shaping emotional associations, signaling professionalism, and reducing perceived risk. To enhance product effectiveness, neuromarketing helps identify hidden cognitive and emotional responses during the development and promotion of banking products. Analyzing subconscious reactions to key elements — such as visual design, wording, and interface structure — allows banks to detect barriers to perception and trust at early stages. This makes it possible to refine the product before launch, leading to higher customer loyalty and engagement.

Price

Financial products — such as loans, deposits, and investment services — often involve complex, multi-layered pricing structures that include fees, service charges, early termination penalties, and hidden costs. This lack of transparency can cause confusion and distrust, especially when customers do not fully understand what they are paying for. In this context, it becomes crucial for banks to shift the focus from the perception of cost to the perception of value (Ennew, C., Waite, N., 2013).

Neuromarketing helps reveal how clients emotionally respond to prices and assists in developing appropriate strategies.

For example, attention can be redirected from the "price" of the service to the "value" it provides — such as security, convenience, exclusivity, deeper personalization, bonuses, gifts, and more. Research shows that people are more accepting of prices when they are presented alongside visuals that evoke trust and pleasure (Afsar, B., 2014).

Neuroscientific data indicates that the act of payment activates areas of the brain associated with physical pain (Knutson, B., Rick, S., Wimmer, G. E., Prelec, D., Loewenstein, G., 2007). This underscores the importance of finding ways to reduce the so-called "pain of paying" (Knutson, B., 2015) — for example, through automatic deductions, installment plans, bundled offers, or presenting prices in a neutral or positive visual context.

Place (Distribution Channels)

Within the marketing mix of banking services, the "Place" element plays a key role in shaping the customer experience, building trust, and influencing brand perception. Today's consumers expect

seamless omnichannel interactions — for example, they may start applying for a service in a mobile app and complete it at a branch office without losing context or quality of service (Haynie, S., 2025). Service delivery channels include both online platforms (such as online banking, mobile apps, and chatbots) and offline points of contact like physical branches, call centers, and ATMs.

Neuromarketing can enhance customer interaction across all these touchpoints. For example, user experience testing using tools like eye-tracking and EEG helps assess how clients perceive an app, website, or digital service in terms of usability and intuitiveness.

Neuromarketing techniques can also be applied to evaluate how customers perceive bank branches, aiming to make them more comfortable, trustworthy, and conducive to effective communication.

Promotion

Promotion in the field of banking services is a critical component of the marketing mix aimed not only at informing but also at building trust and conveying the value of the product. Given the high level of competition and the complex nature of financial products, it is essential to create messages that are clear, credible, and emotionally resonant. Therefore, the effective promotion requires a combination of rational and emotional appeals.

A key feature of promotion in the financial sector is strict regulatory compliance. Bank advertising must be truthful, non-deceptive, and include appropriate risk disclosures. This necessitates precision in messaging and careful content preparation.

In this context, neuromarketing becomes a valuable tool. It enables marketers to identify which visual, auditory, and textual elements capture attention and elicit trust or interest. Understanding psychological triggers — such as fear of loss, the need for control, or the desire for security — helps craft more persuasive marketing messages.

Using neuromarketing techniques like EEG, facial expression analysis, and eye-tracking in A/B testing allows marketers to compare advertising formats and choose those that provoke the strongest emotional responses and are most memorable (Afsar, B., 2014).

People

In the financial services sector, staff are not just service providers — they are part of the product itself. The behavior, professionalism, and empathy of employees shape not only the first impression but also the overall perception of service quality. In banking marketing, employees represent the “face” of the company, and customer experience is directly influenced by their competence and demeanor.

Modern neuromarketing research helps deepen the understanding of interactions between clients and staff by identifying behavioral and emotional mechanisms that affect loyalty and trust.

With the help of neurotechnologies, banks can identify which forms of communication elicit the strongest emotional responses. This allows them to tailor staff communication styles to better meet client expectations. The analysis makes it possible to determine which behaviors (gestures, facial expressions, tone of voice) make customers feel at ease or, conversely, cause stress. These insights can be used to adjust employee behavior and improve service quality (Afsar, B., 2014).

Process

The “Process” component refers to all procedures, sequences of actions, and mechanisms through which a client receives a service. A well-designed process directly impacts customer satisfaction, trust, and loyalty (Ennew, C., Waite, N., 2013).

Neuromarketing allows researchers to understand how the client's brain perceives each stage of the service journey. The data obtained from such research helps simplify the customer journey and make it more intuitive. For example, neuromarketing insights can optimize navigation, eliminate unnecessary steps, and create a more user-friendly process.

Physical Evidence

All physical and visual elements accompanying the delivery of banking services are important components of how customers perceive service quality. These elements serve as the tangible representation of an otherwise intangible service.

Physical evidence includes elements such as the interior design of bank branches, documents, contracts, brochures, cards, devices, ATMs, website and app design, brand identity, and employee appearance and attire.

According to Ennew and Waite (2013), physical evidence can be categorized into:

- Substantial evidence – elements not owned by the client but visible (such as branch interiors);
- Peripheral evidence – physical elements given to the client for use (such as cards, documents, devices).

Neuromarketing research provides a deeper understanding of how clients subconsciously perceive these elements. Using technologies like eye-tracking, facial coding, and EEG, banks can adapt the visual design of branches to reduce anxiety, and improve the perception of physical materials such as bank cards, documents, interfaces, and devices.

5. Practical Application of Neuromarketing in the Banking Sector

Many banks around the world are actively using neuromarketing methods to improve the effectiveness of their services.

For example, Bank of America applied eye-tracking to analyze user interaction with its mobile banking app in real-life settings — at home, on the go, or while shopping. Facial expression analysis was also used. By tracking gaze direction, fixation duration, and navigation paths, the bank identified interface elements that caused user difficulties (Agrawal, V., 2025).

To simplify the perception of its products, Barclays conducted a study examining British consumers' reactions to financial terminology. The results showed that terms like “broker” and “investment risk” triggered stress reactions in two-thirds of participants. In response, Barclays simplified the language on its investment platform to reduce barriers for novice investors (Barclays, 2019). The bank also used neuromarketing to analyze design strategies. Using techniques such as eye-tracking and biometric measurement, it studied how customers perceived bank branch displays, identifying design elements that increase trust and engagement (The Creative Industries Council, 2014).

ING Bank also actively employs neuromarketing and behavioral economics to strengthen emotional connections with clients and improve communication effectiveness. A notable example is their use of fMRI to select the most effective brand melody. During the experiment, participants listened to five custom music tracks while their brain activity was scanned to assess pleasure center responses. This helped ING choose a melody that was not just pleasant but effective in reinforcing brand associations at the subconscious level (Neurensics).

Another example is KakaoBank, which optimized its loan application interface using neuromarketing research. Eye-tracking and facial expression analysis revealed stages of the application process that caused stress and confusion. As a result, the bank simplified the interface, added clear instructions, and implemented real-time support, reducing the number of application rejections (Agrawal, V., 2025).

These examples demonstrate that many financial institutions around the world are already actively applying neuromarketing methods.

6. Conclusions

The application of neuromarketing in the banking industry opens up new opportunities to enhance the effectiveness of financial service marketing and to develop more desirable products that align with client expectations. Because banking products often provoke anxiety and distrust — particularly due to their complexity and intangibility — neuromarketing enables the exploration of consumers' subconscious responses, making it a promising tool for building trust and improving the client experience.

Numerous studies, including the works of Daniel Kahneman, show that consumer behavior is largely driven by emotions, cognitive biases, and intuitive responses associated with System 1. This

challenges the effectiveness of traditional marketing research methods such as surveys and focus groups, highlighting the value of neuromarketing in uncovering real — often unconscious — decision-making factors.

Modern technologies including EEG, eye-tracking, facial coding, and fMRI allow banks to analyze how clients respond to products, interfaces, advertising, and communications across both digital and physical channels. This facilitates not only the optimization of specific elements but the transformation of the entire customer journey from the first point of contact.

Neuromarketing is especially valuable in the context of strict regulatory requirements in financial advertising. It helps construct communications that are both compliant and emotionally resonant, enhancing trust, interest, and loyalty.

Thus, neuromarketing is not just a supplementary tool but a vital component of a strategic approach to creating personalized, transparent, and emotionally engaging customer experiences. Its integration into banking marketing enables stronger customer relationships, lowers perception barriers, and strengthens competitive advantage.

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AI AND ACCESSIBILITY ADVANCES IN 112 EMERGENCY CALL MANAGEMENT

DOI: <https://doi.org/10.53486/dri2025.25>

UDC: 355.588:004.8

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Abstract. *This article explores the role of artificial intelligence (AI) in enhancing accessibility for persons with disabilities within Europe's 112 emergency communication systems. Despite regulatory and ethical commitments to inclusion, individuals with hearing, speech, cognitive, and mobility impairments continue to encounter significant barriers when attempting to request emergency assistance. These barriers range from non-adaptive voice-based systems to high-stress environments that limit effective communication. This research responds to a critical gap between inclusive design principles and their real-world implementation in emergency services. Using the SALSA methodology (Search, Appraisal, Synthesis, Analysis), this study systematically reviews literature, EU policy documents, and pilot initiatives conducted between 2020 and 2025. It categorizes findings into key domains where AI shows significant impact: real-time transcription, emotion detection, chatbot support, and multimodal interfaces. Case studies such as the ODIN 112 project in Romania and the EENA–Corti cardiac arrest detection pilot is analysed alongside conceptual and ethical frameworks from EU bodies. The results suggest that while AI technologies hold transformative potential—offering personalized, scalable, and context-sensitive support—many tools remain in pilot phases and face limitations related to linguistic coverage, stress-induced error, data privacy, and ethical oversight. The research highlights the importance of inclusive, co-designed systems and calls for cross-sector collaboration to scale AI solutions ethically and effectively. This article contributes to the evolving discourse on accessible public service delivery by bridging theoretical models with empirical evidence, offering insights into how AI can support more humane and equitable emergency response systems across Europe.*

Keywords: *Artificial Intelligence in Emergency Services, Accessibility Technologies, Disability-Inclusive Communication, Human-Centered AI Design, SALSA Method*

JEL: O33, I18, H83

Introduction

In emergencies, every second counts. Yet for individuals with disabilities, those seconds are often lost to invisible barriers—barriers not of their own making but embedded in the design of systems that were never built with them in mind. Imagine a deaf caller attempting to request help from a voice-only emergency line, or a person with a cognitive impairment trying to explain their crisis under extreme stress. These are not isolated cases. They are the lived reality for thousands of people across Europe who find themselves marginalized by communication systems meant to protect them. Accessible emergency services, therefore, are not merely technical enhancements—they are expressions of equity, dignity, and justice.

Despite decades of advocacy, Europe's 112 emergency systems remain, in many ways, inaccessible

to people with hearing, speech, cognitive, or mobility impairments (Deetjen-Ruiz et al., 2024). Communication gaps persist, often exacerbated by rigid protocols and one-size-fits-all interaction models that ignore functional diversity. Although universal design has long been a guiding principle (Dattilo, 2021), its operationalization within emergency call centers remains inconsistent, fragmented, and in many contexts, absent altogether.

Recent advances in artificial intelligence (AI) offer a new avenue of hope. Technologies such as real-time speech-to-text transcription (Luo et al., 2025), emotion recognition (Visave, 2025), and chatbot-mediated interactions (Sezgin et al., 2024) are beginning to demonstrate significant promise in enhancing accessibility. A conceptual model for disability inclusion through AI outlines how these tools can improve access across healthcare, mobility, and communication domains (Almfareh et al., 2024). Building on these conceptual foundations, Bokor et al. (2024) analyse the evolution of Romania's 112 emergency system, demonstrating how AI, wearables, and location-based services like AML and eCall can significantly improve response times, coordination, and classification accuracy.

However, innovation alone is not enough. Many current approaches remain technocentric—focused more on what AI can do than on what people need. As Newman-Griffis et al. (2023) rightly argue, any attempt to automate accessibility must begin with the communities most affected. Similarly, ethical guidance from the European Platform for Rehabilitation (2024) urges that AI be co-designed with, not just for, persons with disabilities. Legal and operational safeguards—outlined in frameworks by the European Commission (2019)—stress that AI must be transparent, inclusive, and data-secure.

Real-world pilots such as the ODIN 112 initiative in Romania and the EENA–Corti study on cardiac arrest detection confirm that AI can meaningfully augment human judgment in emergency contexts (Ungureanu et al., 2023; EENA and Corti, 2020). Still, many of these innovations remain confined to pilot stages, hindered by underfunding, linguistic gaps, and limited adaptability under stress.

This study investigates how AI has enhanced accessibility in 112 emergency call systems across Europe from 2020 to 2025. Using the SALSA methodology (Search, Appraisal, Synthesis, Analysis) (Booth et al., 2012), we review academic literature, EU policy documents, and applied pilot programs. Our aim is to bridge the gap between theory and practical deployment, offering evidence-based insights into how AI can ethically and effectively transform emergency communication for all.

This study aims to bridge the gap between theoretical frameworks for accessible emergency communication and the practical realities of AI deployment in European 112 systems. To guide this inquiry, we pose the following research question:

How has artificial intelligence contributed to enhancing accessibility in Europe's 112 emergency call systems for persons with disabilities between 2020 and 2025?

To explore this, we advance two hypotheses:

H1: AI implementation in 112 systems significantly reduces accessibility barriers for disabled users.

H2: Most AI tools used in pilot programs are not yet ethically or operationally scalable across national emergency infrastructures.

By applying the SALSA methodology (Search, Appraisal, Synthesis, Analysis), we aim to provide a nuanced, evidence-based understanding of the role AI plays in building a more inclusive emergency response landscape.

Methodology

This study employs the SALSA framework—an acronym for Search, Appraisal, Synthesis, and Analysis—as a structured method for conducting systematic reviews in the social sciences and interdisciplinary fields (Booth et al., 2012). This approach is particularly well-suited to synthesizing evidence from both academic and policy sources, enabling a comprehensive evaluation of how artificial intelligence (AI) technologies have been applied to enhance accessibility within Europe's 112 emergency communication systems for persons with disabilities.

The Search phase began with a broad and systematic retrieval of literature from multiple platforms. Academic databases such as Scite AI, Google Scholar, and ResearchGate were used in combination

with institutional repositories from the European Commission, the European Emergency Number Association (EENA), the European Parliament, and national emergency services. The inclusion timeframe was limited to documents and publications released between 2020 and 2025 to ensure the analysis reflects the most recent advancements in AI implementation. Search terms were carefully selected to capture a range of relevant topics and included: "*AI emergency calls*," "*112 accessibility*," "*disability and emergency communication*," "*inclusive emergency services*," "*chatbots and disability*," and "*emotion detection in emergency response*."

In the Appraisal phase, identified sources were screened and evaluated based on predetermined inclusion and exclusion criteria. To be included, sources needed to demonstrate a clear focus on AI applications designed to improve communication accessibility for persons with disabilities in the context of emergency response. Studies that focused on general AI innovations without an accessibility dimension, or publications prior to 2020, were excluded. Each selected document was critically assessed for methodological soundness, policy alignment with EU accessibility strategies, and clarity of outcomes.

The Synthesis phase involved grouping the selected sources into thematic categories. These included conceptual frameworks for inclusive AI design, real-world pilot projects (e.g., ODIN 112, Gladia transcription), ethical evaluations, and digital policy integration. This categorization allowed for clearer comparison of theoretical models and applied technologies. Representative examples include EENA's 2024 accessibility report, which outlines AI-supported enhancements in emergency call centers, and Romania's ODIN 112 pilot, which tested real-time emotion recognition and multimodal interfaces (European Emergency Number Association, 2024; Bokor et al., 2025).

Finally, the Analysis phase placed these findings in the broader context of European accessibility legislation and strategy. Policy documents such as the *Union of Equality Strategy 2021–2030* and European Parliament briefings were used to assess whether the technological innovations were not only functional but also aligned with ethical standards and legal mandates (European Commission, 2021; European Parliament, 2024). This phase also identified gaps between pilot-stage innovations and their scalability or sustainability within national emergency infrastructures.

Together, these four phases provided a rigorous, transparent, and policy-relevant assessment of how AI is being deployed—and in some cases, underutilized—to support equitable access to emergency services for all.

Findings and Discussion

Between 2020 and 2025, a range of AI pilot projects demonstrated meaningful progress toward enhancing accessibility in emergency call systems across Europe. These innovations targeted the most persistent communication barriers experienced by individuals with hearing, speech, and cognitive disabilities, offering both technical solutions and conceptual shifts in emergency response design.

One breakthrough involved real-time speech-to-text transcription tools, such as Gladia and NataliA, which enabled immediate conversion of spoken dialogue into text, supporting deaf and hard-of-hearing callers (European Emergency Number Association, 2024). These systems performed with high accuracy under optimal conditions. However, their reliability dropped in high-stress scenarios involving background noise, strong emotions, or regional accents—elements that are typical during actual emergencies (Bahrami and Rubulotta, 2025). This discrepancy between lab-based performance and field conditions highlights the need for robust, adaptable AI training that reflects real-world variability.

Another significant innovation was the integration of emotion recognition technologies, notably through the ODIN 112 project. These systems analysed vocal tone and intensity to detect signs of distress and urgency in callers (Ungureanu et al., 2023; Bokor et al., 2025). When functioning correctly, emotion AI enhanced dispatcher awareness and supported better prioritization. However, research from Haque et al. (2024) found that voice modulation caused by extreme stress could trigger false positives or lead to missed cues. Cultural and linguistic diversity further complicates emotion

detection accuracy, especially when AI models are trained on narrow datasets.

Low-bandwidth and structured text-based solutions also emerged as crucial tools. The ODIN 112 chatbot, for example, allowed users with speech impairments to interact through accessible menu-based messaging—even under poor network conditions (Sezgin et al., 2024). Meanwhile, systems like NOTITIA provided structured dialogue templates to assist call-takers in communicating effectively with cognitively impaired individuals (European Emergency Number Association, 2024). Although both tools improved clarity and consistency, they lacked embedded medical or contextual reasoning. This limitation reduced their adaptability in unpredictable or medically complex situations. Across all pilots, three recurring challenges were identified. First, many AI tools remained confined to pilot phases without a roadmap for national deployment or legal integration. Second, technical and regulatory limitations—including stress-induced voice variability, low multilingual support, and GDPR compliance issues—slowed down scalability (Visave, 2025; Schmager et al., 2024). Third, and most critically, there remains limited inclusion of end-users—specifically persons with disabilities—in the design and training of AI models (Newman-Griffis et al., 2023). Without participatory feedback loops, the risk persists that AI tools will reinforce existing inequities rather than resolve them.

Despite these challenges, the pilots revealed that AI holds transformative potential to personalize emergency communication, reduce misinterpretation, and increase user autonomy during crisis calls. The technologies are not yet universally deployable—but they are undeniably promising. As summarized in Table 1, each project brought forward tangible advancements alongside identifiable constraints. This discussion underscores that successful implementation will require not only technological sophistication but also inclusive co-design, cross-sector coordination, and sustained policy alignment. Without these, even the most innovative tools risk remaining underutilized.

Table 1 AI accessibility contributions and their limitations.

AI Tool	Accessibility Feature	Main Limitation
Gladia	Real-time transcription	Limited offline functionality
ODIN 112	Emotion detection	Early-stage accuracy issues
NOTITIA	Structured call support	Beta, lacks medical expertise
Corti AI	Cardiac arrest detection	Data dependency, GDPR complexity

Source: Authors' elaboration based on the reviewed projects

This systematic review confirms that while artificial intelligence offers considerable potential to improve accessibility in 112 emergency communication systems, its widespread and equitable deployment remains incomplete. Technological innovations such as transcription tools, emotion detection, and chatbot interfaces have demonstrated effectiveness in pilot settings; however, persistent gaps in inclusivity, scalability, and ethical design continue to limit their real-world impact. Bridging these gaps will require not only further applied research, but also robust policy frameworks, inclusive co-design practices, and sustained collaboration between AI developers, emergency service institutions, and disability advocacy organizations.

Conclusion

This systematic review provides robust support for Hypothesis 2 and partial confirmation of Hypothesis 1. Between 2020 and 2025, a range of AI technologies demonstrated clear potential to improve accessibility within 112 emergency call centers across Europe, particularly in aiding individuals with hearing, speech, and cognitive disabilities (Alnfai et al., 2025). Innovations such as speech-to-text transcription tools, emotion recognition systems, structured chatbot interfaces, and co-pilot support modules represent important advances toward more inclusive, responsive emergency communication systems.

However, significant limitations remain. Many of the AI solutions examined in this review are still at the pilot stage and have not been scaled nationally. Technical barriers—such as stress-induced

speech variability, multilingual complexity, and limited offline or low-bandwidth functionality—continue to affect usability in real-world crisis conditions (Bahrami and Rubulotta, 2025; Haque et al., 2024). In parallel, ethical and legal considerations, particularly those related to GDPR compliance and algorithmic transparency, have slowed full implementation (European Commission, 2019).

The most concerning limitation is the insufficient involvement of persons with disabilities in the development, testing, and training phases of AI systems. This exclusion results in tools that may be technically advanced but fail to meet the actual communication needs of their intended users (Newman-Griffis et al., 2023). The diversity and complexity of disabilities further emphasize the need for adaptive, user-centered design approaches capable of responding to varied communication profiles and contexts.

Looking forward, future research should prioritize inclusive design, multilingual and multicultural adaptability, and strong ethical frameworks that ensure transparency, accountability, and user agency. Longitudinal pilot studies, broader pan-European collaborations, and iterative design processes will be crucial in validating and refining AI-supported accessibility tools.

Finally, genuine progress will depend on sustained cross-sector collaboration—between AI developers, emergency service providers, disability rights advocates, policymakers, and end-users. Only through shared responsibility and inclusive innovation can AI-enhanced 112 systems evolve from promising prototypes into universal lifelines accessible to all.

Affiliation

This paper is a result of research conducted within the Doctoral School of Management at Bucharest University of Economic Studies.

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DIGITALIZATION IN MANAGEMENT CONSULTING: A BIBLIOMETRIC ANALYSIS

DOI: <https://doi.org/10.53486/dri2025.26>

UDC: [005.572:004.7]:001.891

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Abstract. Digitalization has become a central theme in the scientific literature dedicated to management consulting, correlated with the transformation of business models, process optimization and adopting new technologies. This article aims to perform a bibliometric analysis on recent research on digitalization in consulting, using the data extracted through the Bibliometrix interface of the RStudio software. The analysis is based on the analysis of 1,342 filtered works in the economic field, out of 3,120 results generated by the Web of Science database, using the search criteria. The research highlights the main thematic trends, prolific authors, relevant sources, and the relationships between concepts. The results show an increasing focus on integrating digital technologies, artificial intelligence, and digital strategies into advisory structures. The article provides an overview of emerging research directions and proposes recommendations for future research in the field.

Keywords: digitalization, digital transformation, management consulting, bibliometric analysis, RStudio, Bibliometrix,

JEL: L84, M13, O33, O38, C89, C80, C87, C88

1. Introduction

Digital transformation is redefining the operating models of management consulting firms and generating significant changes in service delivery, customer relationships and growth strategies. Recent literature emphasizes that digitalization is not only about adopting technological tools but involves a profound change in business paradigms (Nguyen, 2022; Trischler, 2022). In this context, bibliometric analysis is the optimal tool for understanding the evolution of scientific research in this field and identifying emerging areas of interest.

Digitalization is one of the most important drivers of transformation in the service sector, especially in the management consulting industry. The integration of digital technologies in the activity of consulting firms determines not only a change in the delivery of services but also a profound redefinition of business models, organizational structures, and customer interaction (Nguyen, 2022; Hyvönen, 2018). In the last decade, the scientific literature has reflected a significant increase in interest in these transformation processes, especially in the transition to consulting 4.0, based on

artificial intelligence, SaaS platforms and automation.

In this context, a rigorous bibliometric analysis is needed, which identifies the dynamics of scientific production, emerging themes, influential authors, and collaborative relationships in research on digitalization in management consulting.

This research is structured in five chapters, including a brief introduction, review of the main works in the scientific literature, the proposed objectives for the research, the methodology used, the main results obtained, and the conclusions reached after the elaboration of this study.

2. Relevant scientific literature

Through bibliometric analysis, we have identified authors who significantly contributed to the development of digitalization in management consulting, especially between 2015 and 2024.

From the previous period, the contribution of Cotet (2007) is remarkable, bringing a valuable applicative perspective on the use of collaborative digital platforms in training, consulting and product development processes, essential elements for understanding digitalization in technical-managerial environments. By developing and integrating Internet/Intranet/Extranet systems into the CESICED platform, the author anticipates the current digital transformations in the consulting sector, promoting virtual working models and networked knowledge exchange. His most cited work, which describes the architecture of these systems in a context of virtual product development, provides a technological framework that can be extended and adapted to modern digital ecosystems in the management field (Cotet, 2007).

One of the most prolific and influential authors in this field is Volker Nissen, whose work (2015–2018) was instrumental in conceptualizing the virtualization of consulting services. Nissen (2015) proposed a decision-making model for adopting virtual consulting, assessing the benefits, risks, and organizational impact. Subsequently, in the collective volume *"Digital Transformation of the Consulting Industry"*, Nissen (2018a, 2018b) published several studies on selecting appropriate technologies for digital consulting, crowd work, platform models, and the evolution of online services. This research provides an integrated view of the digital transformation of consulting firms and defines the critical parameters of the process: modularity, interoperability, scalability, and customization of services.

Another major contributor is Michael Bode, who developed a series of concepts applicable in digitized IT consulting between 2019 and 2024. His 2022 paper proposes a formalized ontology—DITCOS—which enables the semantic modelling of digital consulting services, facilitating their standardization in distributed architectures (Bode, 2022). In 2024, Bode introduced the DITCOS-DPM model, a tool for assessing the maturity of the digitalization of consultancy through progressive phases (Bode, 2024). His approach centres on systems engineering and integrating digital standards into value delivery processes.

In collaboration with Bode, M.J. van Sinderen contributes to expanding and validating these models. Van Sinderen (2022, 2023) co-authored several papers that visually describe consulting services through graphic tools, such as the DITCOS-DN editor. It also proposed platform-oriented architectures and participated in their empirical validation through focus groups (Van Sinderen, 2021). His contributions bridge theoretical modelling and practical applicability in real organizational environments.

Hans Seifert is another author active from 2015 to 2018. He collaborated with Nissen to substantiate the process of selecting consulting virtualization technologies, emphasizing the functional requirements of digital platforms and how they influence user behavior (Seifert, 2018a, 2018b). His works highlight the importance of technological and cultural compatibility in transforming professional services, bringing more depth to the analysis of human-technology interaction.

On a more technological level, but with the potential to transfer to consultancy, C. Borst and M. Mulder (2016–2022) addressed topics such as human-automation interaction, decision transparency and the design of ecological interfaces, especially in air navigation. Although they do not fall strictly within the scope of management consulting, the principles developed in these works are relevant for designing digital

platforms that assist decision-making in a consultative context (Borst, 2017; Mulder, 2020). Krasteva (2021) highlights the value of using convolutional neural networks (CNNs) to optimize automated analysis processes in complex environments, contributing to developing robust and efficient digital solutions. These convolutional neural networks are AI models capable of extracting and understanding complex data patterns, frequently used in image, signal or text recognition. The model proposed by Krasteva (2021) validates an advanced digital approach that can be transferred to other areas, such as digital consulting, where working with large volumes of data or automated decisions is done under conditions of uncertainty. (Krasteva, 2021). Jekova (2023) also emphasizes the impact of integrating deep learning strategies into digital systems analysis, providing an adaptable algorithmic framework for increasing accuracy in dynamic contexts (Jekova, 2023). Although the research of the two authors is anchored in the medical field, the proposed methods, such as automation, filtering, pattern recognition and decision optimization, are transferable to the field of digitized consulting, AI-assisted management and autonomous diagnostic or decision platforms. In conclusion, the thematic evolution of the analyzed authors' research reflects a clear transition from theoretical foundations to tools applicable in the digital transformation of consulting, with a strong trend of formalization, virtualization, and platform-centric orientation. This orientation confirms the field's maturation and provides a solid basis for future research in artificial intelligence applied in consulting, autonomous services, and human-algorithmic collaboration.

3. Objectives and Methodology

The main objective of this study is to identify the most important works on digitalization in management consulting relevant to a systematic analysis of the literature in the field, highlighting the major research directions and emerging trends for the coming years.

The objectives are to assess the temporal evolution of scientific production from 1981 to 2024, identify the authors and sources with the most significant influence, extract the most frequent themes and key concepts, explore co-authorship and institutional collaboration networks, and map the field using thematic maps.

The achievement of these objectives represents the basis for a future systematic analysis of the literature in the field, which will deepen the main concepts and trends of research.

Bibliometrics is a constantly expanding field, which plays an essential role in the organization, hierarchy, and evaluation of scientific production. Bibliometrics is applicable at the institutional, national, and global levels, helping to stimulate research and innovation (Rădulescu, 2019). Most researchers consider bibliometric analysis the starting point in researching to identify relevant authors and significant works in the literature (Prioteasa, 2023). Another essential element in bibliometrics is the choice of database. We selected the Web of Science (WoS) database because it is the most extensive, covering studies published in the last 44 years of research (Pranckutė, 2021).

Therefore, the bibliographic data were extracted from the Web of Science database and processed with the help of the *Bibliometrix package* from RStudio (Aria & Cuccurullo, 2017). The query used for data extraction is ("digital*" OR "automat*" OR "IT adoption" OR "information technology adoption") AND ("consulting" OR "advisory" OR "consultancy"). This query generated 3120 results from the period 1981 – 2024, from which, following the filters, we extracted 1342 articles that we analyzed bibliometrically, using the Bibliometrix software (version 4.1.2) through the Biblioshiny interface in R Studio. The selection criteria included: publications between 1981 and 2024, in English, containing terms such as digitalization, digital transformation, automatization, IT adoption, information technology adoption, management consulting, advisory or consultancy. In some cases, we have used an asterisk at the base of the keywords to cover various possible keyword formulations. We included articles, proceedings articles, and early access research papers. The bibliometric analysis file was exported in Excel (.xlsx) and processed to identify key bibliometric indicators. Following the filtering of the bibliometric corpus, the 2025 papers and those in the biomedical field were excluded, which, although they use terminologies like those in consulting, such as "evaluation", "automation",

"optimization", do not fall thematically within the scope of business consulting or digital services. Therefore, the analysis focused on authors actively researching the digital transformation of consulting services, virtualization of consultant-client interaction, and architectural modelling of value delivery through digital platforms.

The information was analyzed from the perspective of annual productivity, influential authors and sources, keywords, collaborative networks, and emerging themes. The bibliometric indicators extracted included: number of articles per year, total number of citations, h-index, co-citations, co-authorship, and frequency of terms. To analyze the main concepts, 1139 relevant scientific papers were selected, published between 2015 and 2024, addressing topics related to digitalization and consulting.

4. Results

This section presents the results obtained from the bibliometric analysis, highlighting the main research directions, the dominant thematic structures, and the existing collaboration networks in the field of digitalization of management consulting.

4.1. General information about data

The descriptive analysis of the bibliometric corpus reveals an accelerated dynamic of scientific production in digital transformation, consulting, and information technologies applied in management. Between 1981 and 2024, the literature recorded an average annual growth of 11.8%, suggesting increased academic concerns over the past two decades. The average age of the analyzed documents is about 10 years, indicating a significant concentration of research on recent topics, with a strongly current character.

The final bibliometric corpus comprises 1,339 documents published in 1,076 distinct scientific sources, reflecting a multidisciplinary distribution. As for the typology of papers, articles published in journals predominate (589), followed by papers presented at scientific conferences (641), which underlines the field's technological, applicative, and innovative nature. Other forms of contributions include reviews, book chapters, and early access articles, which, although fewer in number, add diversity and conceptual depth to the analysis (Table 1).

Table 1. General information about the dataset

Main information about the data			
Timespan	1981:2024	Authors collaboration	
Sources (journals, books, etc)	1076	Single-authored docs	194
Documents	1339	Co-authors per doc	3.3
Annual growth rate %	11.8	International co-authorships %	15.61
Document average age	9.94	Document types	
Average citations per doc	10.98	Article	589
References	37776	Article, book chapter	29
Document contents		Article: early access	15
Keywords plus (id)	1344	Article: proceedings paper	43
Author's keywords (de)	4160	Proceedings paper	641
Authors	4042	Review	22
Authors of single-authored docs	190		

Source: author's elaboration after Biblioshiny Report

Another important aspect is related to the degree of collaboration between authors. In total, 4,042 researchers contributed to the papers, and the average number of co-authors per paper is 3.3, indicating a high level of scientific collaboration. However, the proportion of international collaborations is 15.61%, a moderate percentage that suggests a still-developing global openness. Approximately 14.5% of the articles are signed by a single author, confirming a significant share of

individual contributions in parallel with collective research.

The documents' content includes 37,776 references and 4,160 keywords defined by the authors, compared to 1,344 automatically generated terms (Keywords Plus). This gap highlights researchers' tendency to particularize and refine their work's theme, thus contributing to a more sophisticated and contextualized thematic structuring of the field.

Overall, the data highlight an active process of consolidation and diversification in the area characterized by a steady increase in the scientific volume, robust academic collaboration, and high thematic density. These characteristics confirm the progressive maturation of digitalization and management consulting research, consolidating its status as a strategic area for both the academic and practical environments.

4.2. Evolution of scientific production

Scientific production experienced an irregular evolution between 2010 and 2020, followed by a sustained increase since 2021. The most prolific year was 2024, with 121 articles published, accounting for 9% of the total (Figure 1).

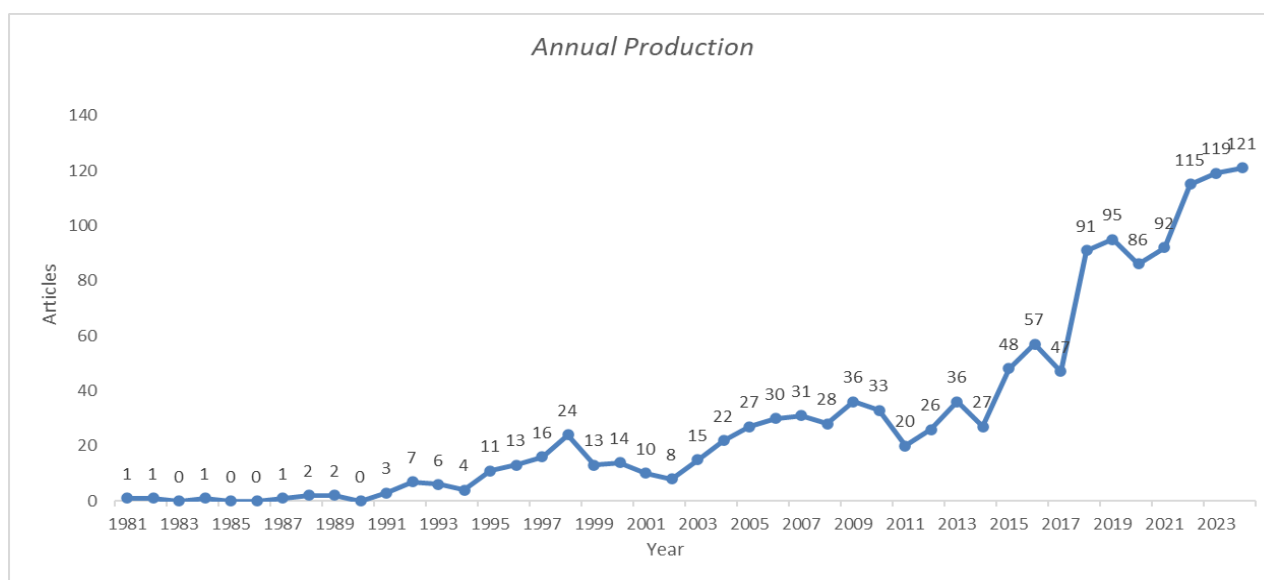


Figure 1. Evolution of annual scientific production

Source: Authors based on data extracted from Bibliometrix

The average annual growth rate is 11.8%, which indicates an intensification of scientific interest in digitalization in consulting, especially in the post-pandemic period.

4.3. Prolific and influential authors

The authors with the most publications in the field are Trischler M.F.G. (4 articles), Hyvönen J. (3 articles), and Audrin B. (3 articles). By the total number of citations, Nguyen K. is the most influential author, with 85 citations in the analyzed corpus.

The authors with the highest number of publications are Jekova (10 articles), Krasteva (9 articles) and Nissen V (8 articles) (Table 2).

Table 2. Most Prolific Authors and Scientific Impact (Top 10)

Authors	Articles	Articles Fractionalized
Jekova I	10	3.50833333
Krasteva V	9	2.50833333
Nissen V	8	3.58333333
Bode M	7	3
Didon JP	7	1.50833333
Borst C	6	1.53333333

Seifert H	6	2.83333333
Van Sinderen MJ	6	2
Mulder M	5	1.2
Cotet CE	4	1.03333333

Source: Authors, with Bibliometrix

The most influential authors by total number of local citations are Jekova and Krasteva, with 24 citations, and Dido, Nissen, and Seifert, each with 18 citations (Figure 2).

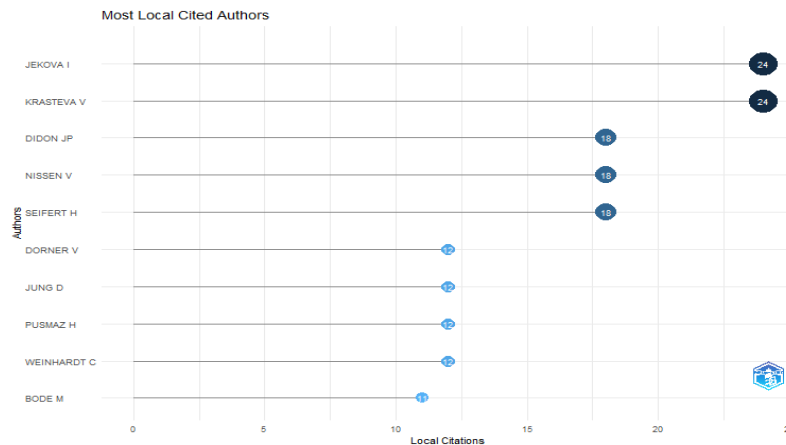


Figure 2. Most locally cited authors

Source: Authors, with Bibliometrix

The authors' production over time places Jekova, Krasteva, and Nissen in the first three places. The first two are also the longest-lived, having been involved in scientific research for 20 years. The digitalization of consulting companies has been an active concern since 2005 (Figure 3).

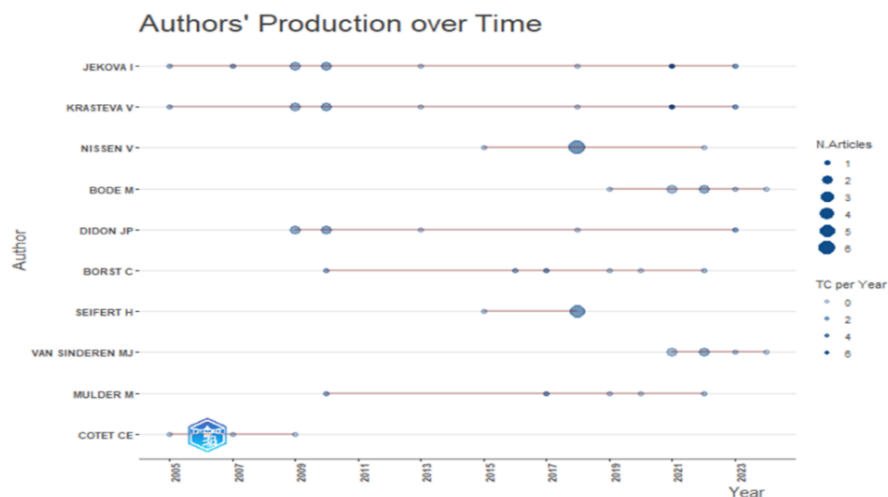


Figure 3. Authors production over time

Source: Authors with the help of Bibliometrix

The analysis of authors relevant to digitalization in consulting highlights the significant contributions of researchers such as Volker Nissen, Michael Bode, M.J. van Sinderen and Hans Seifert. Nissen (2015, 2018a, 2018b) was one of the pioneers of research in the virtualization of consulting services, proposing theoretical frameworks and technological solutions for adapting traditional models to digital reality. Next, Bode (2022, 2024) developed the DITCOS (Digital IT Consulting Ontology for Services) ontology and the DITCOS-DPM phasing model, providing a formalized and scalable approach for the digitalization of IT consulting services. The research of van Sinderen (2021, 2023),

in collaboration with Bode, has made important contributions to the visual and architectural description of digital services. The DITCOS model, developed by Michael Bode and his collaborators, brings a series of methodological and technological innovations in the digitalization of IT consulting services, addressing the need for standardization, formalization and interoperability in a context where consulting is increasingly delivered through digital platforms.

In turn, Seifert (2018a, 2018b) addressed selecting the right technologies for digital consulting and their impact on human-technology interaction. Together, these authors trace a clear evolution of research, from conceptual foundations to applicable models, toward automated, virtualized, and digitally assisted consulting.

4.4. Relevant sources

The most productive journals are "Digital transformation of the consulting industry: extending the traditional delivery model" (14 articles), "Sensors" (11 articles) and "IFAC Papersonline" (9 articles). These are also the most cited sources, confirming their relevance in the field (Figure 4).

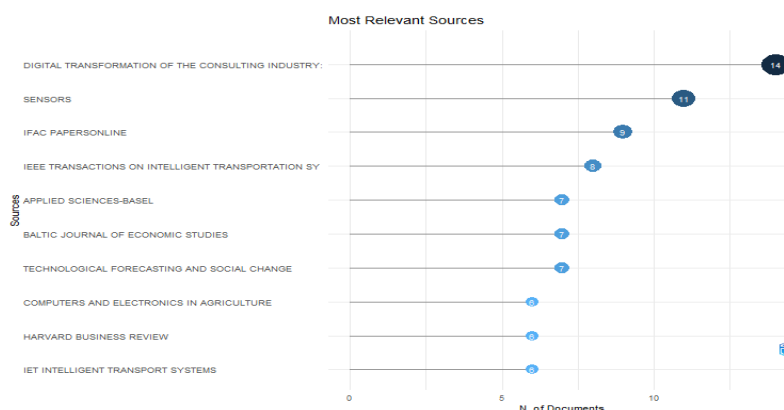


Figure 4. The most cited sources in the field

Source: Authors via the Bibliometrix interface

"Digital Transformation of the Consulting Industry" stands out as the primary source of publication in consulting digitalization, with 14 articles, highlighting a thematic concentration and a core of specialized authors. Other relevant sources, such as "Technological Forecasting and Social Change", "Harvard Business Review", and "Expert Systems with Applications", support the interdisciplinary nature of the research, integrating visions from business, innovation, and artificial intelligence. The consistent presence of journals in the medical field, smart transport and digital agriculture indicates the expansion of concerns related to digitalization in applied sectors, suggesting opportunities for methodological transfer in management consulting.

4.5. Emerging keywords and themes

The term "digital transformation" clearly dominates the analysis, with 49 appearances, signalling the central concern of researchers for the systemic transformation processes generated by digital technologies. Alongside this, terms such as 'artificial intelligence' (34), 'digitalization' (26), 'automation' (25) and 'innovation' (21) confirm the orientation of research towards emerging technologies and their impact on business and consulting models.

Terms such as "machine learning", "deep learning", "blockchain", and "robotic process automation" indicate specific technical directions of this transformation. In contrast, notions such as "knowledge management", "decision support system", and "trust" reflect concerns about the integration of technology into decision-making processes and organizational trust.

The presence of the concepts "digital twin", "ontology", and "simulation" suggests an interest in digital modelling of organizational reality and the development of formal and predictive systems in consulting. Also, terms such as "fintech", "education", and "sustainability" confirm the extension to specific sectoral areas, illustrating the applied and interdisciplinary nature of recent research (Table 3).

Table 3. Frequency of keywords used by authors

Words	Occurrences	Words	Occurrences
digital transformation	49	digital twin	12
artificial intelligence	34	education	12
digitalization	26	trust	12
automation	25	Decision support system	10
innovation	21	industry 4 0	10
deep learning	19	optimization	10
machine learning	19	sustainability	9
consulting	15	decision making	8
fintech	15	digitalizing	8
blockchain	13	ontology	8
knowledge management	13	robotic process automation	8
digital technologies	12	simulation	8

Source: Authors via the Bibliometrix interface

Trend topics provide a chronological analysis of the standard terms used in the scientific literature, including the frequency of their occurrence and the quartile values (Q1, Median, Q3) regarding the year of first use (Q1), the median and the thematic extension (Q3). This chronological perspective allows us to understand the evolution of scientific interest in certain concepts in digitalization, consulting, and associated technologies.

In the current literature, robo-advising is associated with optimizing decisions, reducing costs, and scaling consulting services through technology (Nissen, 2018; Warner & Wäger, 2019). A term specific to intelligent transport and sustainability, eco-driving reflects the integration of digital systems that optimize driving behaviour to reduce emissions, fuel consumption and environmental impact. Eco-driving relates to consultancy in fleet management, green logistics and sustainable mobility policies (IFAC, 2020–2023). An established term recently reinterpreted in the key of digitalization, sustainability is explored in the context of responsible digital transformations in which technologies such as AI, blockchain or RPA can reduce waste, increase resource efficiency or support ecological decisions. In consulting, sustainability becomes an integrated component in strategic planning, impact assessment and ESG reporting (Figure 5).

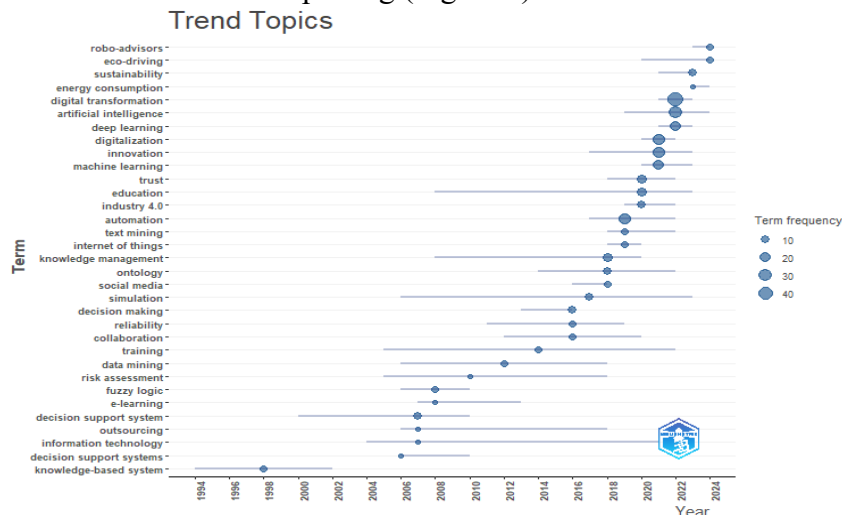


Figure 5. Trend topics

Source: Authors via the Bibliometrix interface

The terms 'digitalization' (26), 'automation' (25), 'innovation' (21), 'industry 4.0' (10), 'trust' (12) and 'text mining' (7) have seen a recent emergence (Q1 > 2017) and the Q3 value (2022–2023) shows that they are in thematic expansion and constitute the current core of research in the digitalization of organizational processes. This reflects a clear orientation towards, smart technologies (automation,

IoT, industry 4.0), data analysis (text mining), ethical and organizational aspects (trust) and paradigm shifts in consulting (digitalization, innovation).

Concepts such as "decision support system", "fuzzy logic", "data mining", "reliability", "collaboration" and "simulation" are themes that have had a constant appearance in the literature between 2006 and 2016, but whose average use has stagnated or expanded moderately in recent years. They have reached a maturity phase, now integrated as technical or methodological foundations in newer research.

Terms such as "knowledge-based system" (Q1 = 1994), "outsourcing", "e-learning", and even "information technology" are concepts that appear early in the literature (between 1994 and 2007) and have not experienced significant expansion recently. These indicate concerns about the early stages of digitalization but are no longer at the heart of the current research agenda.

Terms such as 'knowledge management' (13), 'decision making' (8) and 'ontology' (8) have medians placed around 2018, suggesting that they link the technological side to applicability in decision-making, consulting strategies and information infrastructure.

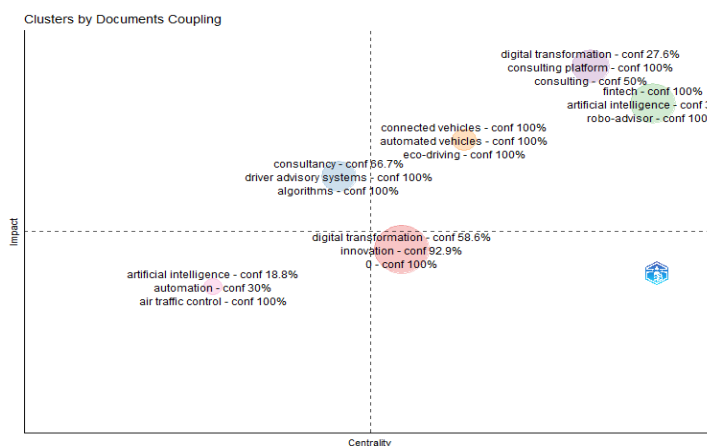


Figure 6. Thematic period
Source: Authors using Bibliometrix

The coupling of documents by theme highlights the existence of six large clusters: digital transformation in accounting and auditing, virtualization, and automation of consulting, fintech & robo-advising, formal models and digital infrastructure, intelligent transport and sustainability, ergonomics, and human-machine interaction. Cluster 1 reflects research on the digital transformation of traditional professions (accounting, auditing, consulting), focusing on redefining professional roles, adapting to digital platforms and the emergence of robo-consulting. There are concerns about automating decisions in professional services firms and integrating technology into internal control. Cluster 2 is focused on **consulting 4.0 and the virtualization of consulting services**. This cluster highlights using **ontologies, artificial intelligence, automation, and SaaS platforms** to rebuild the consultant-client relationship. It is the methodological and architectural core of modern digital consulting. Cluster 3 explores the application of AI and analytics in robo-advising, digital financial markets, investor behaviour, and the role of automated platforms in financial advisory. It also addresses ethical and algorithmic challenges in fintech digital services. Cluster 4 focuses on developing formal models and digital architectures (such as DITCOS) for consulting services. Interoperability, service virtualization and digital maturity of consulting firms through semantic standardization and technology integration are discussed here. Cluster 5 investigates applied consultancy in sustainable transport, eco-driving, autonomous vehicles, and the optimization of driving behaviour through intelligent systems. It is associated with the application of AI in infrastructure decisions and green mobility strategies. Cluster 6 focuses on the interface between cognitive factors and digital technologies, addressing how users interact with digital consulting platforms, focusing on usability, cognitive ergonomics, and decision-making certainty in semi-automated processes.

4.6. Co-citation network and institutional collaboration

Cluster 1 "Digital Transformation and Strategic Management,, has as its central authors Vial (2019), who is the most influential in defining the concept of digital transformation, Teece (2007, 1997), Eisenhardt (1989, 2007), Bharadwaj (2013), Matt (2015) and Miles (1994). Their main themes are related to theories and models on strategic management, dynamic capabilities, and digital transformation. The cluster underpins the understanding of how technology alters organizational structure and strategies.

Cluster 2 is poorly connected, aimed at the adoption of technologies in organizations, and it includes Katsaros (2011) and Wan (2016), who focused on the implementation of new technologies in specific contexts such as education, Human Resources (HR), and administration.

Cluster 3 "Information Technologies and User Behaviour" focuses on Davis (1989), who is the initiator of the TAM model, and Fornell (1981), Chin (1998), Venkatesh (2003), Belanche (2019), Bhatia (2020), and Jung (2018–2019). They analyzed patterns of technology acceptance, user satisfaction and evaluation of information systems. This cluster is the theoretical core of human-technology interaction and digital behaviour.

Cluster 4 directly targets digital consultancy, architectural models, and research methodologies. The central authors are Werth (2016), Hevner (2004), Peffers (2007), Christensen (2013), Bode (2021–2024), Nissen (2015, 2018) and Cerruti (2019). They looked at formal models, digital business models, digital consulting, and design science research. This is the technological and methodological cluster of modern consulting.

In cluster 5, there are isolated or niche studies in a digital context. It includes Kerber (1997), De Gauna (2008) and Irusta (2009), who have contributed to specific themes, but without a "pivot" role in the network (Figure 7).

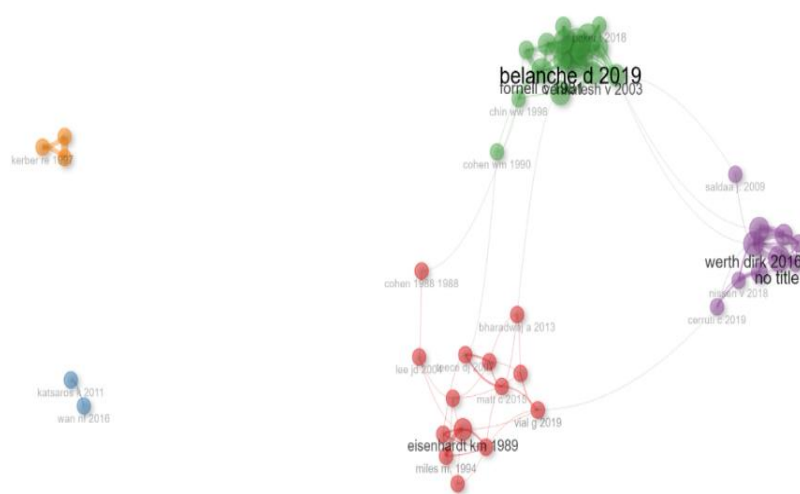


Figure 7. Co-citation network

Source: Authors, with Bibliometrix

The map of international collaborations reflects an intense polarization around the major global players, the US, China, the UK, and France, with a growing international openness, including from emerging countries. Cross-border cooperation is a key factor in the evolution of research in digital transformation, and the geographical diversity of partnerships shows the apparent trend of globalization of scientific knowledge.

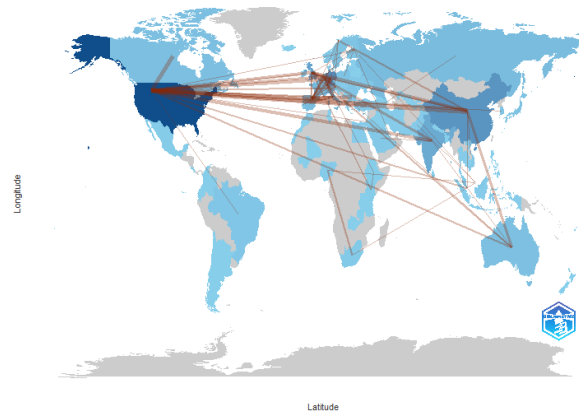


Figure 8. Country collaboration map
Source: Authors, with Bibliometrix

The US is the most active actor in this system, establishing multiple partnerships with over 20 countries, including China (12 collaborations), Canada and France (7 each), Germany, India, and the United Kingdom, each with more than five bilateral connections. The United Kingdom is asserting itself as an essential European node, with intense links in Europe and the non-EU space, especially with India, Australia, and Kenya. Germany and France support a wide, extensive collaborative network in Central Europe, Asia, and North Africa. China is growing open to the Global South, with partnerships with Vietnam, South Africa, Tunisia, and Qatar.

4.7. Thematic maps and conceptual evolution

The thematic map made with the Callon algorithm highlights four major themes: motor, emerging, basic, and niche.

Motor themes underpin the current scientific structure and act as "engines" of development. "Business", "perceptions", and "big data" are the key topics for digitalization, data analysis and managerial transformation. At the same time "management", "model", "technology", "framework", and "optimization" are theoretical and applicative foundations of digital transformation in consulting and industry.

Basic themes are important, but they are being strengthened. They offer a broad base of interest but require further study. While "design", "integration", "risk", "behavior", "future internet" are up-and-coming topics for the development of "digitalized consultancy", "classification", "algorithm" and "system" are fundamental concepts in AI applied in business, but they are in a consolidation stage.

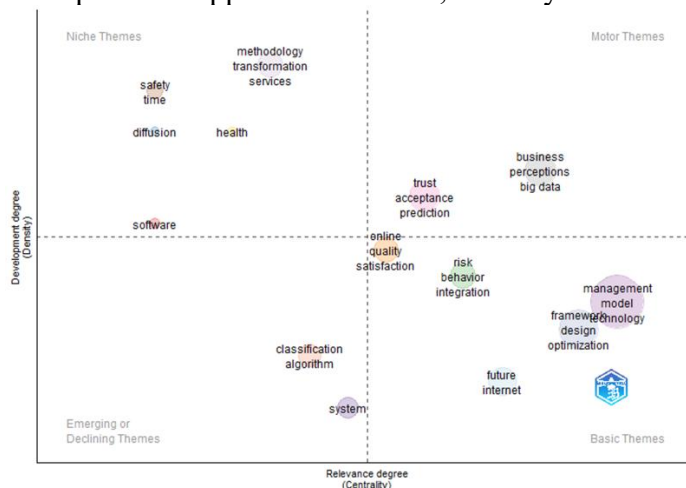


Figure 9. Thematic map – Callon Centrality vs. Density
Source: Authors, with Bibliometrix

Niche Themes are well-developed but have limited relevance to other areas. They are specialized and applicable in specific contexts regarding the digital transformation methodology in sectors such as health services.

Declining Themes are emerging and are in the early stages of development or have been abandoned. Some concepts, such as those related to "software", "system", "classification" and "algorithm", can indicate future directions, especially if they relate to AI and big data.

5. Conclusions

The bibliometric analysis carried out in this article highlights the growing academic interest in the digitalization of management consulting, a field located at the intersection of technological innovation and business transformation. The research reveals the importance of digital transformation, automation, and artificial intelligence, reflecting a structural shift in how advisory services are delivered, personalized, and scaled in the digital economy. The thematic and concept maps indicate an evolution from fundamental technological terms to integrated approaches, including redesigning business models, digital platforms, and hybrid consulting solutions.

The model of international collaboration and the emergence of dedicated research clusters, such as those focused on the architecture of IT consulting, robo-advisory or Industry 4.0, demonstrate that the digitalization of consulting has become a global priority in scientific research. The cross-sectoral influence of digitalization, visible in related fields such as accounting, transport, or agriculture, supports the trans-disciplinary nature of innovation in this space. In addition, the transition to automated and virtualized consulting models underlines the need for up-to-date skills and adapted digital infrastructures in the professional consulting ecosystem.

Regarding research limitations, the analysis was based exclusively on documents indexed in the Web of Science (WoS) database. Therefore, some relevant papers from other databases, such as Scopus or Google Scholar, may have been omitted. Also, the inclusion of only publications written in English could affect the overall representativeness of the results. Using a specific set of keywords is another limitation, as some relevant studies using different terminology may not have been identified. At the same time, the study did not include a qualitative evaluation of the extracted documents, which would have allowed a deeper understanding of the theoretical contributions and methodological rigor. However, I consider that these limitations have little impact on the robustness of the conclusions.

An in-depth content analysis on the most influential studies identified through the bibliometric process is recommended as a future research direction. This would facilitate a more detailed understanding of the conceptual framework and application models used in the digital transformation of consultancy. Also, comparative case studies of consulting firms adopting different digitalization strategies can highlight success factors, resilience patterns, and organizational impact. Extending the analysis to regional and sectoral contexts could further enrich the understanding of how digital innovation is reshaping the consulting industry globally.

From a theoretical perspective, this article fills an existing gap in the literature by systematizing the main currents of thought and emerging research directions in the field. From a practical point of view, the study provides a valuable knowledge base for consulting professionals, business leaders and decision-makers interested in accelerating the digital maturity of consulting services. As digital ecosystems evolve, the intersection of technology and consulting will require continuous adaptation, strategic vision, and collaborative innovation.

Acknowledgements

This paper is the product of research conducted within the Doctoral School Management at the Bucharest University of Economic Studies.

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MAPPING THE INTERSECTION OF STRATEGIC MANAGEMENT AND SUSTAINABILITY

DOI: <https://doi.org/10.53486/dri2025.27>

UDC: [005.1:330.342]:001.891

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Abstract. *The merging of strategic management and sustainability has become a focal point in both academic inquiry and corporate practice, reflecting growing recognition of the need for long-term value creation that integrates environmental, social, and governance (ESG) concerns. This paper maps the intellectual structure of this intersection through a systematic literature review and bibliometric, drawing on data from the Web of Science Core Collection and analyzing over a decade of scholarly output between 2015 and 2025, the study identifies key themes, theoretical anchors, and clusters of research that define this interdisciplinary space. The findings show the evolution of the field from early studies emphasizing corporate social responsibility (CSR) and environmental management to more recent work integrating sustainability into the core of strategic planning, innovation, and performance management. These highlight how firms navigate complexity and uncertainty while aligning strategic objectives with sustainability imperatives. By visualizing the knowledge structure, the paper not only clarifies the fundamental literature but also uncovers emerging frontiers such as circular economy strategies, sustainable innovation, and the role of digital transformation in advancing ESG outcomes. This bibliometric review offers valuable insights for researchers and practitioners aiming to integrate sustainability deeply into strategic decision-making processes. The paper concludes by suggesting future research directions to address underexplored areas and promote cross-disciplinary collaboration that fosters holistic, actionable approaches to sustainable strategy.*

Key words: *bibliometric review, strategic management, sustainability, VosViewer, Web of Science*

JEL: C80, M10, Q01, Q56

1. Introduction

In recent decades, the concepts of strategic management and sustainability have increasingly converged, reflecting a growing awareness of the need for organizations to align long-term planning with environmental, social, and economic responsibilities. This literature review explores the historical and theoretical evolution of strategic management from Chandler Jr.'s foundational insights on organizational structure, through Ansoff's systematic planning models, Porter's competitive frameworks, Barney's resource-based view, and more recent contributions such as David's multidimensional sustainability strategy. The discussion highlights how sustainability, once a peripheral concern expressed mainly through Corporate Social Responsibility, has become central to business strategy, particularly in light of global environmental challenges and societal expectations. As demonstrated by researchers like Tuerk, Centobelli, Ching, and Barbosa, integrating sustainability into strategic decision-making now involves complex interdependencies - spanning technological innovation, supply chain management, governance structures, and public health implications. This study aims to map the academic intersection of strategic management and sustainability by analyzing scientific publications indexed in the Web of Science database between 2015 and 2025. Using

bibliometric tools such as VOSviewer and Web of Science's analytical instruments, the research investigates citation trends, geographic distribution, key research domains, keyword networks, and contributions to the Sustainable Development Goals (SDGs). Through this analysis, the study provides an evidence-based overview of how academic discourse has evolved at the nexus of strategy and sustainability, offering insights for both researchers and practitioners.

2. Literature review

This literature review explores how strategic management and sustainability have increasingly intersected over time. It will underline the evolution of strategic management from Chandler Jr.'s and Igor Ansoff's foundational work on organizational structure and planning, through Michael E. Porter's market-based frameworks, Jay B. Barney's resource-based view of internal capabilities and, finally, to Barbosa's sustainable management models in existing research. Chandler emphasized the alignment between organizational structure and strategy, highlighting how administrative frameworks influence corporate performance (Chandler, 1962). Building on this foundation, Ansoff introduced a systematic approach to business growth, his work providing tools for firms to navigate complex market environments through strategic planning (Ansoff, 1965). Porter's contributions further shaped the field: he introduced the Five Forces framework, offering insights into industry structure and competitive dynamics (Porter, 1980). Jay B. Barney's article presented the Resource-Based View (RBV), emphasizing the strategic importance of unique firm resources in achieving long-term success; this perspective shifted focus from external market positioning to internal capabilities. (Barney, 1991). Talking about sustainability as a strategic concern, the present literature review start with the Brundtland Commission's definition of sustainable development. (Brundtland Commission, 1987). But sustainability entered the business discourse after the Brundtland Report, which defined sustainable development as meeting present needs without harming future generations; initially, companies responded through Corporate Social Responsibility (CSR).

Tuerk (2004) pointed out that corporate sustainability involves an internal development process, requiring skills and resource managers to lead and mediate with stakeholders. The impact of emerging technologies like Communications Technology (ICT), Nanotechnology, and Biotechnology offer innovative yet potentially risky solutions for sustainability. Tuerk explores corporate sustainability strategies for ICT through case studies in mobile computing, e-banking, and online music, comparing their resource consumption with traditional services using the MIPS concept, identifying key factors influencing resource intensity; he emphasizes the growing impact of user behavior, highlighting the need for new governance structures (Tuerk et al., 2004).

In Werbach's opinion, socially responsible companies should have sustainability in the core of its strategy. He believed that thinking just only in terms of the environment was no longer suitable. Thus, a strategy called "moving from green to blue" must incorporate all sides of sustainability: social, economic, environmental and cultural. According to Werbach, the true sustainability is composed by four crucial components: social, economic, environmental, and cultural. So, it is about developing and executing an organization's strategy that considers all aspects of sustainability, involving all employees and the whole community in all parts of the process (Werbach, 2009).

Nowadays, to succeed in an increasingly complex and competitive environment, all organizations, whether they are formal or informal, large or small, public or private, must adopt a proactive and strategic-management approach that empowers employees, sets clear goals, anticipates change, and replaces intuition with logical, systematic planning, because only through deliberate direction can they effectively determine and reach their desired future. The strategic-management process embodies this approach to decision making. It represents a logical, systematic, and objective approach for determining an enterprise's future direction. The strategic-management process, being synonym with strategic planning, embodies this approach to decision making. It represents a logical, systematic, and objective approach for determining an enterprise's future direction (David, 2011).

Analysing the long-term impact of environmental factors on public health in Ukraine, using

sustainable natural resource management to ensure strategic development of environmental health, Koval (2021) developed a model that considers well-being gains, the relationship between pollution, environmental conditions and public health damage, focusing on the rational management of natural resources and its negative impacts on health and investment.

In 2021, Centobelli discussed the relationship between social pressure, environmental commitment, green economic incentives, supply chain relationship management, sustainable supply chain design and CE capabilities to promote CE strategies. He developed a model exploring the relationships between these factors and the result confirmed the positive impact of environmental commitments and green environmental incentives on supply chain relationship management and sustainable design, highlighting their role in improving the CE capabilities of SMEs (Centobelli, 2021).

Ching explored the use of industry 4.0 technologies to support sustainable production, establishing the relationship between the 15 identified functions and their contribution to the economic, environmental and social dimensions of sustainability (Ching et al., 2022).

It is important to understand the four key areas of innovation, namely business model innovation (BMI), sustainable BMI, ecosystem innovation and sustainable ecosystem innovation and the fact that a business model innovation (BMI) has a decisive impact on business ecosystems, society and the planet (Snihur, 2022)

Ivars-Baidal establishes a comprehensive and applicable set of smart destination indicators at strategic, relative, instrumental and applied levels which can be used as a tool for the business and public organisation management and control of any economic activity. The results show that destinations perform differently across key areas such as sustainability, online marketing, and connectivity, and help measure how much progress each one is making toward becoming smart and sustainable (Ivars-Baidal et al., 2021).

Sustainability is crucial for societal development, pushing organizations to balance competitiveness with their responsibility to reduce social and environmental impacts. For small businesses, this challenge is even greater due to limited resources and a lack of established sustainable management models in existing research (Barbosa et al., 2020).

3. Analysis and discussions

In this bibliometric review the main objective is to analyze the relationship between the concepts of strategic management and sustainability in academical scientific papers. Web of Science database was used for gathering data and the search keywords were: "strategic management "AND „sustainability". The analysis was performed for a 10 years period, from 2015 until 2025, including articles, proceedings papers and review articles types, resulting in 807 results. VOSviewer and Web of Science Analysis tool were used for reviewing the gathered data, resulting into the following analysis: Times cited and publications over time, Geographical spread, Document types, Categories, Research areas, Keyword map network visualization, Keyword map overlay visualization, Keyword map density visualization, Authors rank, Most cited papers, Sustainable Development Goals.

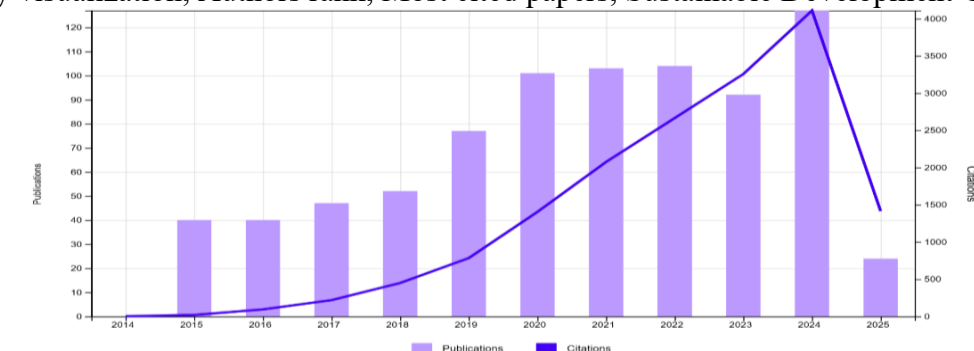


Figure 1. Times cited and publications over time

Source: Web of Science database

Figure 1 illustrates a progressive trend of publications and citations over the years. Between 2014 and 2019 it is registered a steady and stable growth, starting with 2019 until 2024 it is observed a boosting of both publication and citation numbers. The 2025 decrease is explained by the present ongoing activity. Overall the above graph shows the maturity of the analyzed field and its academic relevance.

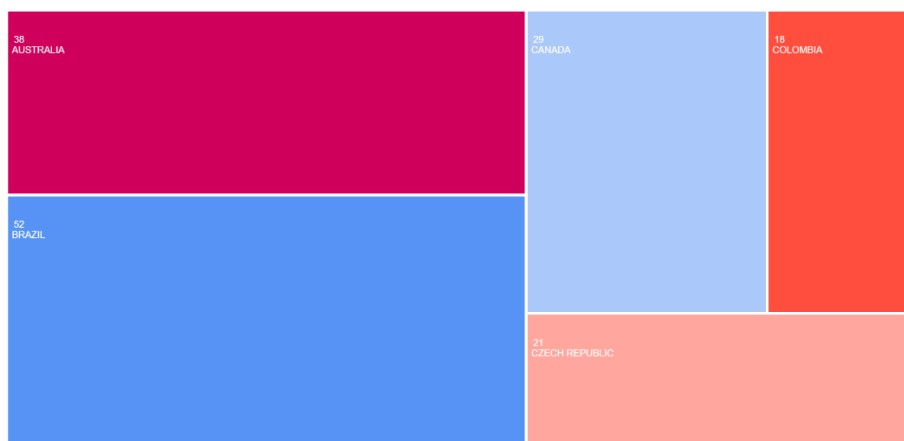


Figure 2. Geographical spread

Source: Web of Science database

Geographical spread figure shows an increase interest of countries such as Brazil, Australia and Canada, Check Republic and Colombia, confirming the global interest in the field of sustainability and strategic management.



Figure 3. Document types

Source: Web of Science database

The analyzed documents are mainly articles (670), followed by proceeding papers (81) and review articles (57), illustrating an intersection between highly theoretical, empirical papers with interactions at the level of academical communities.

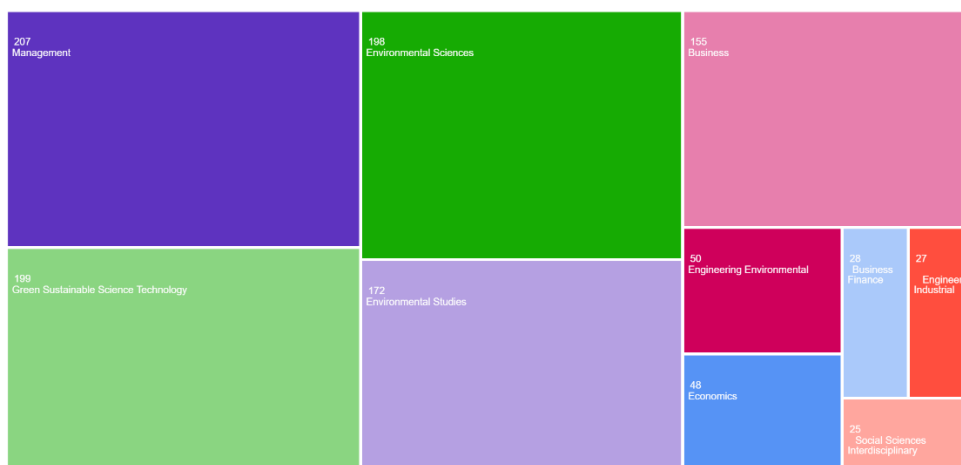


Figure 4. Categories
 Source: Web of Science database

Figure 4 shows the interdisciplinarity of the field of study, highlighting the following domains: Management (2017 papers), Green Sustainable Science Technology (199 papers), Environmental Sciences (198 papers). This demonstrates that sustainability and strategic management concepts were studied from diverse perspectives, such as managerial, social, ecologic and technologic point of view.

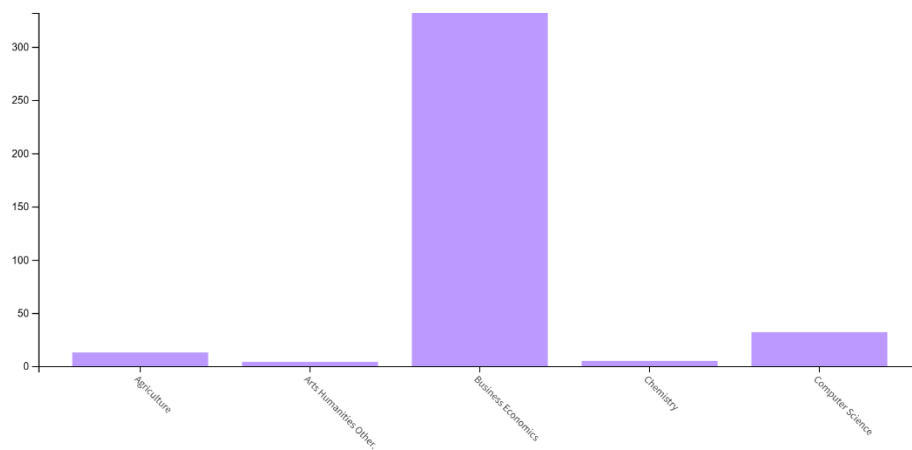


Figure 5. Research areas
 Source: Web of Science database

Business Economics represents the dominating research area with the focus on organizational processes, corporative sustainability, economic governance and sustainable business models. Computer science with the focus on green technology and digital transformation represents another top research area, followed by agriculture, chemistry and Art and humanities areas.

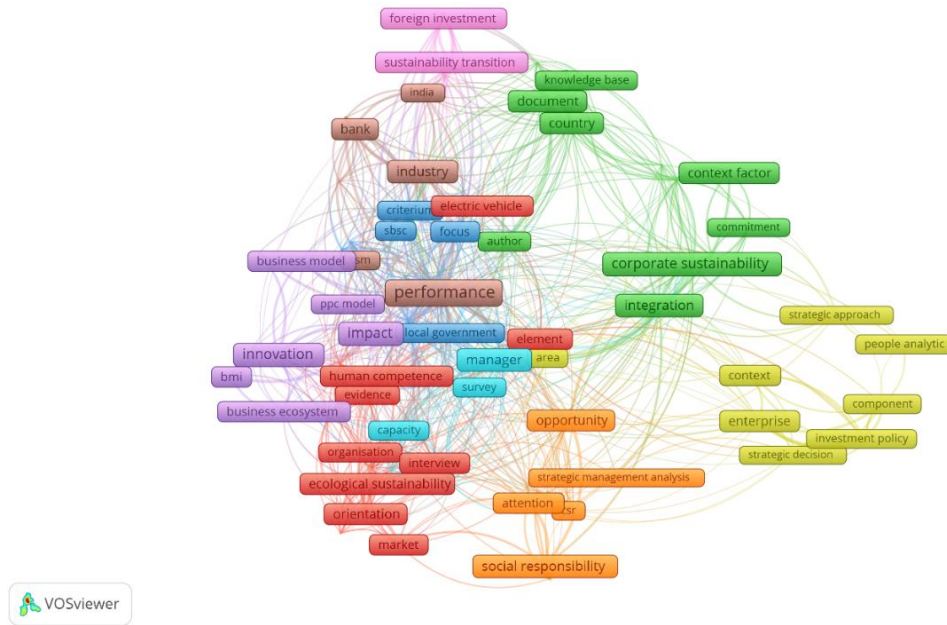


Figure 6. Keyword map network visualization

Source: Vos Viewer

Figure 6 illustrates the keyword map, constructed from 101 items, 9 clusters, 839 links and 3884 total link strength. The main clusters are organizational governance and performance, corporate sustainability, social responsibility, innovation and business models, innovation and ecological sustainability. The organizational governance and performance cluster with keywords such as performance, impact, manager, local government indicates how the organizations are impacted by the decisions, human factors and managerial competences. The corporate sustainability cluster has the following keywords: corporate sustainability, context factor, knowledge base, document and explains the efforts of integrating the sustainability principle into policies. Social responsibility cluster has the following keywords: people analytics, enterprise, component, social responsibility keywords and discusses the themes related to the impact of sustainability strategies on the society. Innovation and business models cluster with the keywords business ecosystem, innovation demonstrates the interest on transforming the structure of the businesses, whereas the ecological sustainability clusters focuses on ecology.

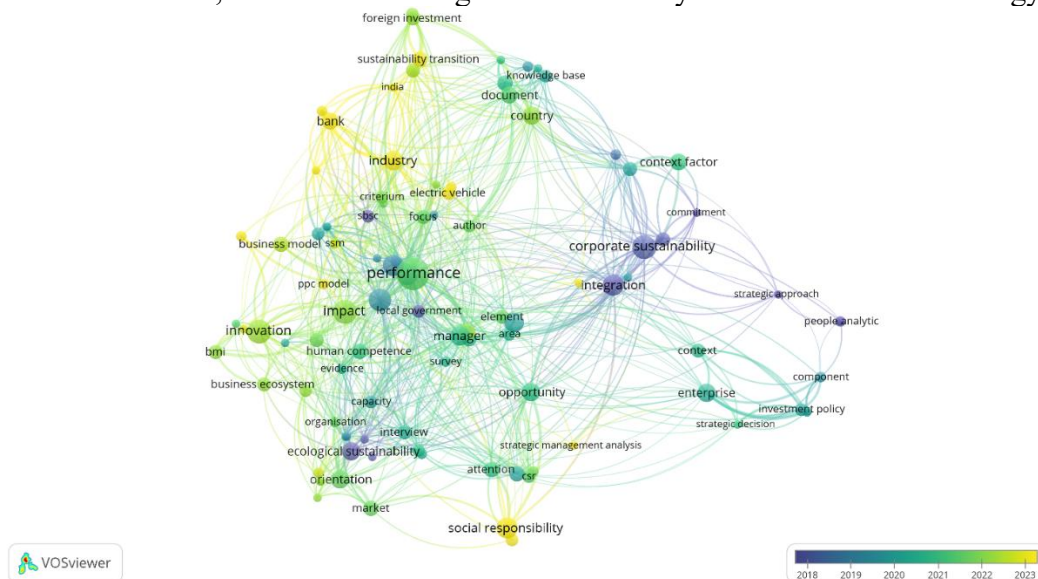


Figure 7. Keyword map overlay visualization

Source: Vos Viewer

The overlay visualization of the keyword map shows the time evolution of the keywords, therefore the older keywords such as strategic approach, commitment, people analytic, ecological sustainability indicate the fundamental themes from the field, followed by performance, focus, manager, opportunity, knowledge base keywords and ending with emergent keywords such as social responsibility, impact, sustainability transition indicate the new directions for research.

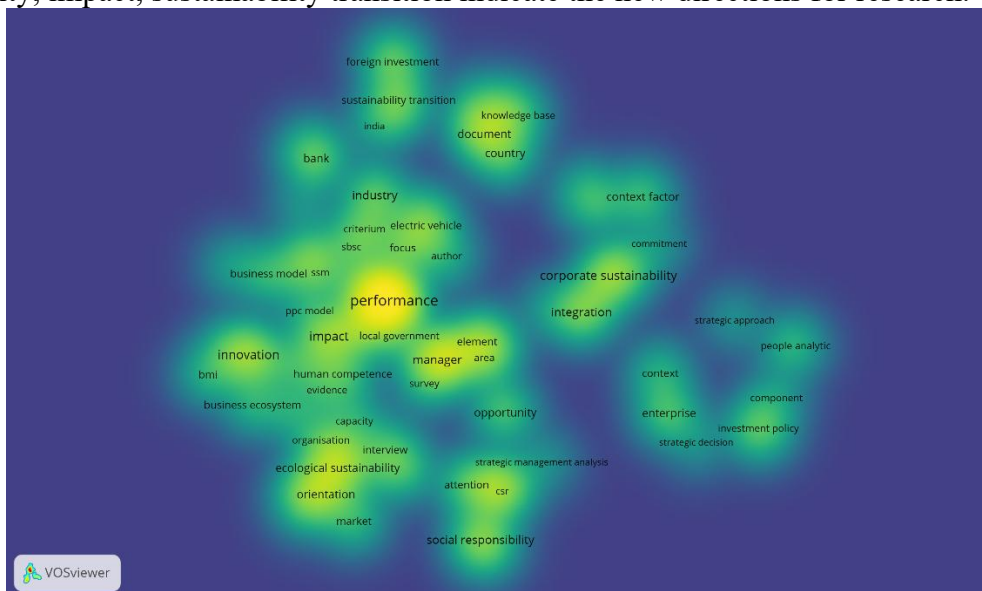


Figure 8. Keyword map density visualization

Source: Vos Viewer

Density visualization of the keyword map highlights the most used keywords and their frequency. Performance is the central keyword, followed by corporate sustainability, innovation, manager, impact, social responsibility and integration keywords.

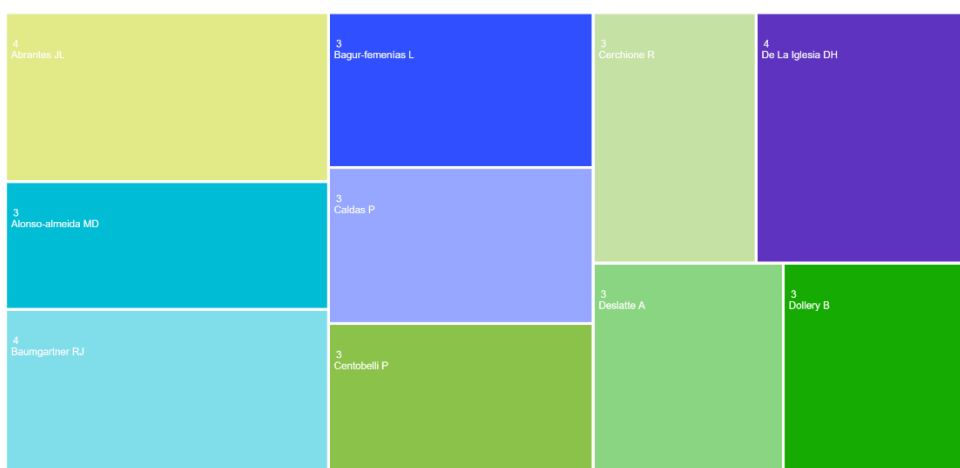


Figure 9. Authors rank

Source: Web of Science database

The top 10 most prolific authors are illustrated in the above figure, noticing that in this field doesn't exist a single main author voice, but rather an equilibrated and collaborative contributions.

Scrutiny, Norms, and Selective Disclosure: A Global Study of Greenwashing article written by Marquis, C., Toffel, M.W. and Zhou, Y.H. (DOI 10.1287/orsc.2015.1039) has the highest numbers of citations, gathering a total number of 568 citations, analysis greenwashing and the legislative importance. Second position is occupied by *Green Product Innovation in Manufacturing Firms:*

A Sustainability-Oriented Dynamic Capability Perspective article written by Dangelico, R.M., Pujari, D. and Pontrandolfo, P. (DOI10.1002/bse.1932), followed by *Designing business models in circular economy: A systematic literature review and research agenda* article written by Centobelli, P., Cerchione, R., (...), Urbinati, A. (DOI 10.1002/bse.2466). All three articles are published in prestigious journals, Organization Science and Business Strategy and the Environment.

The analyses papers align to Sustainable Development Goals, the main SDG goals encountered are Industry Innovation and Infrastructure, followed by Affordable and Clean Energy, Good Health and Wellbeing, demonstrating a strategic connection between scientific production and global priorities.

4. Conclusions and Future Directions

This study has mapped the intellectual intersection between strategic management and sustainability, revealing it as a dynamic, multi-faceted field that has moved from minimal concern to central strategic focus. We identified core themes—such as stakeholder engagement, dynamic capabilities, and CSR—as well as conceptual shifts toward integrated value creation models. This transformation reflects an evolving consensus: that companies must align long-term strategic objectives with broader societal and environmental outcomes (Porter & Kramer, 2011; Elkington, 1997). One of the central conclusions is that sustainability, once viewed primarily as a compliance issue or reputational concern, is increasingly promoted as a driver of innovation, risk management, and competitive advantage. This reframing is particularly evident in the growing interest in how companies develop sustainability-oriented capabilities and metrics, and how they engage with stakeholders to co-create resilient strategies in volatile contexts (Hart & Dowell, 2011). However, the field still faces several challenges. The fragmentation of concepts, varying definitions of sustainability, and the tension between short-term financial metrics and long-term ESG goals suggest the need for more integrated theoretical frameworks. Additionally, there is a gap in research connecting strategy-sustainability integration to performance outcomes in diverse institutional and sectoral contexts.

Future research should pursue the following directions:

- Contextualization: Examine how strategy-sustainability integration varies across industries, geographies, and governance models, especially in emerging economies.
- Longitudinal studies: Investigate the long-term performance implications of sustainability-driven strategies using mixed methods and multi-level analysis.
- Interdisciplinary frameworks: Combine insights from innovation studies, systems thinking, and behavioral strategy to enrich theoretical and practical understandings.
- Digital transformation: Explore the enabling role of digital technologies (e.g., AI, blockchain) in supporting sustainable business models and ESG reporting.
- Impact assessment: Develop more robust tools and metrics to evaluate the real-world impact of strategic sustainability initiatives beyond financial returns.

By identifying both the existing intellectual foundations and future research avenues, this paper contributes to building a more coherent, actionable, and future-ready understanding of how strategic management can meaningfully advance sustainability agendas.

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BIBLIOMETRIC ANALYSIS OF DIGITAL HRM PRACTICES

DOI: <https://doi.org/10.53486/dri2025.28>

UDC: 005.95/96:004:001.891

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Abstract: *Specialized literature constantly contributes to the examination of practices in a given field and in specific areas such as human resource management it is more than relevant; it also plays an essential role in reflecting changes and novelties regarding customs and procedures. Based on these considerations, this paper aims to present the novelties in the HRM field through a bibliometric analysis of the digital practices of this process. The focus on the digital element is largely due to its current relevance and the implications that digital change has on traditional management. Through the research technique selected for this study, an interactive perspective on the literature is provided. The use of network maps will significantly contribute to understanding not only the connections between elements found in the analysed contexts but also the impact they have on organizations in general. The results of the paper aim to make a significant contribution to the scientific field and that is due to their relevance to the research area; they could influence future directions in HRM, both at a theoretical and practical level. Furthermore, given the rapid pace of digital technology change, the research may also play an important role in the future for comparative studies.*

Key words: HRM, practices, digital, recruitment, bibliometric

JEL: M0, O0, O3

1. Introduction

The rapid evolution of technology in recent years has been strongly felt not only in people's social lives but also in their professional lives. The nature of work, how we work, and how we access work have all changed radically. Practice has served as a "witness" to these transformations that have reshaped the business landscape; today, there is a clear orientation toward digitalization and a shift away from the traditional way of managing an organization, moving instead toward a digital technology-based approach. As a result, the digital space has become present in all processes that take place and operate within an organization. Whereas in the past, digital tools were primarily used in customer relations, today, digital technologies are becoming standard even in the interactions between the company, candidates, and employees. In light of these considerations, it can be said that one of the most affected areas in terms of adopting digital changes is human resource management. From the recruitment and selection of personnel to the management of employee relations, HRM had to adapt to the technological changes brought about by the digital age. With change also come uncertainties, leaving a very fine line between classical and modern practices, between their usefulness and performance, as well as between what remains and what is no longer applied. This is precisely why the present paper arises from the need to stabilize the research area, to identify these practices and to classify them. Therefore, the main objective of this paper is to offer a current overview of these practices through bibliometric analysis; thus to be able to determine and define them. In order to achieve this objective, the study will employ a quantitative method for analyzing data from the field of specialized literature. A thorough examination of the literature will be conducted in order to identify the most relevant practices of digitalized human resource management, and the findings of the study are expected to make a significant contribution to the field.

2. Basic content.

The changes that occur over the years inevitably extend into business practices as well; they represent a necessity that companies must embrace in order to remain relevant and maintain their competitiveness. Therefore, in the field of management as well, there is a need for the adoption of new technological trends and in the context of human resource management (HRM), this gives rise to the concept of "e-

HRM" (Foster, 2009). This idea is viewed in the literature as something that supports the practices of this department, being useful both to employees and to managers (Berber et al., 2018).

In relation to the impact that digital practices have on HRM, there are authors who believe that the positive or negative value largely depends on the maturity of the capabilities that this department holds within organizations (Wang et al., 2022). There are also opinions that suggest that the use of artificial intelligence (an integral part of digitalization) in human resource management can lead to sustainable company performance (Mollah et al., 2024). When it comes to digital practices themselves, the areas where the concept of e-HRM is most commonly found are: recruitment and personnel selection (Čirčová et al., 2025), which are also the most relevant for this study; digital labor platforms (Walckirch et al., 2021); and training and development (Bilušić and Vokić, 2025). In the area of recruitment and personnel selection, digitalized HRM practices can bring both advantages and disadvantages (Ahmed Ali and Ahmed Siddiqui, 2024).

It is worth noting that in the case of recruitment, concerns may arise regarding fraudulent job postings (Akram et al., 2024), which can lead to a significant decline in candidates' trust in online hiring platforms. Moreover, other authors also highlight the lack of fairness in recruitment conducted through digital technologies (Rigotti and Fosch-Villaronga, 2024), as bias can be present in modern recruitment methods as well. While in traditional methods, bias was linked to the characteristics of the human element, in digital methods it is associated with the data on which these systems operate. In the case of personnel selection, although this stage is greatly facilitated by the existence of these new technologies, the issue of extending the checks made by recruiters arises. More specifically, recruiters may extend their background check of a candidate beyond the professional context (Berkelaar and Buzzanell, 2014), examining their life on social media, which could influence the recruitment decision due to the image candidates present.

Furthermore, the specialized literature has highlighted that digital selection practices may also raise legal and ethical issues (Tippins et al., 2021).

The research methodology used for this study is bibliometric analysis, a method aimed at presenting the situation regarding the digital practices of human resource management. Through this analysis, a map of the most frequently encountered terms or topics related to HRM practices is presented. For this reason, three data sets were extracted from the Web of Science Core Collection. The first set reflects articles that fall within the general scope of the e-HRM concept; the second set more explicitly reflects the context of automated personnel selection, while the third pertains to e-recruitment. The selection of categories for the bibliometric analysis was based on the specialized literature and its predominant elements; thus, there is a significant connection between the specialized literature presented in the paper and the practical part of the data analysis derived from the Web of Science Core Collection (WOS). As for the data, no filters were applied to them, meaning they are not limited to a specific period or area; rather, they encompass the entire database subject to the research.

The first category of data consisted of a total of 311 WOS-indexed papers. In order to process them in the VOSviewer software, co-occurrence and full counting filters were applied (see Figure 1).

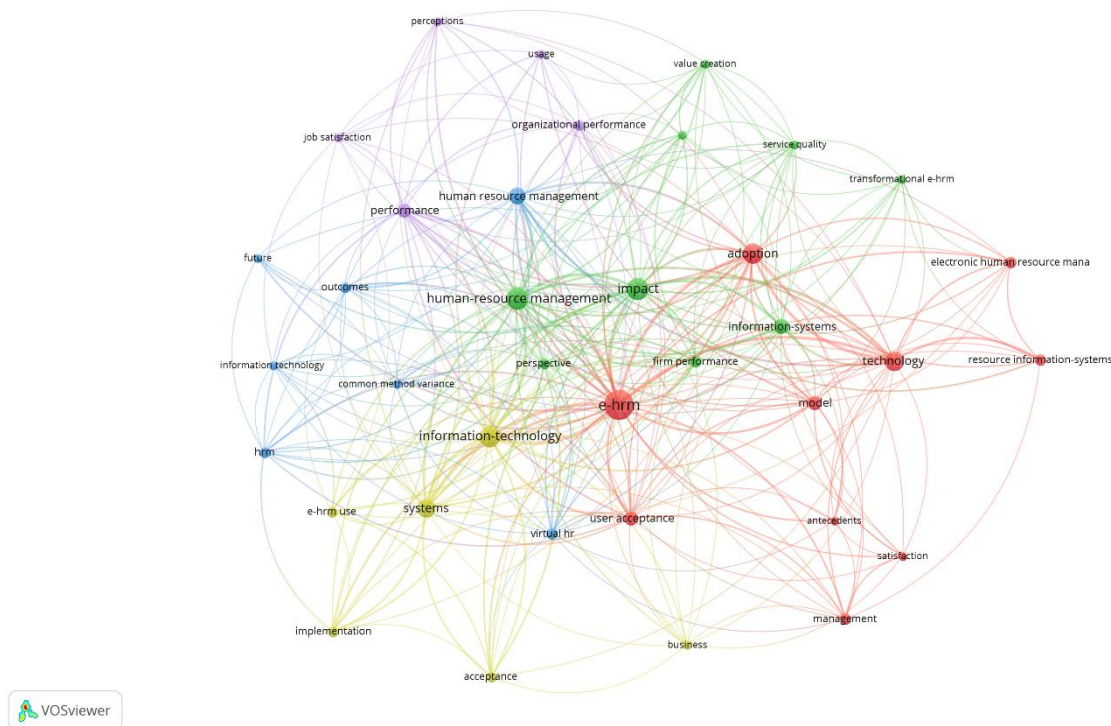


Figure 1. Network map e-HRM

Source: Own processing

From the connections presented in the network, the strong connection of the term e-HRM with other elements of the data group can be seen. The content of this analysis identifies some of the strongest terms as: technology, user acceptance, adoption, impact, information technology, human resource management; while some of the least relevant terms are: job satisfaction, perception, acceptance. Therefore, comparing these considerations with the hypotheses mentioned in the specialized literature, a conclusion can be formed and according to which, regarding the digital practices conditioned by the e-HRM framework, the focus is on the impact they have on this process, rather than on how they are perceived and accepted. Also, from this data set, it can be observed that there is very little interest in the literature regarding human resource management practices, with the term "practices" being absent from the analysis, even though the adoption of digital technologies implies a change in these practices for this process. This indicates the existence of certain limitations in the scientific literature on the chosen research topic, but these limitations may be largely due to the novelty brought by the digitalization of this process and may indirectly highlight gaps in the practical field.

For the second data category, a total of 195 papers were extracted, which is much fewer compared to the first category. The difference is largely due to the fact that e-HRM is a general term that encompasses digital practices in human resource management, while automated personnel selection is much more specific and is limited to personnel selection. The same filters as in the first data group were applied for the analysis (see Figure 2).

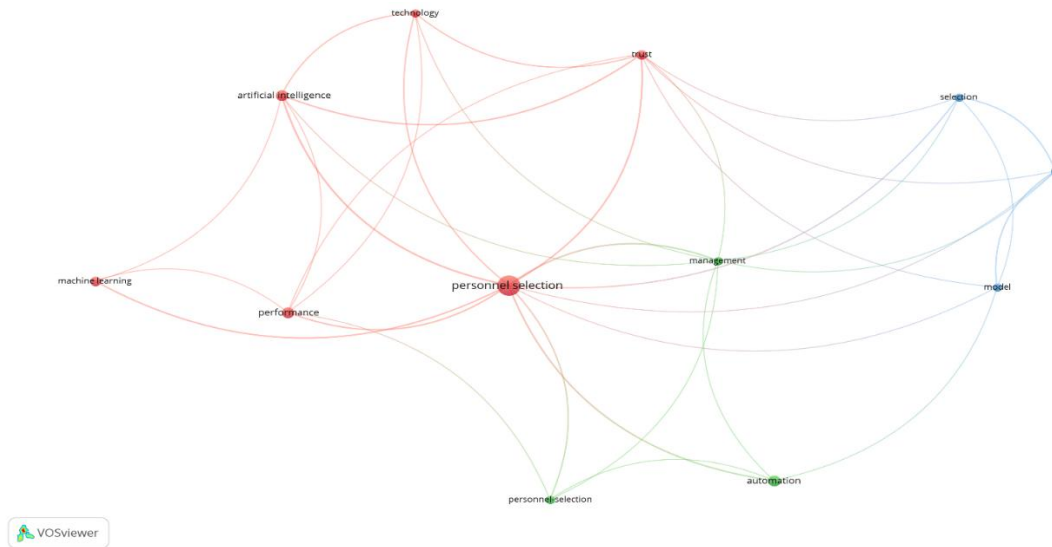


Figure 2. Network map of automated personnel selection
Source: Own processing

This network map is much more limited and focuses on a very small number of elements; specifically, in the area of automated personnel selection, the key components are primarily the terms artificial intelligence and machine learning, as these are the digital technologies frequently used in practice for performing automated personnel selection. As for the other elements, it can be observed that this digital practice of personnel selection is also found in a performance context, implying that the goal is to achieve performance. The third data category consisted of a total of 382 papers, making it the largest of the three. The existence of more papers in this area highlights where the focus of interest lies in terms of digital human resource management practices; more specifically, it can be observed that although e-HRM encompasses both e-recruitment practices and automated personnel selection practices, literature studies give more attention to digital recruitment than to digital practices as a whole (see Figure 3).

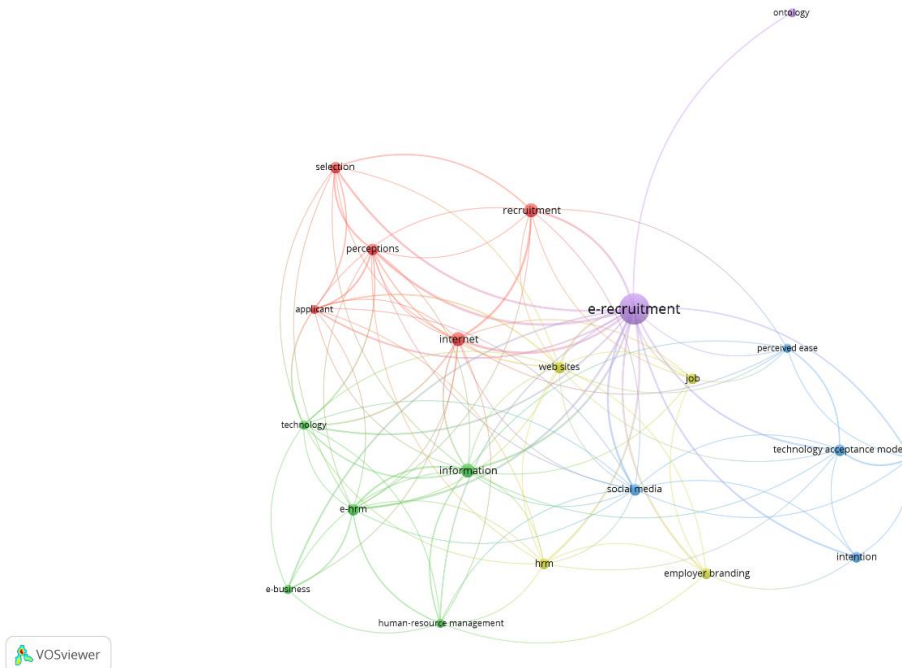


Figure 3. Network map of e-recruitment
Source: Own processing

This map has a structure very similar to that of a star network, with the term "ontology" as its central node and its position in the network suggests that the integration of ontologies in e-recruitment is still an emerging research area. As for the other terms, it can be highlighted that there is a strong emphasis on perception/image and the online environment, which is not at all coincidental, as digital recruitment involves so-called recruitment platforms that generate both employer and candidate images. Comparing the three groups, it can be observed that the last group best represents its specific features.

3. Conclusions.

From the specialized literature mentioned at the beginning of the paper and by associating it with the results of the bibliometric analysis, several conclusions can be drawn. The first is that this area is still a new one, not extensively explored in the literature, which in itself leads to a lack in practice. The second is that, with regard to digital human resource management practices, the focus is more on recruitment than on selection. The third consideration is that the adoption of digital practices is still in its early stages.

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DEVELOPING ECOLOGICAL MARKETING THROUGH THE SUSTAINABLE PUBLIC PROCUREMENT

DOI: <https://doi.org/10.53486/dri2025.29>
UDC: [339.138:352/354]:504(478)

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Abstract. *In the context of the climate crisis and the depletion of natural resources, the Republic of Moldova has committed, through its Environmental Strategy 2024–2030, to aligning national policies with European objectives for sustainable development. The strategy aims to reduce greenhouse gas emissions, adapt to climate change, transition to a circular economy, and protect biodiversity. An important direction is the promotion of ecological marketing, which supports sustainable products and services through energy efficiency and social responsibility. In this regard, Sustainable Public Procurement (SPP) becomes a strategic tool, guiding public demand towards ecological products and encouraging producers to change their behavior. SPP contributes to innovation, social responsibility, and reducing environmental impact. Although Moldova allocates limited resources for environmental protection, the National Environmental Fund and international partnerships support sustainable investments. Compared to the European Union, where public procurement accounts for an average of 14% of GDP, in Moldova it stands at around 11%, indicating significant untapped potential. Through coherent public policies and cross-sector collaboration, sustainable procurement can catalyze the development of ecologic marketing and the transition to a sustainable and resilient economy.*

Keywords: *sustainable development; Environmental Strategy 2024–2030; climate change; ecological marketing; sustainable public procurement (SPP); circular economy; environmental protection; ecological impact; environmental education*

Introduction

Sustainable development, both globally and in the Republic of Moldova, requires a reorientation of public policies and economic practices towards environmental protection and resource efficiency. In this context, ecologic marketing plays a vital role by promoting environmentally friendly products and services and educating consumers about their long-term benefits.

One of the key tools for achieving these objectives is sustainable public procurement (SPP), which integrates environmental and social criteria into procurement processes, encouraging producers to adopt sustainable business models. Through public procurement, the state can become an example of responsible consumption, supporting the transition to a green economy.

The aim of this article is to analyze how ecological marketing can be developed through SPP in the Republic of Moldova, highlighting both the challenges and opportunities in this field.

Basic content

The main direction of actions of the Environmental Strategy of the Republic of Moldova for the period 2024–2030, are the sustainable management of natural resources, which includes the implementation of effective policies for the protection of air, water, soil, biodiversity and natural ecosystems. At the same time a crucial direction to be mentioned is the integrated management of waste and chemicals or the development of the infrastructure and services necessary to reduce the quantities of deposited waste and increase the recycling rate. Integrated environmental monitoring by ensuring an efficient system for monitoring the quality of environmental factors and pollutant emissions is another direction of action. Ecological marketing in another priority direction of actions

and namely education and awareness by promoting ecological education and public awareness on the importance of environmental protection. (Strategy 2024-2030)

The Environmental Strategy 2024–2030 is aligned with the global 2030 Agenda for Sustainable Development and the European Union's environmental objectives, representing an important step towards sustainable development and a green economy in the Republic of Moldova.

The transition to a green and circular economy has turned ecological marketing into a necessity. The goal of ecological marketing is to promote, distribute, and provide services that can be consumed without harming the environment. It emphasizes efficiency, energy, renewable resources, pollution reduction, and social responsibility. Ecological marketing involves adapting the four traditional elements of the marketing mix—product, price, placement, and promotion—to align with environmental principles.

Table 1. Ecological Marketing Mix

No.	Name	Characteristics
1.	Ecological Product	Natural, recyclable raw materials, elimination of animal testing, eco-friendly technologies and packaging
2,	Ecological Price	Based on demand and investments in ecological practices
3.	Ecological Placement	Reduction of environmental pollution elements and use of sustainable distribution channels
4.	Ecological Promotion	Avoidance of misleading "greenwashing" practices

Source: compiled by the authors based on (Arrowsmith, S. 2010; Gosavi, AB, 2013.).

From the perspective of ecological marketing, public procurement influences the quality of products and services and is essential for the adoption of sustainable technologies and materials. Through a strategic reorientation toward objectives grounded in supporting the development of a green economy, the state can transform public procurement into a driver of sustainable development. Encouraging economic agents to adopt sustainable practices will promote the supply of ecological products, innovation, and competitiveness. This approach reduces environmental impact, increases the efficiency of public resource use, and supports a modern and responsible economic framework. Ecological marketing development in the Republic of Moldova is still in its early stages, but it can be expedited by using a key tool like sustainable public procurement.

International academic literature states that public procurement is not just a simple administrative tool, but a complex strategic mechanism, with significant implications for the economy, society and the environment. Public procurement is an essential element of the functioning of the state, through which public authorities acquire goods, services or works necessary to carry out public functions. International academic literature asserts that public procurement is not merely a simple administrative tool, but rather a complex strategic mechanism with significant implications for the economy, society, and the environment. Public procurement is a key element in the functioning of the state, through which public authorities acquire goods, services, or works necessary to fulfill public functions.

Transparency International Moldova highlights the normative dimension of the public procurement process, emphasizing—alongside transparency, efficiency, and fairness—the social and ecological roles of procurement. In this expanded view, procurement becomes a strategic instrument for promoting innovation and sustainable development (EPI, 2023–2024). According to Piga and Tatrai, an appropriate legislative framework is essential for steering procurement processes toward the public interest and for preventing corruption (Gustavo, 2020).

The author Khi V. Thai, a recognized expert in the field of public procurement management, emphasizes in his works the importance of the legal framework and the principles of transparency, efficiency, and fairness that govern this process. In his view, these principles—transparency, efficiency, and fairness—have become fundamental in the governance of public procurement under current conditions.

An important aspect of the sustainability of public procurement is that it goes beyond the logic of the lowest price, taking into account life-cycle costs, environmental impact, and social benefits. In this way, the state becomes a strategic actor in the transition to a green economy, influencing the demand for energy-efficient, recyclable, and ethical products (Eurostat, 2024). Through this mechanism, public authorities not only stimulate sustainable markets but also shape responsible consumption and usage behaviors in society, strengthening the state's position as a central actor in promoting a sustainable economy.

National report based on the OECD set of ecological growth indicators Moldova ranks lowest among European countries in terms of investment in environmental protection. Both the government and businesses have spent too little on these purposes compared to most European countries. In recent years, Moldova has allocated only 0.5% of GDP to environmental protection, while the EU average is 1.9%. There are multiple causes for low investment, generally related to financial constraints and the state of the Moldovan economy. Environmental economic instruments (e.g. environmental taxes and permits) are not able to improve the situation. Environmental protection is often sacrificed in favor of other political or economic priorities.

National Ecological Fund is a public financial instrument, managed by the Ministry of Environment and constitutes an important source of support for sustainable development and environmental protection. The Fund was created in accordance with the Law on Environmental Protection No. 1515-XII of June 16, 1993 and operates on the basis of a regulation approved by the Government, which establishes the manner of collection, administration and use of financial resources. By supporting local and regional projects, the Fund contributes to reducing environmental risks, increasing the quality of life and the transition to a green economy

After 2017, funding through the National Ecological Fund was reorganized, allocating funds from the state budget. However, only about 20% of the resources were directed towards wastewater collection and treatment, with the rest being used for other projects, such as the construction and management of water supply systems.

Sustainable public procurement has the potential to transform markets, through a model effect and by creating high standards of environmental performance.

The place of sustainable procurement in the logistics chain can be analyzed in the following diagram:

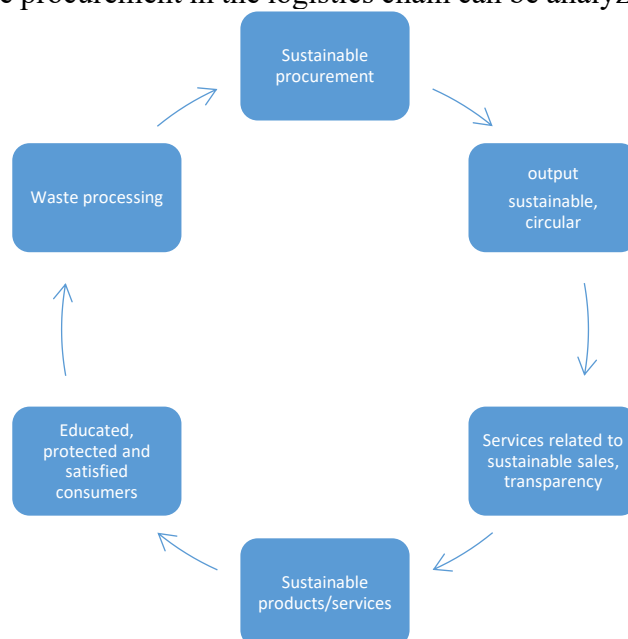


Figure 1. The logistics chain from a sustainable economy perspective

Source: developed by the authors

The development of ecologic marketing through sustainable procurement faces a series of challenges such as:

- lack of information about organic production systems and ecological education among consumers;
- arguing for higher prices for organic products;
- difficulties in assessing the environmental impact of ecological products and services;
- lack of coherent regulations or political will in certain regions.

To overcome these obstacles, an integrated approach is needed, based on collaboration between the public, private and civil society sectors through marketing tools that would inform and educate society. Investments in the field of environmental protection range from waste management infrastructure, wastewater treatment, air pollution reduction and biodiversity conservation. The significant difference between the share of public procurement in GDP in the EU and in the Republic of Moldova highlights opportunities for Moldova to strengthen the role of the state in the economy. By increasing the share of public procurement and directing it towards strategic objectives, such as sustainable development and ecological transition, Moldova can stimulate ecologic economic sectors, promote innovation and competitiveness, strengthen infrastructure and public services, improve transparency and efficiency.

In the European Union, public procurement represents on average between 13% and 16% of GDP, varying from one Member State to another. According to Eurostat and European Commission data, in 2023, the average share of public procurement in EU GDP was around 14%, which is equivalent to over 2,000 billion euros allocated annually through public procurement procedures. Countries such as Sweden, the Netherlands and France have higher shares, while others, such as Romania or Bulgaria, have lower but increasing levels. Public procurement in the EU is regulated by Directives 2014/24/EU and 2014/25/EU, which promote transparency, fair competition, sustainability and innovation (Eurostat, 2024).

Table 2. Comparative analysis and implications for sustainable development

No. d/o	Indicator	European union	Republic of Moldova
1.	Purchases/GDP share	~14%	~11%
2.	Legislative framework	EU directives + national regulations	Law 131/2015 + ANSC regulations
3.	Recent trends	Digitalization, sustainability, innovation	E-transparency, adjustment to European standards
4.	challenge	Regulatory complexity, SME access	Administrative capacity, transparency, corruption

Source: Transparency International Moldova (2023). Monitoring public procurement: good practices and corruption risks. Available at: <https://www.transparency.md>

In the Republic of Moldova, the share of public procurement in GDP is, on average, about 10–12%, depending on the budget year and the volume of public investments. According to data from in recent years (2022–2023), the value of public procurement has varied between 20 and 25 billion lei annually, which represents about 11% of GDP. This share reflects a significant potential to direct funds to sustainable projects, but there are challenges related to efficiency, transparency and institutional capacity. (Annual report, 2023)

Investments in environmental protection play an essential role in ensuring a sustainable balance between economic development and the conservation of natural resources. The SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis provides a strategic perspective on the advantages and limitations of these investments, as well as on the associated opportunities and risks in the national and international context.

One of the most significant **strengths** of environmental investment is international support. The Republic of Moldova benefits from technical and financial assistance from the European Union, the World Bank, UNDP, EBRD and other international financial institutions, which support priority environmental projects. This support contributes to the development of institutional capacities and the transfer of good practices.

Also, the international commitments undertaken by the Republic of Moldova, such as the Association Agreement with the EU, the Paris Agreement on Climate Change and the 2030 Agenda for Sustainable Development, represent a clear framework for directing environmental policies and attracting green investments. These commitments stimulate legislative reforms and increased accountability at the government level.

However, investments in environmental protection face numerous challenges. One of the most pressing is insufficient financing. Public funds allocated to environmental protection remain modest compared to real needs, and private investments are limited by the lack of incentives and an attractive framework.

Furthermore, the weak institutional framework affects the efficiency of project implementation. Responsible institutions are often underfunded, face a lack of qualified staff and fragmented skills. This in turn leads to an inefficient distribution of funds, where resources are not directed to the most urgent or sustainable initiatives.

In the medium and long term, the Republic of Moldova has multiple opportunities to capitalize on in the field of environmental protection. The transition to a green economy, promoted at European and international level, opens new directions for investment in renewable energy, energy efficiency, recycling, organic agriculture and sustainable transport. Adherence to EU standards provides access to pre-accession funds and international ecological markets.

Table 3. SWOT analysis of investments in environmental protection

Strengths	Weaknesses
<ol style="list-style-type: none"> 1. International support 2. International commitments: 	<ol style="list-style-type: none"> 1. Insufficient funding 2. Fragile institutional framework 3. Inefficient distribution of funds
timely	risks
<ol style="list-style-type: none"> 1. Transition to a green economy 2. Digitalization and modernization of infrastructure 	<ol style="list-style-type: none"> 1. Climate change 2. Dependence on external financing 3. Prioritizing other sectors

Source: developed by the authors based on (Monitoring, 2023)

At the same time, digitalization and modernization of infrastructure can contribute to more efficient environmental quality monitoring, waste management, automation of ecological processes and increased transparency in the use of public resources. Technological innovation thus becomes a catalyst for green investments.

Investments in environmental protection, however, are exposed to major risks. First, climate change generates unpredictable costs and requires rapid interventions in disaster protection infrastructure, which can redirect resources towards reactive measures, at the expense of preventive ones.

Another significant risk is excessive reliance on external financing, which can be unstable in the current geopolitical context and contingent on domestic reforms. In the absence of solid domestic sources, ecological projects may become vulnerable to political or budgetary changes.

Last but not least, prioritizing other sectors, such as road infrastructure, defense or health, in the context of multiple crises (pandemics, war in the region, inflation), may reduce interest and support for environmental investments.

Conclusions

In the context of the Republic of Moldova's pre-accession to the EU, environmental protection acquires the status of a strategic priority, both by virtue of the international commitments assumed in the field of sustainable development, and in response to the increasing pressures on natural resources. In the context of integrating the principles of the green economy, investments in environmental protection cover essential areas such as waste management infrastructure, wastewater treatment, air pollution reduction and biodiversity conservation.

Despite the progress made, the Republic of Moldova faces significant gaps compared to the European Union average in terms of the share of public procurement in gross domestic product (GDP). This difference reflects not only a lower investment capacity of the state, but also an underexploited potential in terms of the strategic use of public procurement as an economic and environmental policy instrument.

By strategically reorienting public procurement toward the objectives of sustainable development, the Republic of Moldova can transform this tool into a new concept for economic, social, and environmental change. From the perspective of ecological marketing, the quality of products intended to meet consumer needs is closely linked to the acquisition of technologies, raw materials, and sustainable resources used in the production and service delivery processes.

Harnessing the state's economic potential in this regard would stimulate a sustainable economy and support the development of ecological marketing not only at the national level but also globally. Promoting sustainable practices among enterprises, in response to the requirements of sustainable procurement, encourages innovation, product differentiation on the market, and the development of competitiveness. Thus, ecological marketing becomes a strategic vector for enhancing the visibility, credibility, and environmental responsibility of economic actors, contributing to the efficient use of public resources, reducing environmental impact, and increasing institutional transparency.

Finally, the orientation of public policies and economic strategies towards sustainability and ecological marketing can become a basic pillar for increasing the economic competitiveness of economic agents and for affirming the Republic of Moldova as a responsible and modern state, anchored in the values of the green economy.

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EVOLUTION OF INTEGRATED MARKETING COMMUNICATION FROM TELECOMMUNICATIONS MODELS TO AI FRENZY

DOI: <https://doi.org/10.53486/dri2025.30>
UDC: [339.138:654.1]:004.8

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Abstract: *The general objective pursued in the doctoral thesis "Management of Marketing Communication in the Context of the Development of the Communication Industry and Post-pandemic Challenges" is to establish the impact that marketing communication can have on sustainable economic development at the national level and to validate a communication-based marketing model that would facilitate this process.*

To this end, we specifically aim to analyze the communication industry: its structure, constituent elements, dimensions, and trends; to develop through exploratory research, an Integrated Marketing Communication (IMC) Model; to validate the IMC Model among representatives of the business environment and the academic community; and to develop, based on the obtained results, some practical recommendations and reference principles for the national economy decision-makers, for representatives of the academic field, and for marketing professionals within the business environment.

The key findings are a Matrix of Integrated Marketing Communication Channels, Carriers & Vehicles which maps all current marketing communication tools and provides a classification of IMC vehicles and media; and a IMC communication model based on a flow of seven distinct processes which incorporate all nowadays practices and activities related to IMC.

Key words: *integrated marketing communication, marketing model, marketing strategy, promotional mix*

JEL: M31

1. Introduction

Over the past three decades, among the key drivers of the Moldovan national economic development, a significant impulse has been played by the implementation and development of the marketing concept within local companies.

Many innovations and new approaches have been introduced based on international experience. The openness of many enterprises and organizations to a marketing-oriented approach is reflected in how they promote themselves, especially in the manner and content of the messages they communicate publicly. However, the large majority does not show a genuine concern for customer needs and their satisfaction still remains a current challenge for many of those mentioned.

The pandemic that marked the beginning of the 2020s imposed new game rules, the companies now seek new approaches within existing business models and new public communication strategies, in order to adapt, survive, and potentially grow.

We believe that the incorrect and superficial implementation of marketing – or often the complete absence of it in local business models – and in particular the erroneous or faulty management of *marketing communication*, lead to stagnation or failure for many enterprises and, consequently, for the national economy in general.

Therefore, in the undertaken exploratory research, we aim to study this phenomenon and, ultimately, develop a marketing model that would be useful both for academic study and research purposes and for specialists within the administrative sector, for continuous training needs within the business environment, and, last but not least, for strategic and tactical planning.

2. Evolution and conceptualization of Integrated Marketing Communication

What is Integrated Marketing Communication (IMC)? Although it may seem like a simple question at first glance, the answer requires a few introductory clarifications.

To begin with, there must be an agreement on a common definition of the term "Marketing," a definition that may seem obvious in a professional environment. In reality, the semantic inflation of this term has penetrated even the academic sphere. Today, we often hear "marketing" used to mean "advertising," "promotion," "sales," or "public relations." While these elements are certainly related to marketing, they are either subcategories or related domains. For the purpose of this paper, we will define Marketing as the *strategic decision-making approach within a company, oriented towards consumer interests*.

Secondly, we must clarify what we mean when we speak about *marketing communication*. The economy is a vast field of human activity that includes specialized areas such as finance and accounting, production, distribution, sales, management, human resources, raw materials, banking, energy resources, logistics and transport, and international trade. However, all of these are ultimately shaped by the fundamental phenomenon of economics: *the transaction* – the specific moment when supply and demand meet.

A transaction is essentially the communication of the offer's aspects: benefits, parameters, price, location, etc., along with the negotiation, acceptance of terms, and conclusion of the exchange. All of this constitutes *marketing communication*.

Finally, to clarify the last element of the term Integrated Marketing Communication – "Integrated", we return to the classic model of explaining Marketing through the Marketing Mix: Product, Price, Place, Promotion (Kotler & Armstrong, 2018). The last element, Promotion, encompasses Marketing Communication. Promotion itself has its own mix: Personal Selling, Sales Promotion, Direct Response, Advertising, Publicity, and Corporate Image.

What turns Marketing Communication into *Integrated* Marketing Communication is the combined (integrated) use of all six promotional techniques (Kotler & Armstrong, 2018).

With these clarifications in mind, we are now faced with the challenge of explaining the IMC processes: what elements are involved, what actions are taken, and who are the actors in these actions and processes.

During the evolution of the Marketing concept, there appeared the need to clarify, as well, the concept of Integrated Marketing Communication. A diagram (Fig. 1) was initially borrowed from a new branch of mathematics – Mathematical Communication Theory (Shannon, 1948), to serve as a conceptual model for communication. This diagram originally provided some general answers, such as the basic elements: Source, Message, Channel, Receiver, etc. However, over time, the field of IMC has become so complex and sophisticated that this model now requires substantial updating.

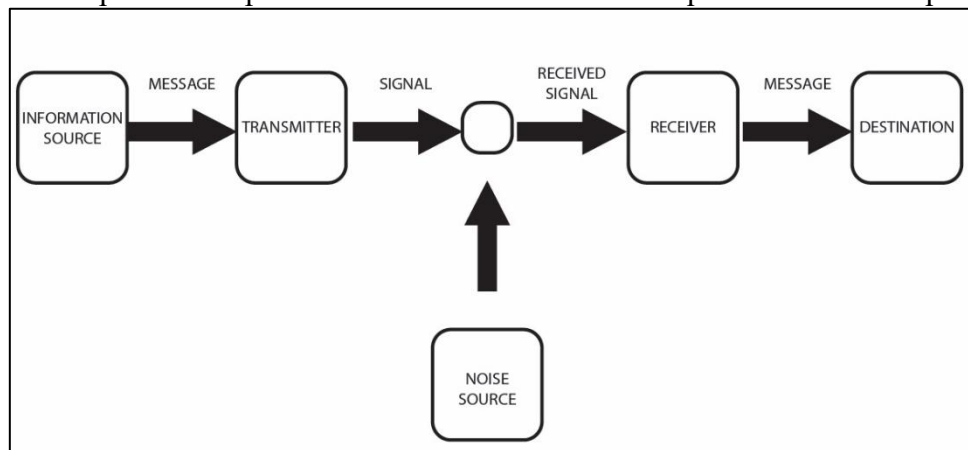


Figure 1. Schematic diagram of a general communication system

Source: Shannon

The evolution of IMC is tied to the broader evolution of marketing itself, which was most clearly explained by Robert J. Keith in 1960 through the periodization of marketing evolution: the Production Oriented Era, the Sales Oriented Era, and the Marketing Oriented Era. Keith formulated this periodization in 1960, therefore the final era he identified ends in 1960. Later works proposed further developments of this framework: Kurtz in *Contemporary Marketing*, Dibb & Simkin in *Marketing Briefs: A Revision and Study Guide*, Lancaster & Reynolds in *Management of Marketing*, Blythe & Martin in *Essentials of Marketing*, Drummond & Ensor in *Introduction to Marketing Concepts*.

These later authors adopted a different principle than Keith's. His original periodization reflected phases of technological advancement, where certain technical tools enabled businesses to evolve and formulate new objectives. Other authors concentrated on the nature of interaction between the company and the consumer and they mainly proposed a Relationship Era starting in the 80s or the 90s.

However starting with the 1980s significant technological advances occurred in a field which is critical to IMC and marketing in general – the *Information Technology and Computers*. This technological breakthrough offered new tools for communication, which came in several waves.

Following is a short review of the most important developments of this new age:

Table 2. Key technological advancements with impact on IMC

First wave:			
1981	Personal Computer	<i>IBM Personal Computer</i>	(Hormby, 2006)
1982	Fonts & Graphic Editors	Photoshop, Illustrator, InDesign, Acrobat	(Adobe, 2025)
1989	Text editor	MS Office: Word, Excel, PowerPoint	(Microsoft, 2025)
Second wave:			
1991	Internet		(Couldry, 2012)
1994	Web Browser	Netscape Navigator	(Matthew, 2019)
1997	E-mail	Yahoo! Mail	(Yahoo, 1997)
1997	Computer Music	Winamp, MP3 format	(Bronson, 1998)
1997	E-commerce	eBay, Amazon	(The Telegraph, 2011) (Shen, 2017)
1998	Electronic Payments	PayPal	(Forrest, 2014)
Third wave:			
2000	Internet Advertising	Google AdWords	(Google, 2000)
2003	Audiochat / Videochat	Skype	(Tänavsuu, 2018)
2005	Computer Videos	YouTube	(Phrasee, 2016)
2006	Social Networks	Facebook	(Phillips, 2007)
Fourth wave: <i>Generative AI</i>			
2018	Video Deepfake	FakeApp, Faceswap	(Robertson, 2018)
2020	Audio Deepfake	15.ai	(Weitzman, 2025)
2021	Graphic Generative AI	DALL-E	(Johnson, 2021)
2022	Text Generative	AI Chat GPT	(Open AI, 2025)

Source: author

Due to its structure, in our view, this period should be regarded as a broader period – an *age*, with each wave determining a new era in marketing evolution.

Hereafter we propose the following updated periodization of Marketing evolution:

Table 2. Updated Periodization of Marketing Evolution

Production Era	prior to 1920s
Sales Era	1920 - 1950
Marketing Era	1950 – 1980
Marketing Communication Age	1980 – ongoing
Digitalization Era	1980 - 1995
Internet Era	1995 - 2005
Social Networks Era	2005 – 2015
Artificial Generation Era	2015 – ongoing

Source: author

This new periodization is necessary in order to allow the integration, within the IMC model, of all elements, processes, actions, and stakeholders involved in the field as it exists today.

Additionally, recent developments in the field of information technology – especially in the area of Artificial Intelligence research – have led to an exponential increase in tools that are transforming the IMC environment. We now have generative AI tools for virtually every creative domain: *Jasper* for AI-powered marketing content, *Anyword* for writing support, *Shortwave* for email writing and management, *Notion AI* for creating a second brain, *Mem* for organized notes, *Runway* for freeform and creative videos, *Wondershare Filmora* for polishing video, *Midjourney* for the best AI image results, *DALL•E 3* for easy-to-use AI image generation, *Adobe Photoshop* for AI-generated image enhancement, *ElevenLabs* for a comprehensive AI voice library, *Suno* for easy-to-use AI music generation, *Beautiful.ai* for automated presentation design elements, *Pitch* for sales teams, *Wix* for intuitive website-building, *Framer* for AI-centric website-building, *Microsoft Power Apps* for in-depth app development, *Pico* for fully automated app-building, *ChatGPT* for versatility, *Claude* for great writing skills, *Zapier Chatbots* for custom-made chatbots (Ramki, 2024).

These tools allow for an increased output, broader diversity of solutions, and speed in areas such as copywriting, graphic design, and market research, establishing a new paradigm.

The frenzy surrounding this breakthrough not only disrupts the status quo but also generates entirely new dimensions. ChatGPT alone has evolved tremendously over recent months, reaching the 5th place (and rising) among the most visited websites globally, surpassed only by Google, YouTube, Facebook, and Instagram (Similarweb, 2025).

3. Conclusions.

Under these circumstances, relying solely on Claude Shannon's diagram (Fig. 1) is no longer sufficient.

Shannon's theory is fundamental to telecommunications – he laid the groundwork for what we now call the Internet and the digital communication itself. But as the title of his work explicitly states ("*A Mathematical Theory of Communication*") it is a *mathematical theory* suitable for electronic or digital communication between devices but not adequate to explain an economic phenomenon involving an anthropic factor.

The key difference lies in the fact that, unlike communication between two machines, human (anthropic) communication (Fig. 2) is aimed at transmitting an Idea that takes the form of a Message.

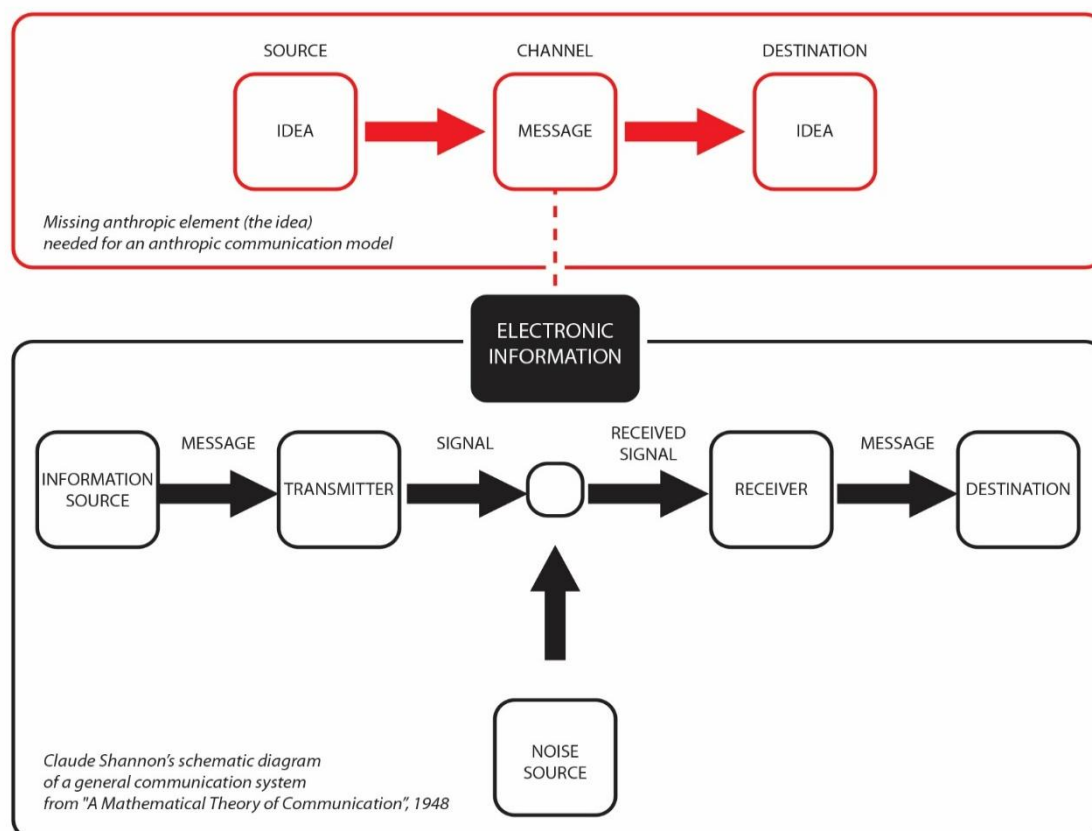


Figure 2. Missing anthropic element in the “Schematic diagram of a general communication system”

Source: Upper frame – author, lower frame – Shannon

The literature review provided us with the understanding that the largest number of conceptual models of IMC are derivatives of Shannon’s diagram with some adaptation depending on each author’s perspective on marketing evolution in general and IMC evolution in particular. The general trait is closing the loop of communication with a new element response/feedback/action that originates at destination and aims for the source. Such models are presented or reviewed by Kotler & Armstrong G in *Principles of Marketing*, Kurtz in *Contemporary Marketing*, Blythe & Martin in *Essentials of Marketing*, Drummond & Ensor in *Introduction to Marketing Concepts*, Kotler, Kartajaya & Setiawan in *Marketing 4.0 Moving from Traditional to Digital*, Kotler & Lane Keller in *Marketing Management*, Oancea in *Evolution of the Main Models of IMC Who Have the Role to Influence Consumer Buying Behavior*, Eiamkanchanalai in *Word of Mouth Marketing A Model of Personal Interaction in IMC*.

A different approach is presented by Varey in *Marketing Communication, Principles and Practice*, where he builds upon a spectrum of general communication models, that brings deep insight in understanding how to formulate the idea but does not offer sufficient ground in detailing how technically to channel it towards the destination.

A number of authors followed the path of Promotion Mix (as part of Marketing Mix) and revolve around it and media channels or by adjusting it to consumer behavior models, customer path etc. However these models do not include message development and adaptation to media vehicles. This approach is presented by Pickton in *What Is IMC Integrating ‘integrated marketing communications’ 3 Models, 4Cs, 4Es, 4Ss, and a Profile*, Kitchen & Burgmann in *Integrated Marketing Communication*, Oancea in *The Model of IMC Who has the Role to Influence Consumer Behaviour*, OpenLearn Open University in *Social marketing 5.2 An integrated marketing communications framework*.

Finally a new pursue is presented by Dumitrache in *DOCTORES model*, a PhD research, however

this research is ongoing and from the summary it details an organizational approach to IMC.

The route we propose is more technical and technological, combining Promotional Mix with message construction, communication vehicles, carriers and channels and deconstruction by the source. In our exploratory research project, "*Management of Marketing Communication in the Context of the Development of the Communication Industry and Post-pandemic Challenges*", we have conducted a detailed mapping of all communication tools within IMC. We structured them and identified the elements, interdependencies, processes, and activities that make up the overall IMC flow.

This structuring enabled a general synthesis in the form of a Matrix of Channels, Carriers, and Vehicles, which provided clarity on how IMC vehicles are compartmentalized and how terms such as "channel" and "media" are more accurately defined.

We found that at this stage there are: 62 communication vehicles, 41 communication carriers, 22 communication channels, 9 communication media types, and 3 technological groups. In particular, a clearer picture of the *communication media* categories emerged, including: Street Media, POS (Point-of-Sale) Media, Entertainment Media, Direct Delivery, Print (text) Media, Telephone, News Media, Broadcasting Media, and Digital Media.

Returning to the anthropic factor and the transmission of ideas, we recognize that an idea must travel from the Source to the Destination, but ideas cannot be transmitted directly from mind to mind—telepathy is not an available option. The fundamental tool available to us humans is language, not only its vocal, sound aspects but more important – the mental dimension of language: the concept of language itself, thoughts, and ideas.

Our ideas come in two forms: mental representations (images of objects), and abstract concepts (e.g., good, evil, success, freedom, or emotions). We understand these concepts, but to share and communicate them, we need words and language. Therefore, our ideas must take on a verbal form. At an initial stage, this form is the Message – what we want to say. Further the process entangles and is more and more sophisticated as it continues. We tried to encapsulate all its aspects and the overall result of this research is a human-centered model of anthropic (human) Integrated Marketing Communication, hence the name: The Anthropic Integrated Marketing Communication Model – (AIMCOMM).

The model (Fig. 3) is structured in three large parts: the Source, the Channel and the Destination with an Idea being channeled from the Source to the Destination.

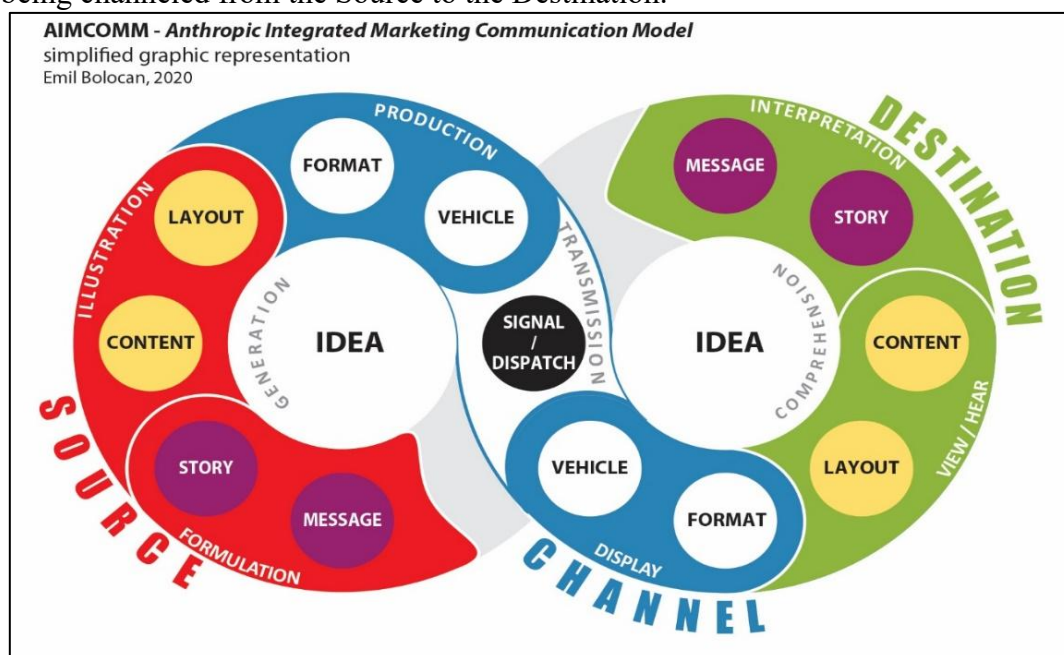


Figure 3. Simplified graphic representation of AIMCOMM

Source: author

This flow is sequenced in seven stages: *Formulation, Illustration, Production, Transmission, Display, View/Hear* and *Interpretation*. Each stage for the exception of the Transmission consists of two actions. The actions are mirrored from the Source to the Destination since they follow a process of construction and deconstruction. The construction is Message → Story → Content → Format → Vehicle, then Transmission (either as signal or in a physical shape) and then deconstructed in reverse order.

As seen, the message alone is not enough. It is sufficient for a mathematical system (as it is present in Shannon's diagram) but in IMC there is the need for human communication elements. It often needs to be explained through a relatable situation, familiar to the consumer we are communicating with – something they have personally experienced. This leads us to the next stage in building communication: the Story. The story we tell eventually ends with a conclusion or a moral, which is our actual message. But even when we construct a story, it is often not polished. It must be refined and edited so the audience can easily understand it – thus the story transforms into Content. Content (particularly web-content) is a form adapted to the way we transmit the idea further – whether in writing or spoken. And even then, the form the idea has taken may still not be efficient enough. So the next step is to illustrate the content, giving rise to the Layout. It may seem like the process is now complete, but this is where the specific marketing communication technologies begin. We must now adapt the Layout to the specific Communication Vehicles that will travel through the communication channel to reach the Destination. Thus, the Layout is formatted in the way required by the provider so it can be placed on the Communication Vehicle – this gives rise to the Format. The Format is then placed on the appropriate Vehicle, which travels through the Communication Channel. Usually, the Format and the Vehicle are essential elements for communication via telecommunication systems. After the Vehicle has traveled through the Channel, the reverse process of "deconstructing" the forms of the original Idea begins: the Vehicle and Format are displayed so the Layout and Content could be seen or read and this continues with interpretation of the Story and the Message, which ideally leads to the Source grasping the original Idea and eventually acquiring the product or service. The entire process of the economic transaction is therefore complete through Incorporated Marketing Communication.

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COMPARATIVE ANALYSIS OF HUMAN RESOURCES MANAGEMENT IN COMMERCIAL BANKS FOCUSED ON SUSTAINABLE PERFORMANCE

DOI: <https://doi.org/10.53486/dri2025.31>

UDC: [005.95:336.71]:005.52

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Abstract: *This article investigates the evolving strategic role of Human Resource Management (HRM) in commercial banks, emphasizing its significance in driving sustainable performance across economic, social, and environmental dimensions. It highlights the imperative shift in HRM from administrative support towards becoming a strategic partner essential for integrating sustainability into banking operations. By utilizing a comparative analysis approach, the research examines how distinct HRM practices contribute differentially to sustainability outcomes in banks across diverse geographic contexts. It underscores the importance of strategic alignment, employee engagement, ethical leadership, and sustainability-focused talent management as critical elements enabling banks to navigate contemporary challenges and achieve enduring sustainable success.*

Keywords: *Human Resource Management (HRM), Sustainable Performance, Commercial Banks, Comparative Analysis, ESG (Environmental, Social, Governance), Strategic Alignment*

Classification JEL: *M12, G21, M54*

1. Introduction

The contemporary commercial banking sector finds itself at a confluence of transformative forces. Heightened stakeholder expectations regarding social and environmental responsibility, the relentless pace of technological advancements, particularly digitalization, and an increasingly complex regulatory environment are reshaping the operational and strategic landscapes of financial institutions. This dynamic environment compels a fundamental re-evaluation of how banks define and pursue value, necessitating a strategic pivot beyond conventional financial metrics towards a more holistic and sustainable operational paradigm.

Consequently, sustainable performance, which holistically encompasses economic viability, social equity, and environmental integrity – often conceptualized through frameworks like the Triple Bottom Line (TBL) (Taticchi & Demartini, 2020) or Environmental, Social, and Governance (ESG) criteria – has transitioned from a peripheral concern to a core strategic imperative for the long-term viability, resilience, and competitiveness of commercial banks. This shift is not merely about corporate social responsibility (CSR) as an add-on; it is about embedding sustainability into the very fabric of banking operations and strategy (Aguinis & Glavas, 2012).

In this evolving landscape, Human Resource Management (HRM) is undergoing a profound transformation. Traditionally viewed as an administrative or operational support function, HRM is increasingly recognized as a strategic partner, indispensable for embedding sustainability within the organizational DNA and operational frameworks of commercial banks. The capacity of a bank to achieve its sustainable performance goals is intrinsically linked to its ability to cultivate the requisite human capital, foster a supportive organizational culture, and encourage behaviors aligned with sustainability principles. HRM, therefore, stands as a critical lever in this transformation.

While the general linkage between HRM practices and overall firm performance has been extensively documented (Huselid, 1995; Khalumba, 2009), and the burgeoning importance of sustainability in the banking sector is widely acknowledged, a more granular and comparative understanding of how specific HRM configurations within commercial banks differentially contribute to holistic sustainable performance remains an area ripe for scholarly inquiry. Much of the extant literature tends to examine

individual HRM practices in isolation or focus on specific, often singular, sustainability outcomes. For instance, research on the nexus between executive compensation and sustainability in banking is noted as relatively scarce. A comprehensive, comparative synthesis that considers the unique contextual factors of the commercial banking sector is less developed. Banks may adopt sustainable HRM practices based on varying motivations, ranging from reactive compliance with external pressures to a proactive pursuit of strategic value and ethical commitments. A bank driven predominantly by institutional pressures, such as regulatory mandates or the desire to mimic competitors, might adopt sustainable HRM practices more superficially. This could manifest as a focus on easily observable metrics or symbolic gestures designed to enhance legitimacy without deep integration into core processes. In contrast, a bank motivated by a genuine belief in the business case for sustainability or strong ethical imperatives is more likely to embed sustainability principles deeply within its HRM philosophy and practices, leading to more authentic and robust contributions to sustainable performance. This distinction in underlying motivation—whether reactive or proactive—is likely to significantly shape the nature, scope, and ultimate impact of sustainable HRM initiatives. Furthermore, the transition towards sustainable banking engenders a distinct "sustainability talent imperative". This goes beyond general talent management to encompass the specific need to attract, develop, and retain individuals possessing a sophisticated blend of financial expertise, proficiency in digital and data analytic technologies relevant to ESG factors, a robust understanding of sustainability principles, and a strong ethical compass. The degree to which banks tailor their talent management systems to address this evolving and specialized talent requirement will be a significant determinant of their capacity to achieve genuine and lasting sustainable performance.

This research article posits that a strategically aligned, contextually sensitive, and integrated system of HRM practices is fundamental for commercial banks to achieve comprehensive and enduring sustainable performance. Through a comparative analysis of HRM approaches and strategies, as documented in the extant academic literature, this paper aims to elucidate the differential impacts of these practices on various dimensions of sustainability. It seeks to move beyond a piecemeal examination of individual practices to propose a more integrative understanding of how HRM can serve as a catalyst for sustainable value creation in the banking sector.

The subsequent sections of this article are structured to systematically build this argument. Section II will explore the evolving strategic role of HRM in fostering bank sustainability. Section III will present a comparative analysis of specific HRM practices and their contribution to sustainable performance.

2. The Evolving Strategic Role of Human Resource Management in Fostering Bank Sustainability

Human Resource Management (HRM) in the commercial banking sector, as in many other industries, has undergone a significant metamorphosis. Historically often confined to administrative and operational tasks such as payroll processing, benefits administration, and ensuring basic regulatory compliance, HRM has progressively evolved into a strategic function that is integral to the formulation and achievement of overarching organizational goals (MVNU, n.d.; EBS, n.d.; ResearchGate Author5, Year TBD19). This strategic repositioning of HRM is particularly pronounced and critically important in the context of fostering sustainability within banks.

The strategic importance of HRM stems from its potential to serve as a source of sustainable competitive advantage (Barney, 1986). In an industry where products and services can often be replicated, the quality, commitment, and capabilities of an organization's human capital, along with the effectiveness of its HRM systems, can provide a distinct and difficult-to-imitate edge. By attracting, developing, motivating, and retaining high-caliber talent, fostering a positive and inclusive organizational culture, and enhancing employee engagement, HRM directly contributes to a bank's long-term success and resilience (Huselid, 1995; Khalumba, 2009).

HRM's contribution to bank sustainability is multifaceted, directly impacting all pillars of the Triple

Bottom Line (TBL) (Taticchi & Demartini, 2020) and ESG criteria.

- **Economic/Financial Performance:** Strategic HRM practices contribute to enhanced financial outcomes through several mechanisms. Effective talent management ensures that the bank has the right people with the right skills to drive innovation, improve productivity, and manage costs efficiently. Engaged and well-trained employees are typically more productive and deliver higher quality service, leading to improved customer satisfaction and loyalty, which in turn supports revenue growth and profitability (Huselid, 1995; Khalumba, 2009).
- **Social Performance:** HRM is at the forefront of addressing the "people" aspect of sustainability. This includes designing and implementing programs that foster employee well-being (physical, mental, and financial), ensuring fair labor practices, championing diversity, equity, and inclusion (DEIB) initiatives, promoting ethical conduct throughout the organization, managing employee relations constructively (Khalumba, 2009), and facilitating employee engagement in community development and corporate social responsibility (CSR) activities (Babu, 2016; Aguinis & Glavas, 2012). These efforts not only enhance the quality of work-life for employees but also strengthen the bank's social license to operate and its reputation as a responsible corporate citizen (Babu, 2016).
- **Environmental Performance:** Through the adoption of Green HRM practices, HR departments can play a significant role in promoting environmentally friendly behaviors and attitudes among employees. This includes incorporating environmental criteria into recruitment and selection, providing training on environmental sustainability, designing performance management systems that recognize and reward green contributions, and fostering a culture of resource conservation and support for the bank's broader environmental initiatives.
- **Governance Performance:** HRM contributes to strong corporate governance by shaping and reinforcing ethical leadership, ensuring compliance with labor laws and ethical codes of conduct, fostering a culture of transparency and accountability, and supporting the development of diverse and effective leadership teams.

The explicit integration of sustainability principles into all facets of HRM gives rise to the concept of Sustainable HRM (SHRM). SHRM is defined as a strategic approach that embeds sustainability into the core of HRM policies and practices, with the overarching aim of ensuring the long-term well-being and flourishing of employees, the organization itself, the broader society, and the natural environment. A key tenet of SHRM is its focus on regenerating and developing human and social resources, rather than merely consuming them, thereby ensuring their availability and vitality for the future.

3. A Comparative Analysis of Human Resource Management Practices for Sustainable Performance in Commercial Banks

The rationale for employing a comparative analysis in the study of Human Resource Management (HRM) is well-established. Such an approach facilitates the identification of similarities, disparities, and crucial contextual factors that influence the effectiveness of HRM strategies across different settings (Grosvold, 2009). This, in turn, lays a more robust foundation for theory development (Eisenhardt & Graebner, 2007), the refinement of conceptual models, and the discernment of best practices applicable within specific sectors like commercial banking (RG Author4, RG Author5, 2024). This section undertakes a comparative analysis of various HRM practices, drawing upon findings and discussions from diverse studies and contexts presented in the available literature, to elucidate their differential contributions to sustainable performance in commercial banks.

A. Strategic Talent Acquisition and Development for Long-Term Resilience and Innovation

A core argument emerging from the literature is that for commercial banks to achieve genuine and lasting sustainability, they require a talent pool that possesses not only traditional core banking competencies but also a sophisticated understanding of sustainability principles (sustainability literacy), a strong ethical grounding, and the capacity for innovation in addressing ESG challenges (Zahra & George, 2002).

- **Comparative Dimensions in Talent Acquisition:**

- Recruitment Focus: A key point of comparison lies in the strategic intent of recruitment processes. Some banks are moving towards explicitly incorporating "green" criteria or sustainability-oriented values and competencies into their talent acquisition strategies. This involves actively seeking candidates who demonstrate an environmental consciousness and a commitment to sustainable practices. For example, Nepalese commercial banks are exploring green recruitment to foster an environmentally conscious value system. In contrast, other banks may still rely on more traditional recruitment models that prioritize technical skills and experience without a specific emphasis on sustainability attributes. The imperative to reengineer recruitment processes to align with future needs, including those driven by sustainability and digital transformation, has been highlighted in contexts such as Iranian banks. Sustainable talent acquisition also involves a commitment to recruiting diverse candidates to ensure the workforce is representative of society, aligning with social sustainability goals of inclusivity and equity.
- The "Build vs. Buy" Dilemma for Sustainability Talent: Banks often face a strategic dilemma regarding how to source specialized sustainability talent, especially given the noted scarcity of personnel proficient in areas like data analysis for ESG metrics or digital technologies relevant to sustainable finance. The choice is essentially between "buying" this talent through external recruitment or "building" it via internal development programs (Zahra & George, 2002). "Buying" talent can offer a quicker solution to fill immediate skill gaps but may come at a higher cost and potentially pose challenges related to cultural integration. "Building" talent through targeted training and development takes longer but can foster greater loyalty, ensure a better fit with the bank's unique sustainability culture, and create a more sustainable internal talent pipeline. The optimal strategy likely involves a nuanced, hybrid approach, balancing external hires for specialized roles with robust internal development programs. Factors influencing this strategic choice include the urgency of the talent need, the maturity of the external market for sustainability professionals, cost considerations, and the bank's long-term vision for embedding sustainability competencies within its workforce. Banks operating in rapidly transforming environments or those initiating significant sustainability drives might initially lean towards "buying" critical talent, while those with a more established, long-term commitment to sustainability will likely invest heavily in "building" capabilities from within.

- **Comparative Dimensions in Talent Development:**

- Development Program Emphasis: Approaches to employee development vary. Some banks may offer general skills enhancement programs, while others are implementing targeted "green training" initiatives designed to equip employees with the specific knowledge and skills required to contribute to environmental sustainability goals. Leadership development programs are also being adapted to cultivate leaders who can champion and drive the sustainability agenda within the bank (Paudel, 2020). The importance of continuous learning and development to foster adaptability and resilience in a changing banking landscape is a recurring theme. In Nepalese commercial banks, for instance, training effectiveness and managerial support for training have been identified as significant factors influencing employee engagement, which is crucial for driving sustainability initiatives.
- Retention Strategies: Beyond acquisition and development, retaining sustainability-savvy talent is paramount. Banks are employing various strategies to foster long-term commitment, including offering clear career development pathways that incorporate sustainability roles and responsibilities, promoting a healthy work-life balance (Guest, 2017), and ensuring that the bank's sustainability goals and values resonate with those of its employees (Barney, 1986).

B. Navigating Contemporary HRM Challenges in the Pursuit of Sustainable Banking

The contemporary banking landscape presents HRM professionals with a multitude of challenges, driven largely by rapid technological advancements, evolving regulatory environments, and increasing expectations for environmental and social governance. In order to successfully navigate these challenges it is required to have adaptive strategies that proactively align HR practices with company sustainability objectives.

One important challenge is the rapid speed of digital transformation. Banks all over the world are making extensive technological upgrades and automation, fundamentally reshaping job roles, skill requirements, and workplace dynamics. HR departments must manage the complexities coming up from this transformation, such as reskilling and upskilling employees to handle advanced digital tools, analytics, and cybersecurity protocols. Effective HRM strategies involve comprehensive training and development programs that combine technical knowledge with critical sustainability skills, strengthening a workforce agile enough to succeed in digital and sustainable environments.

Moreover, aligning performance management systems with long-term sustainability goals remains a complex task. Traditional performance metrics focusing on short-term financial gains often conflict with sustainability objectives, which require a longer-term perspective. To address this, forward-looking banks implement balanced performance measurement frameworks, such as the Sustainability Balanced Scorecard, which integrate financial indicators with social, environmental, and governance metrics. This alignment ensures that employee behaviors and incentives consistently support sustainable value creation.

Another key challenge is maintaining employee engagement and well-being amidst ongoing changes and increased performance pressures. Banks must foster inclusive workplace cultures, prioritize mental health and overall well-being, and implement policies promoting diversity, equity, and inclusion (DEI). Sustainable HRM initiatives emphasize flexible working arrangements, comprehensive wellness programs, and robust diversity policies, which together enhance employee satisfaction, loyalty, and productivity, directly contributing to organizational resilience and sustainable performance.

Additionally, a significant challenge specific to regions like Moldova is workforce shortage coupled with low employee productivity. Banks face difficulties in attracting and retaining qualified talent due to demographic trends and migration patterns. This shortage places additional pressure on existing staff, negatively affecting overall productivity and organizational efficiency. HR departments must therefore develop innovative talent acquisition strategies, implement targeted retention programs, and foster environments that enhance productivity through continuous employee development and motivational incentives.

Lastly, regulatory compliance continues to present an ongoing and demanding challenge. Banks operate within stringent regulatory contexts, where continuously evolving ESG-related guidelines significantly influence HR policies and practices. Effective HR teams must diligently monitor and proactively integrate these regulatory changes into their strategic frameworks, thus ensuring both compliance and organizational credibility.

4. Case Studies of HRM Excellence in Sustainable Banking

To transcend theoretical frameworks and practical applications, this chapter presents a series of compelling case studies showcasing commercial banks that have successfully integrated innovative and effective Human Resource Management (HRM) practices to significantly enhance their economic sustainability. These diverse examples, drawn from various geographical regions and banking models, illuminate the specific HRM strategies employed and the tangible positive outcomes observed in terms of financial performance, employee engagement, and overall organizational resilience. By analyzing the key success factors and extracting valuable lessons learned from these real-world implementations, this chapter aims to provide actionable insights for other banks aspiring to leverage their human capital for enhanced economic sustainability.

Case Study 1: Canara Bank - Strategic Talent Management for Long-Term Growth

Canara Bank has demonstrated a commitment to strategic talent management as a cornerstone of its long-term growth strategy (Harvard Business Publishing Education, 2016). By conducting regular workforce studies, the bank proactively identifies its future talent requirements, considering factors such as branch expansion plans, business growth projections, retirement forecasts, and demographic analysis. This forward-thinking approach enables Canara Bank to develop proactive, upfront, and efficient hiring processes. Their long-term recruitment strategy ensures a consistent pipeline of qualified candidates, reducing time-to-hire and minimizing recruitment costs. Furthermore, the bank prioritizes internal talent development, often filling newly created leadership positions, particularly in branch and retail banking, from its existing talent pool. This focus on internal mobility not only reduces recruitment expenses but also enhances employee engagement and retention by providing clear pathways for career advancement. The success of Canara Bank's strategic talent management framework highlights the tangible benefits of aligning HRM practices with long-term business objectives, contributing significantly to the bank's sustained economic growth and operational efficiency.

Case Study 2: Capital One – Human Capital Investment

Capital One has strategically leveraged its human capital through substantial investments in continuous learning and skill enhancement (Capital One, 2023). Recognizing the rapid technological shifts in the banking sector, Capital One partnered with leading educational platforms to provide employees with extensive learning resources, ranging from digital literacy to advanced data analytics and cybersecurity. Initiatives like the "Tech College" enable employees to continuously update their skills, fostering a culture of innovation and adaptability. By prioritizing human capital development, Capital One has successfully accelerated its digital transformation, improved operational efficiency, and boosted innovation, resulting in enhanced productivity and long-term financial sustainability (Capital One Annual Report, 2023).

Case Study 3: First Bank – Sustainable Employee Engagement

First Bank has emphasized sustainable employee engagement as a core aspect of its HRM strategy. Given its widespread geographic footprint, First Bank implemented the Bucketlist Rewards platform, designed to facilitate peer recognition, reinforce core values, and encourage meaningful employee connections across departments (Bucketlist Rewards, 2023). This initiative has significantly improved morale and motivation, with reported engagement rates exceeding 90%. By systematically recognizing employee contributions and fostering a cohesive organizational culture, First Bank has successfully enhanced employee productivity and retention, contributing directly to its sustainable organizational performance and long-term competitive advantage (First Bank Sustainability Report, 2023).

Case Study 4: Bank of America - Aligning Performance Management with Sustainability Objectives

While specific details on a comprehensive integration of sustainability goals into Bank of America's performance management system were not explicitly available in the provided snippets, the bank's extensive sustainability reporting and commitment to ESG initiatives suggest a strong alignment between its overall strategy and its operational practices (Bank of America, (2024). Bank of America has demonstrated a long-standing commitment to sustainability, evidenced by its detailed annual sustainability reports outlining its efforts across various environmental and social aspects. Furthermore, the bank has undertaken significant training initiatives focused on compliance and regulatory requirements, ensuring that employees understand and adhere to relevant standards. Although the direct link to performance management is not detailed, Bank of America's broader commitment to sustainability and robust training programs indicate an understanding of the importance of aligning employee actions with the bank's overarching sustainability objectives. This case highlights the broader strategic emphasis on sustainability within a large financial institution, implying an indirect alignment with performance expectations and a contribution to long-term economic and environmental sustainability.

Case Study 5: maib Bank – Strategic HRM Integration for Enhanced Sustainable Financial Performance

Maib, the largest commercial bank in Moldova, underwent a comprehensive transformation of its Human Resource Management (HRM) practices aimed at achieving sustainable performance and enhanced competitiveness. Recognizing the importance of aligning human capital strategies with long-term strategic goals, maib introduced robust initiatives centered around leadership development, succession planning, and organizational culture transformation. Leadership development programs at maib emphasized strategic thinking, ethical governance, and customer-centric behaviors. Initiatives such as leadership academies, internal mentorship programs, and executive coaching sessions were implemented to build strong, adaptive leaders capable of navigating complex financial and regulatory environments. Succession planning was formalized through clear talent pipelines, ensuring continuity and institutional memory. In addition, maib heavily invested in employee training and upskilling, particularly in digital banking capabilities, cybersecurity awareness, and compliance management. Comprehensive training curricula were established, incorporating both technical and soft skills development. The bank introduced innovative digital learning platforms accessible to all employees, significantly enhancing engagement and knowledge retention. maib also prioritized creating an inclusive and diverse organizational culture. The bank undertook a structured approach to diversity, equity, and inclusion (DEI), implementing transparent recruitment processes that encouraged diverse candidate pools and equal career advancement opportunities. Additionally, maib initiated community engagement projects aimed at financial literacy and local development, reinforcing its corporate social responsibility (CSR) commitments and enhancing employee pride and engagement. Strategically, HRM at maib integrated sustainability metrics directly into employee performance evaluations and compensation structures. Employees were incentivized to meet not only financial targets but also ESG-related goals, such as environmental initiatives, ethical practices, and community involvement. This alignment of incentives reinforced sustainable behaviors and outcomes throughout the organization. Consequently, maib's HRM transformation resulted in measurable financial improvements. Notably, maib recorded significant increase in profitability, improved return on equity (ROE), and stronger market positioning. Non-financial indicators, such as employee satisfaction surveys and external employer brand ratings, also showed consistent positive trends. These outcomes underline the effectiveness of integrated and strategic HRM practices in fostering long-term, sustainable organizational success.

The case studies presented offer several key insights into how commercial banks can effectively leverage HRM to enhance their economic sustainability. A common thread across these examples is the importance of aligning HRM strategies with the bank's overarching business objectives and long-term vision. Proactive talent management, as demonstrated by Canara Bank, ensures a consistent supply of skilled professionals who are equipped to drive future growth. Investing in continuous learning and development, as exemplified by Capital One, fosters a culture of innovation and adaptability, enabling banks to remain competitive in a rapidly evolving industry (Zahra & George, 2002). Cultivating a strong and engaged organizational culture, as seen in the case of First Bank, leads to a more motivated and productive workforce, ultimately contributing to the bank's success (Barney, 1986). While a direct case study of performance management fully aligned with sustainability objectives was not explicitly detailed, the broader sustainability commitments of institutions like Bank of America underscore the growing importance of integrating ESG considerations into all aspects of banking operations. The overarching lesson is that a strategic and holistic approach to HRM, which prioritizes talent acquisition and retention, invests in employee development, fosters a positive culture, and aligns employee performance with organizational goals, is fundamental to achieving and maintaining economic sustainability in the commercial banking sector.

5. Conclusions

This research article has undertaken a comparative analysis of Human Resource Management within the commercial banking sector, focusing on its pivotal role in fostering sustainable performance. The synthesis of existing literature reveals that HRM is no longer a mere administrative adjunct but a strategic imperative for banks navigating the complexities of the 21st-century operational landscape, characterized by escalating stakeholder demands for environmental and social responsibility, rapid technological evolution, and intricate regulatory frameworks.

The key arguments advanced underscore that a transition towards sustainable banking—one that genuinely balances economic viability with social equity and environmental integrity is inextricably linked to the strategic and integrated management of human resources. Various HRM practices, spanning from talent acquisition and development, performance management and rewards, to the cultivation of employee well-being, diversity, inclusion, ethical leadership, and a supportive organizational culture, all play distinct yet interconnected roles in driving a bank's sustainability agenda. The comparative lens adopted has highlighted that the effectiveness of these practices is often contingent upon their alignment with the bank's specific context, its overarching sustainability strategy, and the degree to which they are implemented as a synergistic system rather than isolated initiatives. A critical insight emerging from this analysis is the necessity of moving beyond a piecemeal approach to adopting "HRM practices *for* sustainability" towards the more profound endeavor of designing and embedding "sustainable HRM *systems*". Such systems are characterized by internal coherence, where all HR policies and practices mutually reinforce sustainability objectives, and by external attunement, where the HRM system is responsive and adaptive to the evolving expectations of diverse stakeholders and the broader societal and environmental context. This systemic perspective is crucial for achieving lasting organizational change and authentic sustainable performance.

The journey towards truly sustainable commercial banking is, therefore, not a destination with a fixed endpoint but an ongoing process of adaptation, learning, and continuous improvement. This implies that HRM functions within banks must themselves be agile, forward-looking, and capable of iterative development. HR professionals require enhanced "sustainability dexterity"—a sophisticated blend of strategic acumen, ethical grounding, and technical competence in ESG matters—to effectively lead and support this transformation.

In conclusion, the strategic management of human resources is not merely a contributor to sustainable banking; it is central to its very achievement. Commercial banks that recognize this profound interconnectedness and proactively invest in building robust, integrated, and adaptive sustainable HRM systems will be better positioned not only to mitigate risks and enhance their reputation but also to unlock new opportunities for value creation, foster long-term resilience, and make meaningful contributions to a more sustainable global economy and society. The continued commitment of researchers, the unwavering support of bank leadership, and the ongoing professional development of HR practitioners are all vital to fully realizing this transformative potential.

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SECTION 3: FINANCE

OPPORTUNITY COSTS OF BANKING SUPERVISION

DOI: <https://doi.org/10.53486/dri2025.32>

UDC: 657.471:336.71.078.3(478)

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Abstract: *This paper focuses on the definition of banking supervision and indicators of effort and effect of banking supervision. The idea of the importance of measuring the effectiveness of supervision through cost-benefit analysis has been profiled and the categories of costs of supervision have been categorized according to several authors. In addition to direct costs related to personnel, remuneration, technical sources, supervision entails many indirect costs, including compliance and opportunity costs. According to some authors, the ratio of indirect to direct costs is 4:1. This is also why the task of quantifying the effectiveness of banking supervision is so difficult. In the article we tried to penalize overliquidity and overcapitalization as an opportunity cost of supervision in Rep. The period 2008-2024 was analyzed. During this period many events occurred that destabilized the banking system, ranging from international financial crisis, bank failures, pandemics, war that brought strong inflationary pressures. Therefore, a broader analysis of the reasons behind the banks' decision to go far beyond the minimum requirements regulated by the National Bank is needed.*

Key words: *banking supervision, costs of supervision, regulation, supervisory authority, supervisory effectiveness, cost-benefit analysis*

JEL: G21

1. Introduction

Banking supervision is a concept that has been around for over a century. In recent decades, against the backdrop of the crises of the 21st century, countries around the world have realized how important banking supervision is in the financial sector and the economy in general.

Banking supervision must contain an arsenal of strategies and regulations through which the state, including the supervisory authorities, can guarantee the viability of the banking system and the stability of the financial system. Banking supervision must be able to develop, implement and monitor supervisory policies effectively under both normal and critical economic and financial conditions.

Efficiency takes into account not only impact or outcome, but also effort. There are such situations where the costs of supervisory resources are greater than the benefits in terms of compliance or societal benefits, the solution for market failure may be worse than the failure itself (supervisory failure). It is therefore considered appropriate to identify the costs of banking supervision and analyze their effect, including from the perspective of missed opportunities.

In recent years, the academic literature has focused more on research on banking regulation, and banking supervision still remains a little-researched field of study. This is also due to the limited access to information about supervisory activities, which is considered as confidential information of supervisory authorities. Therefore, the article aims to investigate the theory defining different categories of banking supervision costs according to different authors, to analyze the practice of the European Central Bank's supervisory cost assessment and to evaluate through a mathematical model a potential opportunity cost of banking supervision applied in Rep. Moldova through prudential indicators related to capital and liquidity.

2. Definition and classification of bank supervision costs

2.1. Definition of banking supervision

"Banking supervision refers to the activity of monitoring the financial situation of banking institutions and checking how **banking regulations** are complied with and enforced". This is the micro view.

From a macro perspective, banking supervision must contain an arsenal of strategies and regulations

through which the state, and hence the **supervisory authorities**, can guarantee the **viability of the banking system and the stability of the financial system**.

Thus, the idea has emerged that banking supervision aims not only to ensure compliance with certain standards and legislation, but also to influence the macroeconomic environment by achieving societal objectives.

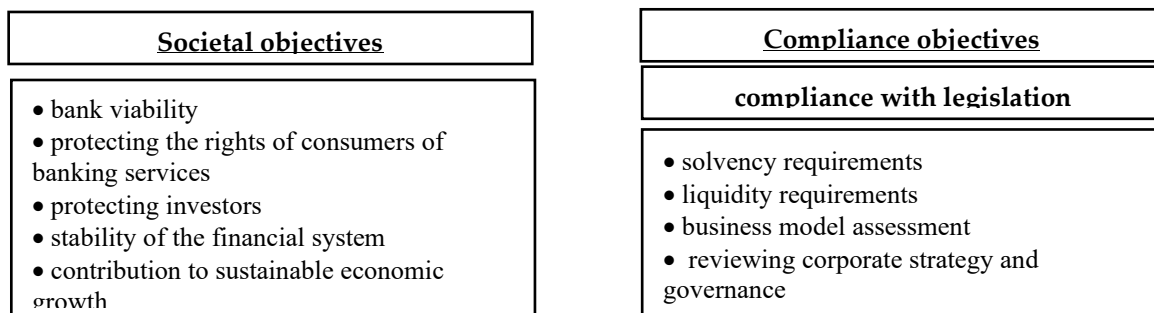


Figure 1. Objectives of banking supervision

Source: by author

In other words, supervisory authorities must be able to demonstrate the causal relationship between their activities (cause) and outcome (effect) and to assess the effectiveness of the set of regulations, decisions and tools they have applied.

Both monitoring and supervisory intervention is costly for the supervisory authority. The supervisory strategy should therefore be chosen as optimally as possible to balance the benefits and costs of supervision. More intensive supervision may be considered a better option considering its benefits alone. However, there is a need for optimal supervision, the intensity of which is limited by the level at which marginal costs are higher than marginal benefits.

The Basel Committee proposes the following indicators for calculating the performance of financial supervision, which in fact correspond to different stages of the supervisory process:

- Supervisory resources - indicators in this category determine the extent and intensity of banking supervision. These indicators include: supervisory staff, supervisory budget, quality of reported data.
- Supervisory activities - indicators in this category refer to the tools by which supervisors identify and mitigate risks. These indicators include: time spent on supervisory activities, number of reports and on-site visits, number of supervisory meetings with banks.
- Impact of supervisory activities - indicators in this category relate to how institutions respond to the identified findings. Supervisors monitor banks' migration from one risk category score to another to identify the impact of supervisory activities. Risk scores are used to help plan future supervisory activities. These indicators include: the number of entities at heightened risk, the impact of supervisory adjustments and recommendations, the index of repeated infringements after a legal proceeding, stakeholder surveys, internal audit and the national audit office
- The outcome of surveillance activities, depending on the ultimate objective of the surveillance. This is the most relevant but also the most difficult way to measure the effectiveness of supervision. Supervisors have different measures to monitor the financial condition of the institutions they supervise. (BIS, 2024)

In order to summarize the indicators proposed by the Basel Committee, we have created Table 1, where we have delineated effort indicators from effect indicators. Thus, **effort indicators** show how much time and resources are required to achieve the supervisory objectives, while **effect indicators** measure the performance of supervision and show the outcome, intermediate and final impact of the intervention.

Table 1. Indicators for calculating the effectiveness of banking supervision

Effort indicators	Impact indicators
<ul style="list-style-type: none"> time and resources to achieve the objectives of supervision surveillance activities 	<ul style="list-style-type: none"> result - direct consequence of the supervisory intervention intermediate impact - actions of the supervised bank final impact - results achieved as a result of the actions
<p style="text-align: center;">- <i>cost-benefit (effort-result) analysis</i> - <i>avoid surveillance failure (cost > benefit)</i></p>	

Source: by author

On the basis of the effort and effect indicators, we can proceed to a more detailed analysis of the costs of banking supervision and their structure.

2.2. Classification of the costs of banking supervision

In the literature, several approaches to the classification of supervisory costs can be found. Some of them refer only to the act of supervision, others - only to bank regulation, in some sources regulatory and supervisory costs are addressed in unison.

Goodhart et al. (1998), Alfon and Andrews (1999) divide the costs of financial supervision into three categories:

1. *Institutional costs* - are costs arising from the work of supervisory and regulatory authorities. These are considered as direct supervisory costs.
2. *Compliance costs* - are costs imposed on regulated entities through regulatory requirements. Compliance costs comprise operational costs and opportunity costs (Elliehausen, 1998). Operational costs refer to all costs necessary to comply with regulatory requirements.
3. *Structural costs* - refers to a possible impairment of market competition and innovation in financial intermediation. This type of cost is quite difficult to quantify, but is very much responsible for the sector's performance.

Schüler and Heinemann (2005) have a similar classification of supervisory costs: institutional costs (direct costs), compliance costs and structural costs. According to their research, institutional costs are passed on to the financial (banking) sector and thus can be seen not only as direct costs but also as an important component of compliance costs.

Economist Briault (2003) categorizes the costs of bank regulation and supervision into:

1. *Direct costs* - costs that are borne by the authorities, the financial industry and the state or society as a whole and that enable regulatory and supervisory activities to be carried out in various forms, from rule creation to enforcement;
2. *Indirect costs* - are costs incurred by supervised entities in order to comply with regulated requirements. This category includes compliance costs, as well as costs of reporting to the authorities. One of the most essential compliance costs is the profit forgone by banks due to the use of cash to comply with regulatory requirements. Another cost relates to the high capital requirements imposed on the banking sector to ensure micro and macroeconomic stability on the one hand, but which can negatively influence lending conditions for bank customers on the other hand. And in practice it is very difficult to measure this impact and find a consensus. At the same time, indirect costs should not be ignored. According to the economist Franks et al. (1997), **there is a 4:1 ratio between indirect and direct costs.**
3. *Distortion costs* - these costs derive from the potential distortions that a particular legislative requirement may bring. Normally, if a legislative initiative is well thought through, the distortionary costs it may bring should be clearly outweighed by the benefits it brings.

In response to the global financial crisis, many microprudential regulations (notably capital and liquidity requirements) have been tightened in many countries to enhance supervision and the resilience of the banking system.

Jakob de Haan et al. (2019) analyzed how liquidity and capital regulations influence individual and systemic risk. Following a computational model by these authors, they find that liquidity regulations can have a positive impact on banks' individual risk. However, in order to reduce banks' risk appetite, liquidity regulations need to be combined with other policies to improve the quality of banks' assets and market liquidity. At the same time, liquidity regulation has an insignificant impact on systemic risk, as do other categories of regulation, including capital regulation.

Rochet (1992) shows that the relationship between bank capital and bank risk can be ambiguous, especially if the risk weights used in prudential capital regulations deviate from actual market risks. Also, Perotti et al. (2011) argue that higher equity capital may also imply higher risk appetite, implying that stricter capital requirements do not necessarily imply lower individual bank risk.

Supervision is designed to address the ambiguous relationship between regulation and banking risks. Thus, strict supervision can prevent risky decisions by banks and improve their stability. (Barth et al., 2004a). Thus, stronger bank supervision could mean lower individual bank risk.

Supervisory controls can also mitigate the risk of contagion risk in the system, due to the role of the supervisor as lender of last resort or resolution and winding-up supervisor to intervene at an early stage and block the risk of systemic crisis spreading.

BIS General Manager Agustín Carstens told a summit of the European Banking Federation that "well-defined capital and liquidity requirements - as proposed by the Basel III standards - are intended to equip banks with a buffer to withstand sudden interest rate fluctuations and give them time to address several structural weaknesses. At the same time, we must recognize that the current regulatory framework may not fully capture all risks."

So the theory goes that supervision is meant to reduce banking risks that regulation either has not yet covered or is not yet able to manage. "Minimum regulatory requirements are very narrow and not tailored to the risk profile of each bank. And there is no level of capital or liquidity that would make a bank viable if it has an unsustainable business model and weak governance." (Dahlgren et al., 2023) This is why supervision is so important. However, considering that supervisory resources are limited, the high costs of carrying out supervisory activities may ultimately lead to inadequately supervised banks and poor performance and stability. Banking supervision fulfils its role as a stabilizer of the system, but up to a certain level of effort, which is considered optimal. Banking supervision therefore needs to be calibrated. (Barth et al., 2004a).

2.3. Assessing the opportunity costs of banking supervision - the case of Rep. Moldova

Since there are no public data on the costs that the National Bank of Moldova incurs in the act of supervision, in terms of staff, technical resources and other supervisory efforts, I will try to assess the costs of banking supervision from the perspective of opportunity costs. Specifically, I will assess the potential effects of overliquidity and overcapitalization on the performance of the system, as expressed by profitability indicators.

Dynamic analysis of the values recorded by liquidity indicators shows that banks in Rep. Moldova respecting the regulated limits (Principle I and Principle II of liquidity) including in the crisis years (2008-2009 and 2020), being liquid and over-liquid.

Thus, over the period 2008-2024, long-term liquidity varies around the coefficient of 0.7. The exception is 2014, when the maximum regulated level of 1 was exceeded due to the liquidity indicators reported by BEM, Banca Socială and Unibank.

Regarding current liquidity, it ranged between 20-40% between 2008-2013. In 2014, due to the three problem banks, the current liquidity ratio decreased to 22.5%, and from 2015 onwards it exceeded 40%, reaching a maximum of 55.5% in 2017 and maintaining a ratio close to 50% until 2021. Starting from January 2022, the liquidity principle II was replaced by the liquidity coverage ratio (LCR) $\geq 100\%$, which amounted to 235.47% in 2022 - 235.47%, 282.12% in 2023 and 274.13% in 2024, well above the minimum regulatory limit.

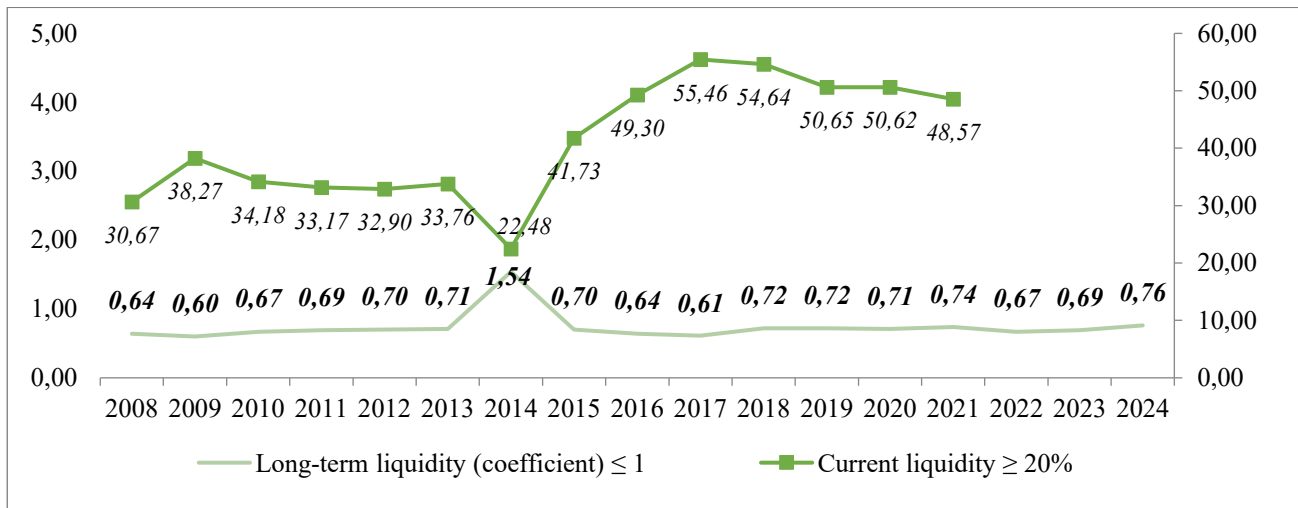


Figure 2. Liquidity Principle I and Principle II, evolution of indicators by banking system a.y. 2008-2024 (%)

Source: prepared by author based on National Bank of Moldova data [online] [cited March 22, 2017]. Available: <<http://bnm.md>>.

In order to harmonize the legislation of the Republic of Moldova with the European one, since 2016, Principle III - Liquidity by maturity bands (>1) was also implemented. Thus, until 2016, there were some gaps in the NBM's regulatory acts in terms of liquidity indicators, because liquidity needs were not calculated in the period from 1 month to 2 years. Because banking operations have different maturities and often uncertain, the task of matching bank liabilities to bank assets is difficult so that liquidity risk is minimized. Principle III has come to fill these regulatory gaps.

According to the information on the economic and financial activity of banks in Rep. Moldova for the year 2016-2022, the liquidity principle III exceeds the threshold of 1 in all maturity bands, being well above this regulatory minimum.

Table 2. Principle III - Liquidity by maturity bands (>1)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
up to and including one month	2,91	2,72	2,94	2,67	2,28	1,89	2,17	2,19	1,79
1-3 months inclusive	14,85	18,40	19,09	18,14	19,86	19,64	20,42	16,07	12,69
3-6 months inclusive	4,75	2,74	3,12	12,90	14,74	14,43	12,10	12,55	12,29
6-12 months inclusive	4,22	3,06	2,37	8,83	9,97	9,92	7,48	9,47	8,33
over 12 months	5,32	4,74	4,34	8,74	7,97	8,35	7,25	8,36	8,14

Source: author based on data from the National Bank of Moldova [online] [cited March 22, 2025]. Available: <<http://bnm.md>>.

Thus, the banking sector of the Republic of Moldova does not have problems in terms of liquidity indicators, which means that it has adequate sources to support bond payments and increased resilience to possible external shocks. However, banks are far exceeding the regulated requirements, which makes for a superliquid banking system, and this entails certain risks or opportunity costs. By hoarding liquidity, they miss the opportunity to transform these assets into long-term bank loans, i.e. to generate profits.

At the same time, excess liquidity hampers the transmission of monetary policy decisions taken by the central bank as it tries to adjust monetary policy instruments to its inflationary expectations and crisis forecasts. Also, theoretically, the build-up of liquidity in the system could undermine the financial intermediation function of banks and their role in supporting economic growth.

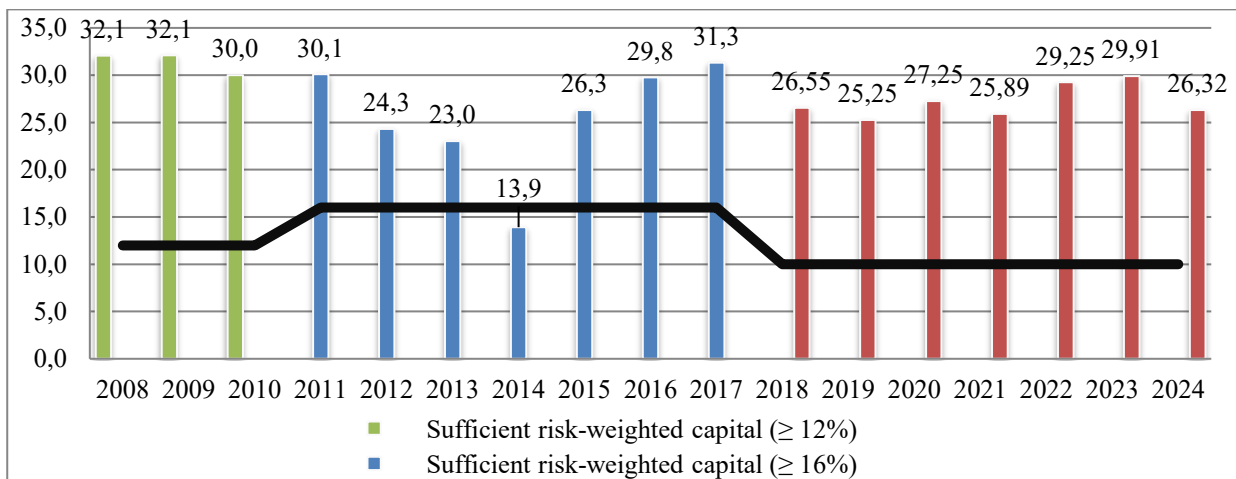


Figure 3. System-wide evolution of risk-weighted capital adequacy between 2008-2017 and total own funds ratio between 2018 and 2024 (%)

Source: author based on data from the National Bank of Moldova [online] [cited January 22, 2025]. Available: <http://bnm.md>.

The average risk-weighted capital adequacy of the banking system in the period 2008-2017, shown graphically in Fig.2.3., shows that the capital adequacy ratio was above the regulatory level of $\geq 12\%$ - in the period 2008-2010 and $\geq 16\%$ - in the period 2011-2017. The exception is the year 2014, when this indicator amounted to 13.92%, below the minimum regulated level. The situation in 2014 was not a systemic problem, but was generated by Banca de Economii and Banca Socială - banks that in 2014 recorded a risk-weighted capital adequacy ratio slightly above 3%.

The evolution of the own funds ratio in the period 2018-2024 shows that banks in Rep. Moldova continue to be sufficiently capitalized in relation to their risk profile. As mentioned above, according to the new calculation methodology, the total own funds ratio takes into account not only credit risk, but also market and operational risk. Thus, it is natural that this indicator is lower than the indicator calculated until 2018. In the period since the total own funds ratio has been applied, this indicator has shown an upward trend, from 26.55% in 2018 to 26.32% in 2024.

Return on Assets (ROA) and Return on Equity (ROE) indicators will be used to analyze financial performance.

In the period under analysis, 2009 - the year of the financial crisis - stands out, when the banking system recorded losses and profitability ratios were negative. However, in the post-crisis years, banks managed to improve their profitability ratios significantly, with the exception of 2014 (the year of problem banks) and 2020 (the pandemic year). In 2024, ROE amounted to 14.8% and ROA - 2.2%. Although the evolutions are substantial, it can be noted that profitability indicators were higher in 2008 - the pre-crisis year.

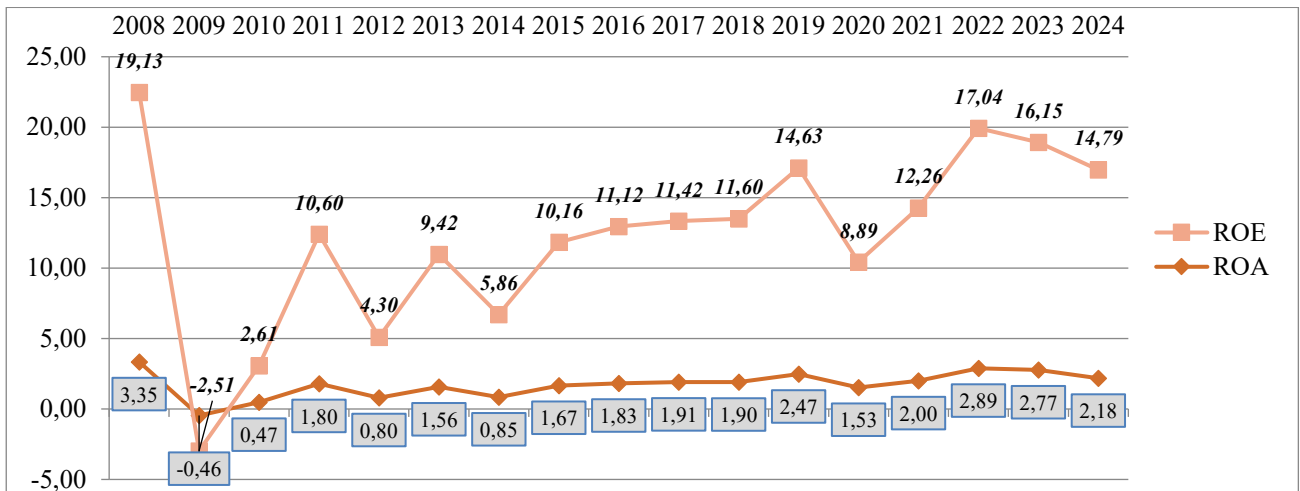


Figure 4. Profitability evolution 2008-2024 (%)

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <<http://bnm.md>>.

If we look at the situation on a system-wide basis, we note that the relationship between capital and liquidity indicators and profitability indicators is not linear. Thus, the relationship is non-monotonic and requires the determination of an optimal level at which the profitability levels are maximized. In order to find an optimal level of liquidity and capitalization, it is proposed to use a polynomial regression of degree 2.

$$y = a * x^2 + b * x + c \quad (1)$$

Where:

y – the dependent variable (in our case ROE or ROA)

a - the coefficient of the quadratic term, which measures the curvature of the relationship between the variables x and y (in our case, Liquidity or Capital and Profitability)

b - the coefficient of the linear term, which measures the slope of the linear relationship between x and y and shows the direct effect of x on y

c - the free term or intercept, which is the theoretical value of y when x is zero

Based on this equation, we can find the optimal level of x :

$$x_{opt} = (-b)/2a \quad (2)$$

If the whole period of analysis is taken into account, the situation becomes even more complex taking into account the structural changes in the system (the 3 bank failures between 2013-2024) as well as regulatory changes. It is therefore considered appropriate to analyze correlations by sub-periods.

In the case of analyzing the correlations between liquidity indicators and ROA, individual indicators per bank were considered and weighted by the systemic importance of each bank (calculated as the share of assets in total assets in the system). Correlations were analyzed and the regression results yielded the equations below.

Table 3. Calculation of optimal level of liquidity indicators, by sub-periods of analysis

Liquidity indicators	Calculation sub-periods	Equation	Calculated optimal level
Principle I	2016-2021	$y = -2.9855x^2 + 3.5748x - 0.0235$ $R^2 = 0.8301$	0,5987
	2022-2024	$y = -9.6573x^2 + 6.0017x - 0.0478$ $R^2 = 0.9452$	0,3108

Principle II	2016-2021	$y = 0.0008x^2 + 0.0338x - 0.0157$ $R^2 = 0.8065$	21,125%
Principle III	2016-2021	$y = -0.0403x^2 + 0.2747x - 0.0314$ $R^2 = 0.4022$	3,41
LCR	2022-2024	$y = -5*10^{(-5)}x^2 + 0.0152x - 0.0932$ $R^2 = 0.813$	152%

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <<http://bnm.md>>.

For the analysis of correlations between ROE and capital ratios, individual ratios per bank, weighted by systemic importance and normalized, were used. The analysis was also performed by sub-periods, taking into account the change in the regulated limit.

Table 5. Calculation of the optimal level of capital indicators, by sub-periods of analysis

Capital indicators	Calculation sub-periods	Equation	Normalized optimal level	Denormalized optimal level
Capital adequacy	2013-2017	$-188.49x^2 + 100.96x - 13.07$	0,268	34,56
	2018-2024	$-2.6198x^2 + 1.7233x + 0.0076$	0,329	20,89
	2015-2024	$-3.221x^2 + 2.0861x - 0.039$	0,324	25,35
Debts/ Capital	2013-2024	$7.8794x^2 - 7.1223x + 1.8572$	0,452	3,85

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <<http://bnm.md>>.

3. Conclusions

Regulation and supervision are interrelated processes, as they are instruments of the supervisory authority - both in the dimension of dictating rules and in the dimension of checking how these rules are respected and serve macroeconomic and social objectives.

If regulation is based on clear rules and verifiable information, then supervision is much more discretionary and can go beyond regulation to cover risks that the law may have failed to regulate. Because supervisory resources are limited, it is important to emphasize efficiency in carrying out supervision.

Measuring the effectiveness of banking supervision is important to determine whether the costs of supervisory resources outweigh the benefits and the solution to market failure is worse than the failure itself (supervisory failure).

Although it is difficult to construct a portfolio of performance indicators, the effectiveness of supervision needs to be analyzed in terms of the causal relationship between interventions and supervision objectives, as well as opportunity costs.

Taking into account that no public data on the NBM's supervisory expenses (direct costs) were available, we made a mathematical calculation based on regression equations and found the optimal levels of liquidity and capital ratios, at which ROA and ROE reach maximum levels.

The optimal levels are well above the regulated minimums, which means that the liquidity and capital ratios recorded by banks in the system present significant opportunity costs to their performance. This reality is driven on the one hand by regulatory pressures, but also has other potential underlying causes, such as low demand for high quality credit, low cost of liquidity and capital, a safety net measure in conditions of economic and political uncertainty.

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THE ROLE OF ESG FACTORS IN SHAPING FIRM PERFORMANCE: INSIGHTS FROM US HEALTHCARE COMPANIES

DOI: <https://doi.org/10.53486/dri2025.33>

UDC: [658.15:614.2]:556(73)

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Abstract: *Corporate finance is continuously evolving, placing increased emphasis on various performance indicators. This research evaluates the financial performance of 60 healthcare companies listed on the S&P 500 index, using data from 2000 to 2024. By employing advanced analytical methods, including linear regression, nonlinear regression, and interaction-effect models, the study investigates the influence of key environmental, social, and governance components on corporate profitability. The findings indicate that total water consumption consistently exhibits a positive correlation with the financial performance of healthcare companies. Furthermore, the analysis identifies a specific threshold where this positive relationship changes in magnitude, indicating a turning point. Additionally, the proportion of female employees within companies also positively influences financial performance, with a similar threshold effect observed. During the global health crisis, the beneficial impact of women's representation in the workforce persisted and became statistically significant, emphasizing the robustness of this relationship under crisis conditions. Contrary to the initial hypothesis, the highest remuneration package did not negatively impact performance; instead, it demonstrated a positive correlation accompanied by a turning point at which the strength of this relationship shifted. Overall, this research enhances understanding of how diverse environmental, social, and governance strategies affect financial outcomes, operational transparency, and shareholder protection. The results emphasize the importance for companies to dynamically adapt their environmental, social, and governance policies to changing market conditions to maintain long-term financial health and effective corporate governance.*

Key words: *ESG strategies, financial performance, healthcare companies, turning point*

JEL: G30, G34, G39

1. Introduction

Profitability continues to be a fundamental concern in the field of corporate finance, with ongoing scholarly debate surrounding the factors that shape it. This study investigates the influence of key environmental, social, and governance (ESG) indicators on firm performance, focusing specifically on healthcare companies included in the S&P 500 index over the 2000–2024 period. The healthcare sector was selected for its critical economic significance and the considerable shifts in performance it has experienced in recent years, driven by rapid innovation and heightened service demand. The S&P 500 index offers a reliable benchmark for this analysis, as it encompasses a broad spectrum of leading United States firms and provides a stable context for evaluating corporate governance dynamics.

The central research objective is to explore how governance-related ESG factors influence the profitability of firms operating in the healthcare industry. Gaining insight into these connections is vital for stakeholders who seek to optimize firm performance and manage evolving market challenges effectively. This paper contributes to the literature through several novel aspects. The extended study period enables the use of a rich and longitudinal dataset, while the application of nonlinear regression models allows for the identification of nuanced patterns that linear models may overlook. Moreover, the inclusion of a pandemic-related dummy variable offers the opportunity to assess the crisis's specific effects on corporate behavior and performance.

The study's global significance lies in its analysis of governance mechanisms and their impact on profitability, offering valuable implications for corporate transparency and responsible business conduct. The paper proceeds with an introduction, literature review, methodological framework, empirical findings, and a concluding discussion.

2. Basic content

2.1 Literature Review

The relationship between various corporate indicators and firm performance has attracted growing scholarly interest, particularly in emerging and developing markets. Empirical research has employed a range of methodologies and datasets to identify both financial and non-financial determinants of corporate performance. The following synthesis presents the main findings from recent studies, focusing on the effects of each indicator on firm performance.

Water withdrawal total has been positively associated with firm performance in both quantitative and qualitative studies analyzed. (Hongming, et al., 2020), using panel data linear regression for 50 non-financial firms listed on the Pakistan Stock Exchange during 2013–2017, observed that higher water withdrawal was linked to improved firm performance, potentially due to higher operational intensity or environmental reporting practices. Similarly, (Talbot & Barbat, 2019), through qualitative analysis of 58 entities following the global reporting initiative between 2012–2013, found a positive relationship between water disclosure and firm success.

Women employees also appear to positively influence firm performance. (Allison, et al., 2023), analyzing data from 130,000 firms across roughly 130 developing countries between 2008–2017 using panel data regression, reported a positive effect of female workforce representation on firm outcomes. (Das & Smriti, 2022), in their study of 272 Indian firms listed on the National Stock Exchange between 2007–2019, confirmed these findings, showing that gender diversity contributes positively to performance metrics.

Regarding highest remuneration package, results are mixed. (Aslam, et al., 2019) applied GMM models to 100 non-financial firms listed in Pakistan between 2009–2016, and identified a negative effect, suggesting that excessive executive compensation may undermine performance, possibly due to agency conflicts. Conversely, (Harymawan, et al., 2020), using panel data from 847 Indonesian listed firms during 2014–2017, found a positive relationship, indicating that well-structured remuneration may incentivize better managerial outcomes.

Firm size, examined in the same study by (Harymawan, et al., 2020), showed a positive influence on firm performance, supporting the notion that larger firms benefit from economies of scale, market dominance, and improved governance structures. Similarly, sales growth, also studied by the same authors, was positively associated with firm performance, as revenue expansion often reflects strong market positioning and operational efficiency.

The indicator firm age has been shown to positively impact firm performance. (Almustafa, et al., 2023), in a study covering 739 non-financial firms across 12 Middle East and North Africa (MENA) countries during 2011–2020, used panel regression models and concluded that older firms tend to perform better, likely due to accumulated experience, brand recognition, and organizational stability. Dividend payout ratio was investigated by (Sondakh, 2019) in a sample of 99 service-sector firms listed on the Indonesia Stock Exchange during 2015–2018. The results indicated a negative effect on firm performance, potentially reflecting the tension between shareholder returns and reinvestment needs.

Liquidity, measured by the current ratio, was positively linked to performance in a study by (Rompotis, 2024), who analyzed 80 publicly traded firms listed on the Athens Stock Exchange over the 2018–2022 period using panel data regression. This finding aligns with the argument that liquidity strengthens financial resilience and operational flexibility. In contrast, debt to capital, as examined by (Harymawan, et al., 2020), was found to negatively affect firm performance, highlighting the risks associated with high leverage. Finally, the pandemic crisis was associated with a negative impact on firm performance, according to (Almustafa, et al., 2023), underlining the vulnerabilities firms face during global shocks, regardless of maturity or size.

In summary, these studies contribute to a nuanced understanding of the multifactorial nature of firm performance, particularly in the context of emerging markets. Although existing studies provide valuable insights into the relationship between ESG variables and firm performance, many researchers have not explored potential turning points in these relationships, nor have they

systematically accounted for the impact of the pandemic crisis on key ESG indicators, leaving important dimensions of this field underexamined.

Table 1. Summary of the Literature Review

Indicators	Study	Companies	Years	Methodology	Effect
Water Withdrawal Total	(Hongming, et al., 2020)	50 non-financial firms listed on the Pakistan Stock Exchange	2013–2017	panel data linear regression	+
	(Talbot & Barbat, 2019)	58 Global Reporting Initiative	2012–2013	qualitative analysis	+
Women Employees	(Allison, et al., 2023)	130,000 firms across approximately 130 predominantly developing countries	2008–2017	panel data linear regression	+
	(Das & Smriti, 2022)	272 Indian firms listed on the National Stock Exchange	2007–2019	panel data linear regression	+
Highest Remuneration Package	(Aslam, et al., 2019)	100 non-financial firms listed in the Pakistan Stock Exchange	2009–2016	GMM models	-
	(Harymawan, et al., 2020)	847 entries involving companies publicly listed on Indonesia's stock market	2014–2017	panel data linear regression	+
Firm size	(Harymawan, et al., 2020)	847 entries involving companies publicly listed on Indonesia's stock market	2014–2017	panel data linear regression	+
Firm age	(Almustafa, et al., 2023)	739 publicly traded companies from 12 nations within the MENA region, excluding those in the financial sector	2011–2020	panel data linear regression	+
Sales Growth	(Harymawan, et al., 2020)	847 entries involving companies publicly listed on Indonesia's stock market	2014–2017	panel data linear regression	+
Dividend Payout Ratio	(Sondakh, 2019)	99 service-sector enterprises traded on the Indonesia Stock Exchange	2015–2018	panel data linear regression	-
Current Ratio	(Rompotis, 2024)	80 publicly traded firms operating on the Athens Stock Exchange	2018–2022	panel data linear regression	+
Debt to Capital	(Harymawan, et al., 2020)	847 entries involving companies publicly listed on Indonesia's stock market	2014–2017	panel data linear regression	-
Pandemic Crisis	(Almustafa, et al., 2023)	739 publicly traded companies from 12 nations within the MENA region, excluding those in the financial sector	2011–2020	panel data linear regression	-

Source: Authors' own research

The hypotheses guiding this research study are as follows:

H₁: Environmental ESG factors, particularly the volume of water consumption, positively influence corporate performance.

H₂: Social ESG aspects, especially the percentage of female staff members, positively affect business outcomes.

H₃: Governance ESG variables, specifically the level of the highest individual compensation, negatively influence company performance.

2.2 Methodology

2.2.1 Dataset Characteristics and Variable Explanation

This research focuses on healthcare firms included in the S&P 500 index over the 2000–2024 period. Drawing on data sourced from the Thomson Reuters Eikon database, the study examines long-term financial dynamics and sector-specific developments within the healthcare industry. In light of the sector's pivotal role in contemporary society, the analysis seeks to assess the impact of recent

transformations on both financial outcomes and ESG-related metrics. The performance of these companies serves as a proxy for broader shifts in healthcare innovation and sustainability, highlighting their significance as indicators of overall economic and social progress.

Figure 1 illustrates that the healthcare sector is one of the largest sectors within the S&P 500 index.

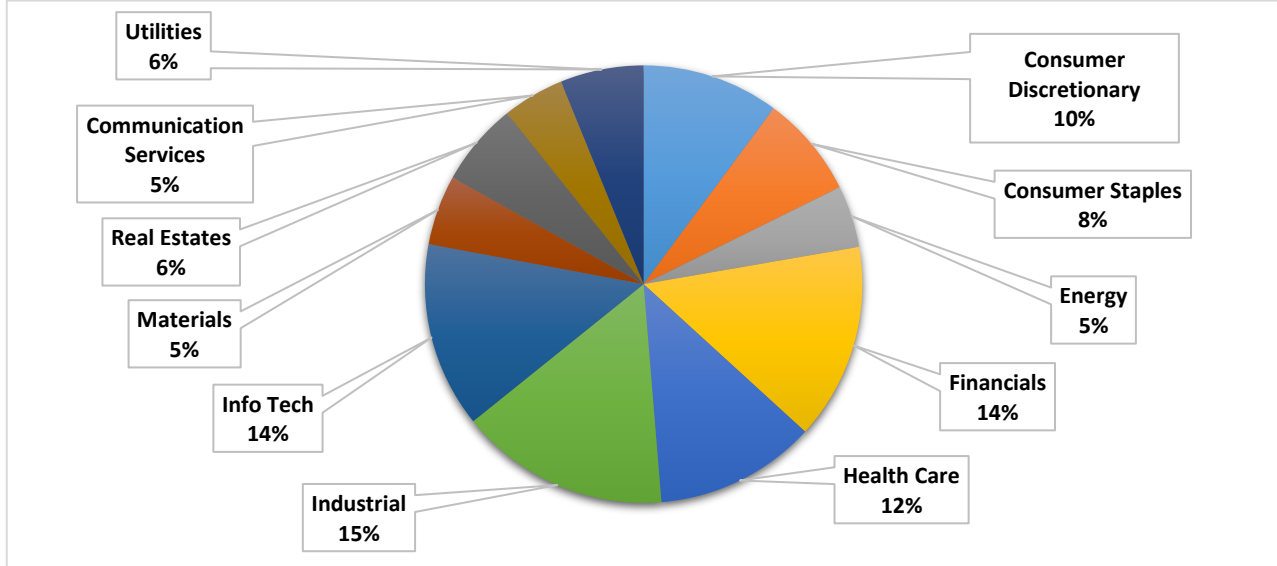


Figure 1. S&P 500 Sectors

Source: Authors' work

Thus, alongside the industrial, information and technology, and financial sectors, the healthcare sector plays a significant role in the United States economy. Table 2 outlines the core variables employed in the analysis, including their corresponding abbreviations, theoretical relevance, and detailed computational formulas.

Table 2. Presentation of Variables

Dependent variables	Symbol	Meaning	Measurement
Return on Assets	ROA	Measures how efficiently a company generates profit from its total assets.	$ROA = \frac{\text{Net profit}}{\text{Total Assets}}$
Earnings per Share	EPS	Indicates the portion of net profit allocated to each outstanding share.	$EPS = \frac{\text{Net Income}}{\text{Number of Shares}}$
Independent variables	Symbol	Meaning	Measurement
Water Withdrawal Total	WWT	Aggregate quantity of water drawn from all sources used by the company.	$WWT = \sum \text{Water withdrawn from each source}$
Women Employees	WE	Share of female employees within the company's total workforce.	$WE = \frac{\text{Number of women employees}}{\text{Total employees}} \times 100$
Highest Remuneration Package	HRP	Maximum compensation package provided to an individual employee.	$HRP = \max(\text{Total Compensation})$
Firm size	FS	The company's size measured by applying a logarithmic scale to total revenues.	$FS = \ln(\text{Total Revenue})$
Firm age	FA	The duration in years since the company's establishment or registration date.	$FA = \text{Year}_t - \text{Year}_{\text{foundation}}$
Revenue Growth Rate	GW	Rate at which the company's revenues have increased over a given period.	$GW = \left(\frac{\text{Sales revenue}_t}{\text{Sales revenue}_{t-1}} \right) - 1$

Dividend Payout Ratio	DPR	Ratio indicating the portion of net earnings distributed as dividends to shareholders.	$DPR = \frac{\text{Dividend paid}}{\text{Net income}}$
Current Ratio	CR	Evaluates the company's ability to fulfill short-term obligations using its short-term assets.	$CR = \frac{\text{Current assets}}{\text{Short term liabilities}}$
Debt to Capital	DC	Proportion of debt financing in the company's overall capital structure.	$DC = \frac{\text{Long term liabilities}}{\text{Equity} + \text{Long term liabilities}}$
Pandemic Crisis	COVID	Specifies whether the data corresponds to a year affected by a pandemic crisis.	Dummy variable: 1 if the year is 2020, 2021, or 2022; 0 otherwise.

Source: Authors' work

The computational formulas presented in Table 2 are consistent with methodologies commonly cited in established scholarly and professional literature.

2.2.2 Model Specification and Estimation Methods

This research employs Stata software to conduct the econometric analysis, which encompasses descriptive statistics and Pearson correlation coefficients. For data preprocessing of variables such as ROA, EPS, GW, DPR, CR and DC, 90% winsorization was applied to mitigate the influence of extreme outliers and ensure the robustness of the regression results. The analytical approach integrates baseline, linear, and nonlinear regression models, incorporating both fixed effects and random effects specifications. Model selection is guided by the Hausman test, applying a 5% significance level to determine the appropriate estimation technique.

To evaluate the effects of the health crisis on firm-level indicators, the study introduces interaction terms between pandemic-related variables and ESG indicators. These models are estimated under both fixed and random effects frameworks. Additionally, nonlinear regression models are employed to capture potential turning points in the relationship between the independent variables and firm profitability, using the same methodological structure. The following regression equations are estimated:

-Linear Regression Model: $Firm\ profitability_{it} = a_0 + a_1 ESG\ variables_{it} + a_2 Financial\ variables_{it} + a_3 COVID_{it} + \varepsilon_{it}$ (1)

-Nonlinear Regression Model: $Firm\ profitability_{it} = a_0 + a_1 ESG\ variables_{it} + a_2 ESG\ variables_{it}^2 + a_3 Financial\ variables_{it} + a_4 COVID_{it} + \varepsilon_{it}$ (2)

-Interaction Variable Regression Model: $Firm\ profitability_{it} = a_0 + a_1 ESG\ variables_{it} + a_2 ESG\ variables_{it} * COVID_{it} + a_3 Financial\ variables_{it} + a_4 COVID_{it} + \varepsilon_{it}$ (3)

Where a_0 is the intercept, $a_1 \dots a_{10}$ denote the estimated coefficients, ε represents the error term, and firm profitability metrics include ROA and EPS. Financial variables are FS, FA, GW, DPR, CR, DC, COVID and ESG variables are WWT, WE, HRP. Also, $i = [1; 60]$ and $t = [2000; 2024]$.

2.3 Empirical Findings and Analysis

2.3.1 Statistical Description and Correlation Analysis

Table 3 presents the descriptive statistics for the dataset, summarizing the key characteristics of the variables under investigation. A standard deviation exceeding the mean indicates high variability, suggesting substantial fluctuations over time. In contrast, variables with a lower standard deviation relative to the mean are considered more stable. Notably, earnings per share, revenue growth rate, dividend payout ratio, and the pandemic crisis exhibit significant volatility, reflecting pronounced shifts during the study period. The table also provides the minimum and maximum observed values for each variable, offering insights into the distribution and range within the sample.

Table 3. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	Skew.	Kurt.
ROA w	1147	.093	.056	-.026	.209	.174	2.838
EPS w	1363	4.354	4.467	-.302	17.01	1.477	4.528
WWT	524	14.4	2.014	7.336	19.627	-.353	3.096
WE	495	52.896	12.128	28.3	80	.447	2.543
HRP	1005	16.241	.753	12.493	18.723	-1.056	5.31
FS	1410	22.561	1.942	10.82	26.715	-.683	4.403
FA	1259	34.604	31.572	0	137	1.408	4.078
GW w	1350	.121	.148	-.075	.531	1.398	4.59
DPR w	1251	.201	.268	0	.883	1.271	3.478
CR w	1328	2.29	1.354	.912	6.009	1.419	4.175
DC w	1403	.36	.222	.003	.868	.484	2.907
COVID	1500	.12	.325	0	1	2.339	6.47

Source: Authors' work

Skewness reflects the asymmetry of a variable's distribution. Within the dataset, variables such as earnings per share, firm age, revenue growth rate, and the pandemic crisis exhibit pronounced skewness, indicating highly asymmetric distributions. In contrast, total water withdrawal, highest remuneration package, and firm size display negative skewness, suggesting left-skewed distributions. The remaining variables are positively skewed, indicating distributions with longer right tails.

Kurtosis, by contrast, measures the extent to which a distribution is either sharply peaked or relatively flat compared to a normal distribution. Variables such as return on assets, women employees, and debt to capital show kurtosis values below 3, characteristic of platykurtic distributions, which are flatter than the normal distribution. In contrast, the rest of the variables exhibit leptokurtic tendencies, with kurtosis values exceeding 3, indicating sharper peaks and heavier tails.

Table 4 presents the correlation coefficient matrix, illustrating the strength and direction of linear relationships among the variables included in the analysis.

Table 4. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROA_w	1.000										
(2) EPS_w	0.266	1.000									
(3) WWT	-0.142	-0.133	1.000								
(4) WE	-0.287	0.104	0.041	1.000							
(5) HRP	-0.061	0.160	0.349	0.182	1.000						
(6) FS	-0.387	0.224	0.550	0.370	0.596	1.000					
(7) FA	0.058	-0.128	0.486	-0.232	0.211	0.140	1.000				
(8) GW_w	0.105	0.039	-0.096	0.046	0.061	0.027	-0.092	1.000			
(9) DPR_w	-0.192	-0.207	0.620	0.031	0.329	0.420	0.399	-0.132	1.000		
(10) CR_w	0.246	-0.110	-0.373	-0.270	-0.243	-0.528	-0.169	0.050	-0.314	1.000	
(11) DC_w	-0.130	0.285	0.085	0.057	0.082	0.239	-0.103	0.007	0.238	-0.371	1.000
(12) COVID	0.130	0.234	-0.152	-0.049	0.057	-0.004	-0.032	0.143	-0.105	-0.011	0.082
Variables	(12)										
(12) COVID	1.000										

Source: Authors' work

In this study, a correlation coefficient greater than 0.65 is interpreted as indicating a strong positive relationship, whereas values below -0.60 suggest a strong negative association. However, no such strong correlations were identified within the dataset.

2.3.2 Results

The core findings of this research are presented in Table 5. Based on the results of the Hausman test, the models incorporating fixed effects are identified as the most appropriate specifications for the data. The linear regression models without effects are presented in Models 1 and 2. Models 3 and 4

correspond to linear regression models with fixed effects. Furthermore, Models 5 and 6 represent nonlinear regression models without effects, while Model 7 is a nonlinear regression model incorporating fixed effects. Finally, Model 8 is a fixed-effects regression model that includes an interaction variable.

Table 5. Regression Models

	(1) ROA_w	(2) EPS_w	(3) ROA_w <i>fe</i>	(4) EPS_w <i>fe</i>	(5) ROA_w	(6) EPS_w	(7) ROA_w <i>fe</i>	(8) EPS_w <i>fe</i>
WWT	0.00433* (2.07)	-0.428* (-2.16)	-0.0114** (-2.63)	0.547* (2.04)	0.00443* (2.16)	6.378** (3.28)	-0.00965* (-2.23)	0.470 (1.76)
WE	-0.000697* (-2.28)	0.00499 (0.17)	0.000260 (0.36)	0.0238 (0.54)	0.00698** (3.11)	0.00425 (0.15)	0.000546 (0.76)	0.00548 (0.12)
HRP	0.0253*** (3.82)	0.922 (1.46)	0.0135** (3.12)	-0.117 (-0.44)	0.0207* (3.12)	1.086 (1.75)	0.268** (2.89)	-0.111 (-0.42)
FS	-0.0197*** (-6.30)	1.371*** (4.60)	0.0335*** (3.62)	5.003*** (8.79)	-0.0201*** (-6.54)	1.158*** (3.87)	0.0327*** (3.57)	4.956*** (8.76)
FA	0.0000554 (0.68)	0.00913 (1.19)	-0.00162** (-2.93)	0.133*** (3.90)	0.0000134 (0.17)	0.0112 (1.48)	-0.00183** (-3.32)	0.130*** (3.83)
GW_w	0.0450 (1.89)	-2.850 (-1.26)	0.0321* (2.17)	0.620 (0.68)	0.0403 (1.72)	-1.328 (-0.59)	0.0354* (2.41)	0.858 (0.94)
DPR_w	-0.0223* (-2.07)	-5.597*** (-5.47)	-0.0410*** (-4.04)	-0.584 (-0.94)	-0.0311** (-2.86)	-5.196*** (-5.14)	-0.0424*** (-4.22)	-0.666 (-1.08)
CR_w	0.000944 (0.32)	0.344 (1.23)	-0.00287 (-1.27)	-0.0834 (-0.60)	-0.00200 (-0.66)	0.408 (1.48)	-0.00344 (-1.53)	-0.0965 (-0.69)
DC_w	0.000223 (0.02)	7.203*** (5.69)	0.00135 (0.09)	3.971*** (4.31)	0.00291 (0.22)	7.783*** (6.20)	0.000463 (0.03)	4.191*** (4.55)
COVID	0.0119* (2.08)	1.792** (3.29)	0.00964** (2.91)	0.658** (3.22)	0.0123* (2.19)	1.861*** (3.48)	0.0102** (3.12)	-1.714 (-1.57)
WWTxWWT						-0.236*** (-3.52)		
WExWE					-0.00007*** (-3.45)			
WExCOVID								0.0470* (2.22)
HRPxHRP							-0.00777** (-2.75)	
_cons	0.132 (1.41)	-36.93*** (-4.14)	-0.655*** (-3.34)	-126.0*** (-10.47)	0.0307 (0.32)	-83.51*** (-5.26)	-2.749*** (-3.49)	-122.9*** (-10.21)
Obs	323	326	323	326	323	326	323	326
R-sq	0.254	0.294	0.0378	0.0122	0.282	0.321	0.275	0.673
F-stat	10.65***	13.11***	9.299***	55.03***	11.10***	13.48***	9.343***	51.19***
Mean VIF	1.67	1.66						
Hausman Test			37.60***	141.40***			141.40***	141.40***
Turning point					47.75146	13.487031	17.316742	

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' work

With regard to the ESG indicator pertaining to the environmental dimension, in this case total water withdrawal, empirical results based on the baseline regression models indicate a positive and statistically significant effect on accounting performance. Conversely, market performance is negatively and significantly impacted. When employing fixed effects regression models, as determined by the Hausman test, the direction of influence shifts: accounting performance is negatively affected, while market performance exhibits a positive and statistically significant relationship with the environmental ESG indicator. Moreover, nonlinear regression analysis reveals the existence of a turning point. Specifically, the impact of total water withdrawal on EPS is positive

up to a threshold value of 13.48, beyond which the effect becomes negative. These findings are consistent with previous studies such as (Hongming, et al., 2020) and (Talbot & Barbat, 2019), which also reported a positive relationship between environmental ESG factors and firm performance. Furthermore, the empirical evidence supports the study's initial hypothesis. The contrasting effects of total water withdrawal on ROA and EPS can be explained by the distinct financial dynamics they represent. ROA, as a measure of asset efficiency, may decline with higher water usage due to increased operational and compliance costs, especially as facilities expand. In the healthcare sector, however, water-intensive processes, such as sterilization, and facility hygiene can drive revenue growth and support profitability. As a result, EPS may increase if net income improves or if share buybacks occur, even as asset efficiency declines.

Considering the number of women employed at the company level, this ESG indicator related to the social dimension shows a negative and statistically significant impact on ROA, while its effect on EPS is positive but not statistically significant, according to the baseline linear regression models. Based on fixed effects linear regression models, the influence of this indicator is positive for both accounting and market performance; however, the results are not statistically significant. From the perspective of nonlinear regression models, a turning point was identified: up to a threshold of 47.75, the proportion of female employees exerts a positive influence on ROA, after which the impact becomes negative. Additionally, regression models incorporating interaction terms reveal that during the pandemic crisis, the influence of this indicator on market performance intensified and became statistically significant. These findings are consistent with prior research by (Allison, et al., 2023) and (Das & Smriti 2022), who also reported a complex and context-dependent relationship between gender diversity and firm performance. Moreover, the results are aligned with the main hypothesis of this study. In the healthcare sector, a higher proportion of female employees can positively influence both ROA and EPS due to the alignment between gender representation and sector-specific competencies. Women are often overrepresented in essential healthcare roles such as nursing, patient care, and support services, positions that directly contribute to operational effectiveness and service delivery. This alignment enhances productivity and can improve financial efficiency as well as profitability per share. During the pandemic crisis, the demand for healthcare services surged, and the contribution of female workers became even more critical.

From the perspective of the governance indicator, specifically, higher remuneration packages, a positive and statistically significant impact on the analyzed performance indicators is observed based on the baseline regression models. According to the fixed effects regression models, the influence on ROA is positive and statistically significant, while the effect on EPS is negative but not statistically significant. Furthermore, the presence of a nonlinear relationship was identified: up to a threshold of 17.31, the influence of this indicator on ROA is positive, but beyond this point, the effect turns negative. These findings are consistent with those reported by (Harymawan et al., 2020); however, they do not support the hypothesis of the present study. Economically, a higher remuneration package may initially enhance firm performance by attracting and retaining qualified executives and specialists, especially in sectors where managerial expertise is crucial to operational success, such as healthcare. This can lead to improved decision-making, innovation, and overall organizational efficiency, positively affecting ROA. However, beyond a certain threshold, excessive remuneration may indicate inefficiencies, agency problems, or misaligned incentives, which can reduce the return on assets.

Finally, the control variables, such as firm size, sales revenue growth rate, debt-to-capital ratio, and the pandemic crisis, exert a positive influence on both accounting and market performance. In contrast, the dividend payout ratio and current ratio show a negative impact on firm performance. Regarding firm age, the results indicate a negative influence on ROA, while the effect on EPS is positive.

3. Conclusions

This empirical study investigates the impact of key ESG-related factors on the financial performance of healthcare firms in the United States between 2000 and 2024. The analysis is based on a panel of 60 companies, all constituents of the S&P 500 index. The research focuses on exploring how selected environmental, social, and governance indicators relate to firm profitability, employing a comprehensive econometric framework that includes linear and nonlinear regression models, along with interaction effects to account for the influence of the pandemic crisis.

The findings reveal distinct patterns: total water withdrawal initially supports accounting performance, but beyond a certain threshold, its effect turns negative, indicating diminishing returns on excessive resource use. In contrast, its relationship with EPS is overall positive, reflecting scale-related profitability in water-intensive operations. The proportion of women employed shows a nuanced effect, negatively associated with ROA but mildly positive, though not statistically significant, for EPS. Notably, this indicator's influence shifts direction at higher representation levels, and during the pandemic, its impact on market performance became significantly more positive. Higher executive remuneration consistently improves performance metrics up to a point, especially ROA, but shows signs of negative returns when compensation exceeds certain levels. Interestingly, the effect on EPS is less robust and statistically insignificant. These insights suggest that while ESG investments can enhance performance, their outcomes are contingent on scale, timing, and context. Control variables such as firm size, revenue growth, leverage, and pandemic-related dynamics further strengthened the explanatory power of the models.

From a policy perspective, healthcare companies should closely monitor how resource usage, workforce composition, and executive compensation influence their financial performance. Efficient water management is essential, as moderate levels of resource use can enhance operational outcomes, whereas excessive withdrawal may reduce asset efficiency. Human capital strategies should prioritize balanced gender representation, as a diverse workforce, particularly female employment, has shown varying effects on profitability, which may become more favorable in times of crisis. Compensation policies must be carefully structured to attract talent and drive performance, while avoiding excessive packages that may lead to diminishing returns. In sum, ESG-related policies must be calibrated to sector-specific dynamics and periodically reassessed, especially under disruptive conditions such as global health emergencies.

This study is limited by its focus on S&P 500 healthcare companies within a specific timeframe. Future research could expand by including other sectors and regions, a broader range of ESG indicators, and macroeconomic variables, using more refined econometric approaches to capture complex relationships between sustainability practices and firm performance.

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This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

TRANSFER PRICING ISSUES – THE ARM’S LENGTH PRINCIPLE

DOI: <https://doi.org/10.53486/dri2025.34>

UDC: 336.22:339.92

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Abstract: *As the globalization process and international trade has taken off, the number of multinational groups significantly increased. Especially for the past century. In this regard, it is important to address the consequences for the MNEs as well as for national tax authorities. Since, the topic of transfer pricing has become the top priority on the tax authority's agenda it is important to highlight the issues found within the documentation of transfer pricing, such as the arm's length principle. This paper provides an overview on the main considerations on the arm's length principle: applying steps, arm's length price determination, main issues encountered in tax practice. The paper is based on qualitative research according to the field literature/legislation as well as the author's practical perspective. As the results have shown there are several issues within the arm's length principle, more specifically: differences identified between controlled and uncontrolled transactions; identifying and applying reasonable search criteria in a specialized database; identifying comparable and independent companies suitable as benchmarks for comparability analysis; identifying a reasonable sample of comparable to determine the arm's length range; identifying and applying the most appropriate transfer pricing method. That's why it is fundamental to ensuring equitable taxation across borders, fostering openness in related-party transactions, and protecting national tax resources from erosion due to unlawful profit shifting by multinational corporations.*

Key words: *transfer pricing, arm's length principle, arm's length price, multinational groups.*

JEL: H25, H26

1. Introduction

Nowadays, in the context of globalization and international trade, the subject of transfer pricing is gaining more and more ground. Firstly, because in recent decades the number of multinational groups has increased significantly, as has their role in the global economy. Secondly, because of the tax implications of the topic – companies often use transfer pricing as a tool to shift profits to tax-favourable jurisdictions.

As a complex subject, transfer pricing has always been intensively debated among transfer pricing specialists and researchers. Therefore, intra-group trade is a developing issue. (Ylönen, Teivainen, 2018, p. 441)

Moreover, through the past decades there has been observed an increase in intra-group transactions. Due to the issues associated with international transfer pricing, the topic gained considerable attention in international taxation and is expected to become more significant.

In this context, both tax practice and specialized literature have tended to highlight the deficient aspects of the subject: the problems faced at the level of legislation, methodology, interpretation of terms etc.

An important role is played by the arm's length principle (for the purpose of this paper the following abbreviation will be used "ALP"), because it is the instrument, on the one hand to protect the tax authorities from the phenomenon of evasion, on the other hand to defend multinational groups by ensuring compliance with the prices charged by independent entities.

According to the academic literature as well as the legislative framework, the basic rule in a transfer pricing analysis is that transfer prices should be carried out at arm's length, i.e. in accordance with the arm's length principle. For this reason, the ALP has been and continues to be addressed in economic and tax circles, because it is the cornerstone when we talk about the compliance of the prices charged by affiliated entities in intra-group transactions, whether it is a question of goods, services, loans, intangible assets, with those practiced by independent entities. Thus, when the ALP

is proved to be respected, the taxpayer has implicitly correctly established its profits and has not engaged in profit shifting activities.

Since there has been recorded an increase in cross-border transactions, it is important to highlight the arm's length principle issues, because: **(i)** it ensures fairness and compliance – helps to prevent profit shifting and the alignment with global standards; **(ii)** it avoids the double taxation phenomenon – if the ALP is not followed, it can lead to double taxation or a country's tax base erosion; **(iii)** transparency – supports transparent documentation; **(iv)** risk management – allows to avoid adjustments and penalties; **(v)** strengthens a MNEs position.

2. Literature review

The first country to implement transfer pricing legislation and to introduce the notion of the arm's length principle is the USA, as after the First World War increased the pressure regarding the allocated profits between the companies. (*Fulop, 2023, p.345*)

The arm's length principle is typically used by the tax authorities for the purposes of corporate taxation, more specifically to identify comparable arm's length prices, in order to assess the fair pricing by multinational companies (for the purpose of this paper the following abbreviation will be used "MNEs") in intra-group transactions. (*Keuschnigg, Devereux, 2013, p.432*) As the transfer prices can be used by MNEs for profit shifting purposes, is it important to ensure that the pricing policy applied is in line with the arm's length principle. (*Lemus, Moreno, 2020, p.78*) That's why world countries have started to adopt specific regulations in this area and pay close attention to the transfer pricing issue. (*Ignat, 2019, p.755*)

The ALP was adopted by the tax authorities worldwide, with very few exceptions according to Chongwoo and Matsushima (*2013, p. 119*), as the key principle for multinational companies' taxation and as a tax base protection tool. (*Keuschnigg, Devereux, 2013, p.432*) The principle is defined in the OECD Guidelines ("Organisation for Economic Co-operation and Development Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations"), detailed information about it can be found in the Article 9. In the Romanian Tax Code (Law No. 227/2015) the definition on the ALP can be found under Article 7, paragraph 33.

The arm's length principle is one of the main tenets of previously established universally recognized taxation standards. (*Greil, Schwarz, Stein, 2018, p. 3*) Applying the arm's length principle involves comparing the actions of a tested entity with those of a genuinely independent entity under comparable or identical conditions. (*Keuschnigg, Devereux, 2009, p.3*)

Perhaps there are numerous issues within the ALP. (*Wilkie, 2012, p. 137*) The reliability and the plausibility of the data is one of the critical points when speaking about the ALP. (*Challoumis, 2019, p. 209*)

Nowadays, the effectiveness of the arm's length principle is being contested increasingly. (*Ylönen, Teivainen, 2018, p. 450*) If a transfer price is found to be set not according to the arm's length principle, tax authorities may perform adjustments accordingly. (*Yao, 2013, p.2*) Also, penalties can be applied. (*Chongwoo, Matsushima, 2013, p. 119*)

The ALP is found challenging to implement, has no solid theoretical underpinnings, and provides opportunities for tax evasion tactics, thus applying the arm's length principle has been under strain for years. (*Greil, 2019, p.1*)

Considering all mentioned, the article provides practical examples regarding the issues faced by practitioners in the field of transfer pricing to audit the compliance of intra-group prices with prices charged by independent companies for comparable goods/services.

Reflecting on the preceding, the paper is found to be important for several reasons: **(i)** its usefulness for both the practitioners and national tax authorities; **(ii)** its informativeness on the particularities of the arm's length principle; **(iii)** its practical approach on the subject.

3. Research methodology

The research methodology was applied starting from the following hypotheses:

Hypotheses one: MNEs face certain difficulties when applying the arm's length principle.

Hypotheses two: the ALP issues need to be addressed for several reasons, including the need to ensure fair and consistent tax practices across jurisdictions, promote transparency in international transactions, and prevent tax avoidance through profit shifting.

For testing the two hypotheses mentioned above, qualitative research was performed based on the field literature/legislative framework as well as the author's practical perspective. For a better understanding of the ALP, the article presents an illustrative case study and includes legislative analysis.

4. The arm's length principle applying steps

The tax obligations of related businesses and the tax receipts of the host jurisdictions may be skewed when transfer prices fail to consider the market dynamics and the arm's length principle. (*OECD Guidelines, Chapter 1, p.29*)

The implementation of the ALP revolves upon comparability analysis (*Greil, 2019, p.3*) and can be considered as a three-step process (see **Figure 1** presented below).

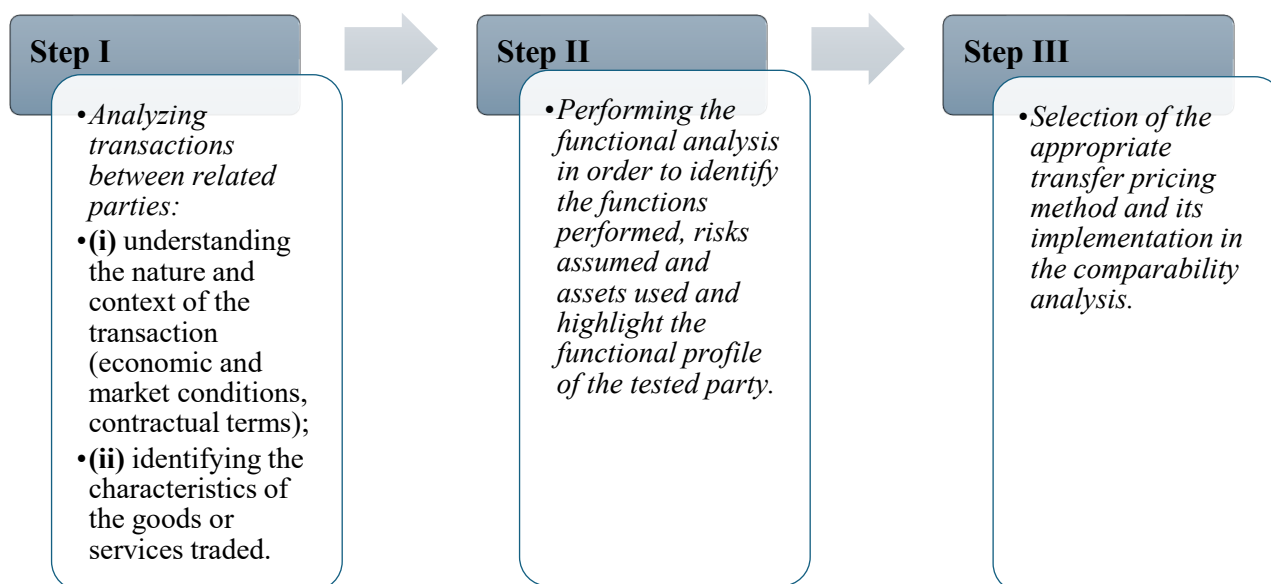


Figure 1. Steps to follow when applying the arm's length principle

Source: own processing

Applying the arm's length principle implies a good understanding of the performed transactions between related parties. First, the facts and circumstances associated with the intra-group transaction must be analyzed. It is a very essential step in the following analysis as it helps to understand what comparable should be identified or if there is any need of adjustment. Once the nature and context of the transaction has been understood, the character of the goods and services where identified the functional analysis should be performed. A functional analysis helps to identify the tested party and its functional profile taking into account the functions performed, risk assumed and assets used. To assure that the comparability analysis is an accurate one, it should be selected the appropriate method for the analysis (see below the transfer pricing methods – **section 6**).

5. Example case of arm's length price determination

One of the companies within the group (manufacturer/distributor/service provider) is in charge to perform certain activities within its functional profile (manufacture/sale/provide) for the benefit of its related party. The Company records a production/distribution/provision cost for the goods/services of 10 EUR. Furthermore, after adding a specific mark-up, the Company sales the goods/services at a price of 12 EUR to its related party – an entity operating in another jurisdiction (for this specific example the Company will be considered a resident of Romania and the related party a resident of Italy). The transactions' flow can be seen in the Figure 2 below:

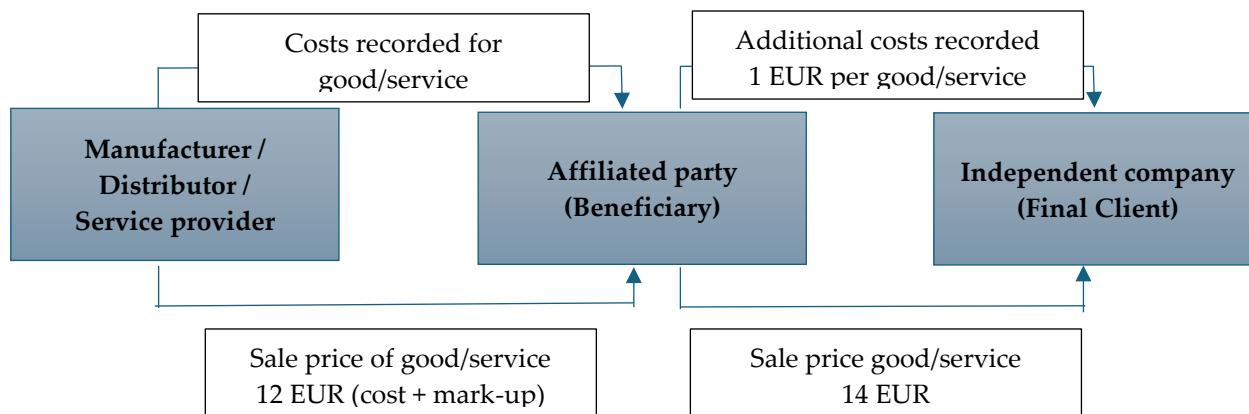


Figure 2. The transaction's flow

Source: own processing

In the case of independent entities with similar or identical functional profile, that are engaged in similar or identical transactions, the price charged for goods or services is considered to be between 8 – 14 EUR (for the purpose of this specific example). Thus, the compliance with the arm's length principle is assured and the sale price of 12 EUR by the Company to the related party is to be considered an arm's length price. The range between 8 – 14 EUR is the arm's length range, determined based on a comparability analysis.

The profit recorded within the Group is 4 EUR, 2 EUR profit in Romania and 2 EUR profit in Italy. Considering that the tax rates in both countries are different, throughout the intra-group transactions the companies could be involved in profit shifting practices by artificially inflating or deflating the transfer price. As a result, the price would not be aligned with the arm's length principle.

6. The arm's length principle considerations and issues

Applying the arm's length principle practically might be challenging since related businesses might do things that independent businesses wouldn't. These kinds of transactions might not always be driven by tax evasion, but they might happen because members of an MNE group deal with each other under different commercial conditions than independent businesses would. (*OECD Guidelines, Chapter 1, p.32*) The compliance of intra-group transactions with the arm's length principle is ensured through comparability analysis. In general, a comparability analysis involves analysing the terms and conditions of a controlled transaction (transactions between affiliated entities) compared to uncontrolled transactions (transactions that take place between independent entities under arm's length conditions).

Normally, any entity, when evaluating the terms of a potential transaction, compares the practical/realistic market options available. In this sense, the entity will not participate in the transaction unless it finds a more attractive alternative.

Checking compliance with the ALP can be difficult for several reasons:

1. Differences identified, if any, should not affect the conditions examined. The OECD Guidelines mention five important factors by which comparability is to be determined, namely: the service/goods specifications; the functional analysis (specifically the functions

performed, the risks assumed, and the assets used); the terms of the contract; the economic circumstances and the strategy of the entity.

2. Identifying and applying reasonable search criteria in a specialized database.
3. Identifying comparable and independent companies suitable as benchmarks for comparability analysis.
4. Identifying a reasonable sample of comparable to determine the arm's length range.
5. Identifying and applying the most appropriate transfer pricing method. The selection of a transfer pricing method is based on: **(i)** data availability and accuracy; and **(ii)** the feasibility of benchmarking between transactions under control and those carried out under conditions of economic independence.

To establish the arm's length price of intra-group transactions, the literature recommends the use of either traditional or transactional methods. The figure below shows the methods that can be used in transfer pricing analysis.

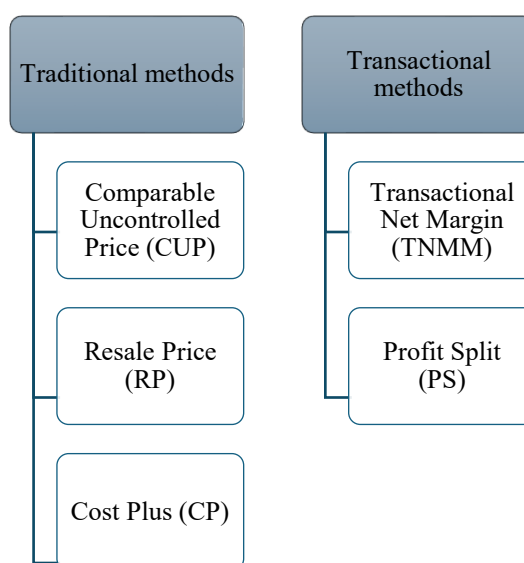


Figure 3. The transfer pricing methods

Source: own processing

Determining the transfer price at market level requires the use of an appropriate method, considering the following elements:

- The circumstances under which prices are set in comparable markets.
- The availability of financial information for both affiliated and independent entities.
- The accuracy and precision of adjustments required to be made for comparability purposes.
- The specific circumstances of the transaction, including the activities carried out, more specifically: market conditions, contractual terms, particularities of the goods/services traded, specificities of the business, market competitiveness etc.

Some methods have proven to have a higher practical applicability. However, in tax practice, the most frequently used method has proved to be the net margin method (TNMM). The particularities of each transfer pricing method are presented below.

1. *CUP* – is applied to identical or similar goods/services traded under identical or similar conditions, it refers to both controlled and uncontrolled transactions. In the case of this method, the price should not be influenced by differences identified at the product/service level or by the circumstances of sale. Among the differences that can have a significant impact on price are: quality, type of market (en-gross / en-detail), geographic criteria, etc. For comparability, either internal comparable (if available) or external comparable can be used.
2. *RP* – is used for transactions consisting of distribution activity, usually applied if no plus value is added on the good that has been traded. The method consists of comparing the resale price

in relation to an independent company, for a good purchased from an affiliated entity, considering the following flow: affiliated party (seller) – tested party (intermediary) – Independent party (end customer). The price is reduced by the resale price margin. The market price under this method turns out to be the price minus the gross sales margin, adjusted for costs (e.g. customs duties, transportation).

3. *CP* – used for activities of production/assembly of goods or rendering of services, in the affiliate-affiliate relationship. The method considers the gross profit margin related to the field of activity.
4. *TNMM* – consists in comparing the net profit margins of the tested party with those of independent entities. The profit indicator is established depending on the functional profile of the tested party, as well as on the availability of information of the companies included in the comparability sample.
5. *PS* – is based on the profit to be shared between the affiliated entities. In general, this method assumes the existence of significant intangible assets. At the same time, this method is feasible when transactions between affiliated parties cannot be segmented, being highly integrated.

As shown above, the research hypotheses have been validated. As long the legislation highlights certain issues when applying the arm's length principle and the field practitioners face those issues in a daily practice, consequently MNEs face certain difficulties when applying the arm's length principle. These issues must be addressed and diminished.

7. Conclusions

The topic of arm's length principle issues is of particular importance. It is fundamental to ensuring equitable taxation across borders, fostering openness in related-party transactions, and protecting national tax resources from erosion due to unlawful profit shifting by multinational corporations.

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

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THE CORRELATION BETWEEN INNOVATION AND ECONOMIC GROWTH

DOI: <https://doi.org/10.53486/dri2025.35>
UDC: 001.895:330.35

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Abstract: *This article analyzes the correlation between innovation and economic growth. This paper aims to analyze and explore how economies can successfully increase their capabilities through innovation policy. Innovation is considered the key factor in technology improvement, the new driver of economic growth, and the crucial strategy for developing the national economy. In order to establish a proper innovation policy is required a deeper analysis of the innovation system, which usually deals with complex interactions between R&D, human capital, and innovation diversification. Due to a virtuous circle that exists between R&D expenses, which can generate new technology and innovations, the result of innovation usually has a direct impact on the increase of productivity and GDP per capita. This thesis emphasizes the importance of structural industrial transformation in determining long-term sustainable economic growth and upgrading the traditional labor-intensive industry to technology. And determining which factors has the greater impact on economic growth and how this can be integrated into innovation policy?*

Key words: *innovation ecosystem, industrial policy, industrial structure transformation, STI system, innovation index, financial infrastructure*

1. Introduction

Better technology offers the potential of better lives for many people, expands human capabilities, better-functioning schools, factories, and applied throughout the economy, greatly increasing efficiency and productivity.

Indeed, we are greatly better off than our ancestors thanks to unprecedented advances in technology, that could give us a much healthier, longer life today than three centuries ago. We are living in an age more optimistic, enjoying much higher living standards.

New technologies, according to journalists, politicians, and scientists, make it possible a heading path towards a better world. Today, we benefit from an incredible tool that is available to us, including magnetic resonance imaging (MRI), mRNA vaccines, industrial robots, the internet, computers, and innovations that we can use to solve problems. The advantage of AI consists in new opportunities provided to scientific and talented entrepreneurs to create and invent solutions to existing problems that the world may face today, which means more capable robots, much human-level artificial intelligence, and perhaps scientific advances that could solve cancer, global warming, and even poverty.

This process of innovation and improvements is also linked to education, skills, competencies, and know-how of the workforce that gives them the ability to create a vision, because how we use knowledge and science determines our capability to turn knowledge into techniques and methods that can be targeted at specific problems.

In addition to that, another key important aspect is the ability of a country to capitalize and to encourage technological innovation, to invest in people, to create a level playing field, and to mobilize the talents and skills of individuals in developing new businesses that can bring new technology to life.

Also, to achieve a better balance by restraining corporate power, strengthening workers' rights, or to increase the availability of finance and technology for the new firms. All of this can improve the quality of life and encourage economic progress. This is actually the reason why societies with better systems of social protection can be more innovative.

2. Basic content

New technology usually increases worker marginal productivity through new machines and production methods, also produce higher wages and create prosperity. This was an example that happened in 1960, period with a large scientific exploration that transformed everything about human existence. During the 1950s-60s, scientists created new goods, including automobiles, refrigerators, televisions, and telephones. Furthermore, industrial countries (America, Germany, or Japan) benefited from higher productivity, all thanks to breakthroughs in technology.

The progress continued with personal computers and digital tools starting to spread rapidly in the 1980s-90s. New digital technology have made a rapid growth and created new jobs, trained as computer scientists, engineers, and financiers. It well known that companies and firms which invest in R&D are more able to increase labor productivity.

This thesis intends to determine the correlation between innovation and economic growth and find the indicator that is weighted the most in measuring the progress of technology-innovation in a country that influence the output.

The awareness of knowledge and human capital as a central role for economic growth led to a significant increase in mass literacy, public education, research and development, and public investment in science and technology. According to Gordo (2013), "the realization that innovation is the key long-term driver of development was itself an innovation". The economic growth model of major economies in the world today has innovation as the key component.

The new era was followed by developing the international enterprise with worldwide recognition, companies such as Google in the U.S. or Silicon Valley.

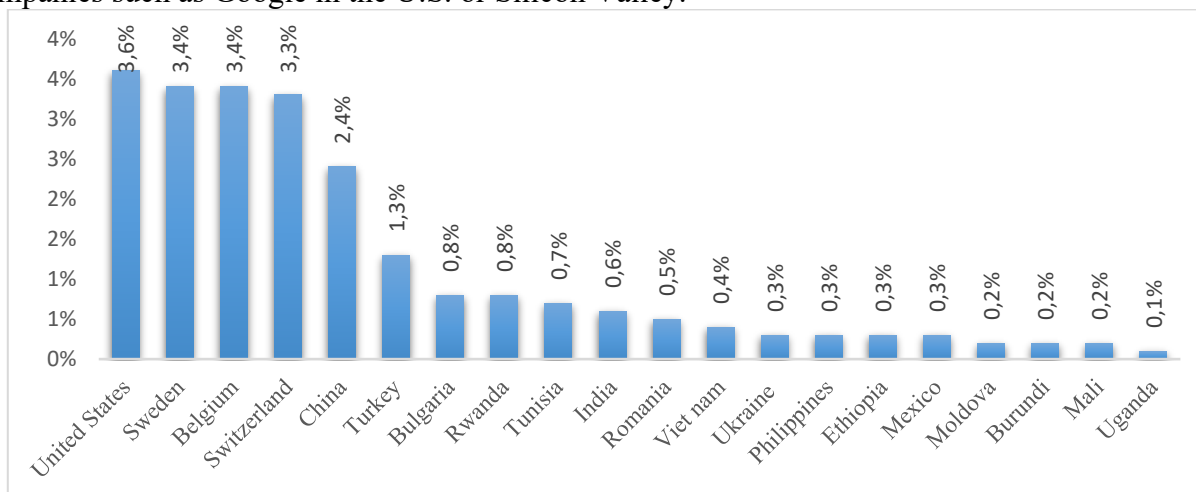


Figure 1. Gross expenditure on R&D, %GDP (2024)

Source: developed by the author based on World Intellectual Property Organization (WIPO) data

In the Republic of Moldova case, the total expenditure for R&D represents only 0,2% form GDP or MDL 699,1 million and the total workforce engaged in this activity is composed by 3,3 working people. Funding for the development and maintenance of research infrastructure is also low, so far it only covers personnel costs and indirect costs related to research activity. Therefore, the need to stimulate innovation through effective and impactful policies to ensure digital transformation is highlighted. An approach in this regard is designed through the medium-term public policies developed by the Moldovan government in the context of EU accession. These policies serve as support for the implementation of the Growth Plan for Moldova and the general objectives of the National Development Strategy. In order to achieve digital transformation, the SND provides a specific objective of developing opportunities for innovation and entrepreneurship, with a priority focus on investments in industrial infrastructure. Another objective considered a priority in this regard is ensuring an attractive business environment, favorable to attracting foreign investment and international collaboration.

However, it must be acknowledged that the design of innovation policies is not an easy task. It may require more analysis of the innovation system of a given country, region, or city. To achieve the industrial structure transformation in the national economy, which is considered the new economic growth driver, each country must focus on scientific, technological, and production capabilities. Nevertheless, the output of each dimension is difficult to estimate. Economic literature typically uses the scientific publication in internationally recognized academic journals to measure scientific advancement. Patent applications are used to reflect the availability of new technology, where each country is assigned to one of 14 technological domains according to the International Patent Classification (IPC). Exports are used as an indicator to show a country's ability to provide competitive goods and services.

The innovation system is a complex and long-term path that requires a wide range of preconditions and policies that are essential for industrial development. The entities' incentive to engage in innovative activities depends on a complex framework that includes macroeconomic stability, a functioning legal system, an effective educational system, and a financial system that can turn savings into investments. Economic research has shown that a series of policy instruments (traditionally so-called *industrial policy*) employed by the government aiming to promote high-technology industry development had a massive impact on industrial diversification over the past half-century. These policy measures include import tariffs, subsidies, and subsidized loans and import-substitution-industrialization (ISI), aimed at improving the competitiveness and capabilities of domestic firms and promoting structural transformation. Starting in the 1950s, industrial policy has been an important strategy for many developing economies in East Asia before becoming globally competitive.

However, many economists claimed that despite East Asia have been the only country that used this specific growth model and had indeed a substantial increase of value added in manufacturing, which was reflected in real GDP. The industrial policy nowadays, compared to the 1950s, is more directed towards the service sector rather than manufacturing, where most factories have embedded robotic machinery in their repetitive and straightforward tasks.

Regarding the service sector, focused more on human knowledge complexity, the policy emphasizes the importance of science, technology, and innovation (STI) and the primary goal is to enhance this pillars that bring new opportunities, create dissemination of knowledge in other important sectors (public health) that improve the daily living society. Additionally, the STI can be incentivized by the government funds and public policy that are able to connect different institutions, such as universities, training centers, research organizations, and regulatory institutions, that can easily create a framework for transferring technology developed in the academic lab to companies.

In advanced economies, the expenditure on education as a percentage of GDP is much higher than in developing countries; for instance, the ratio represents 6,7% in Sweden and 4,6% in India, compared with Uganda, expenditure is even more reduced, 2,6% of GDP. In the Republic of Moldova total expenditure on education as a percentage of GDP represents 6,1%.

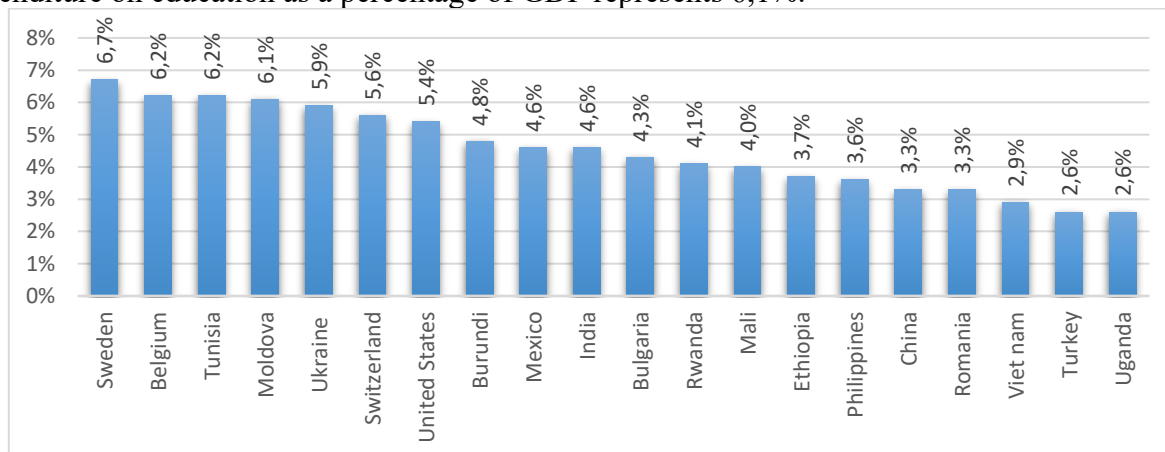


Figure 2. Expenditure on education, %GDP (2024)

Source: developed by the author based on World Intellectual Property Organization (WIPO) data

The linkage between innovation and education has been considered the most important element for technological transformation by many countries. Additionally, a lot of studies have revealed a positive correlation between innovation and education, and the necessity to connect the academic and the business world. The importance of education came from many empirical analyses, which have shown that, even if the government would allocate sufficient funds towards research and development (R&D), the lack of qualified skills would not bring the expected results.

Education gives the possibility for upgrading the supply of labor from low or middle-level skills to sophisticated skills workers essential for high-technology industry development. Advanced countries have already made the process of investing in human resources to create a high labor-qualification in order to develop their own enterprise or to absorb much easier foreign technology. For example, the European Union (EU) is adopting industrial policy, – called smart specialization, designed to encourage innovative skill education and scientific training to increase the competitiveness of the Union's industry. The US had successfully integrated universities and other institutions into its innovative system through technology policy. Japan was another example of cultivating talents by reforming the public education system and funding studies of advanced technology overseas.

However, according to Yifei G. (2022), the education improvement in lower-income countries is faster than the higher-income countries, and this gives the opportunity to contribute to more profound research.

Yet STI policy faces tough decisions in determining which fields of scientific research should receive support, which consequently reflect on which industrial activities will offer long-term benefits.

First, because studies based on surveys find that not all goods and services developed through advanced technology capability are successfully commercialized in the market, sometimes advanced innovations are created from basic exploring science. For instance, discoveries of penicillin and semiconductors that boosted the health and electronics industry. Second, the scientific research can be very theoretical and not easily applicable to organizational practices, which leads to barriers in establishing science-industry linkages.

Usually, many industrial policies are built to support the country's or region's strengths to achieve a higher level of productivity and innovation. And this is the reason why countries do not produce the same outcome and instead are specialized in a specific scientific, technological, or production field using comparative advantage. Studies show that among the 11 important scientific domains, the chemistry domain accounts for the largest output; subsequently, among the 14 technological domains, the information and communication technology (ICTs) and biopharma have the most international patents; and lastly, among the 15 production domains the machinery and transport equipment accounts all exports. For instance, the European Union has launched a five-year plan called the European Skills Agenda to ensure that people have the right skills for jobs. The European Union also pointed out the importance of girls and women in the information and communications technology (ICT) sector, which today represents only 19,5% of employees.

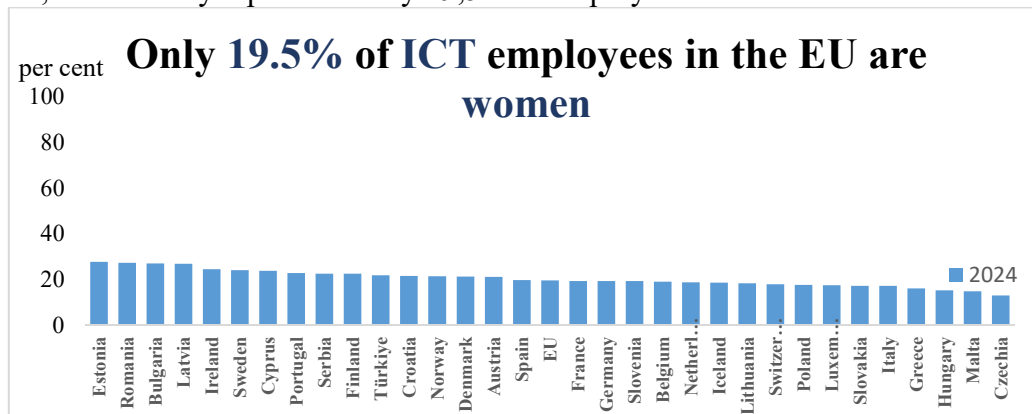


Figure 3. Women ICT employees in EU

Source: EURSTAT, European Parliament (www.europarl.europa.eu)

The same aspect we could find when the R&D sector was analyzed for the Republic of Moldova, technology and innovation have a lower number of women researchers (26,6%) from all science domains. For instance, the Government of Rwanda has established a funding instrument, "Women in Science Research and Innovation Grant (WIS)" to help women scientists develop research proposals that will enable them to create jobs and become entrepreneurs.

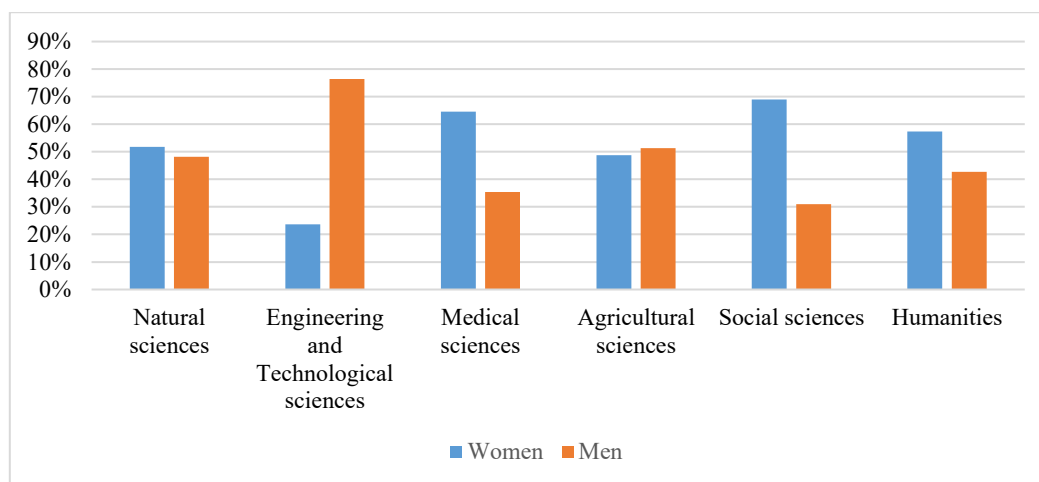


Figure 4. Women in science research and innovation in the Republic of Moldova
 Source: NBS

Specialization has its benefits as well as drawbacks. For instance, it can boost the economy's growth and efficiency, develop expertise, and produce higher-quality output; however, it can also be vulnerable to global supply chain disruption, external shocks, or international market volatility.

The majority of high-income economies managed to specialize and accumulate a considerable diversity of capabilities, making them part of the global innovation area. Over the past 20 years, these top countries are namely United States, Japan, China, Germany, and the Republic of Korea, whose economies have highly concentrated innovative outcomes.

Therefore, these top countries already have a high-functioning innovation ecosystem that can transform ideas into science and technology for the future and avoid vulnerabilities as much as possible. Understanding the specialization and diversification is essential for less developed regions in designing innovation policies, along with the concept of smart specialization, more recently developed by Western countries.

Therefore, studying the relation between innovation effort (meaning the performance of the high-technology industry and massive input in the research and development, R&D section) and economic output can also help to better compose the policy agenda for the recovery of the economy. Literature review reveals that the innovation index positively correlates with education level, and there is a positive correlation between innovation and R&D expenditure. However, even if the R&D investment takes a long time to have a visible impact on the economy, it nevertheless has a stronger correlation with GDP growth or income per capita. From the graph below, we can see that developing and underdeveloped countries are still struggling with low income per capita (PPP USD\$), despite their higher expenditure on education.

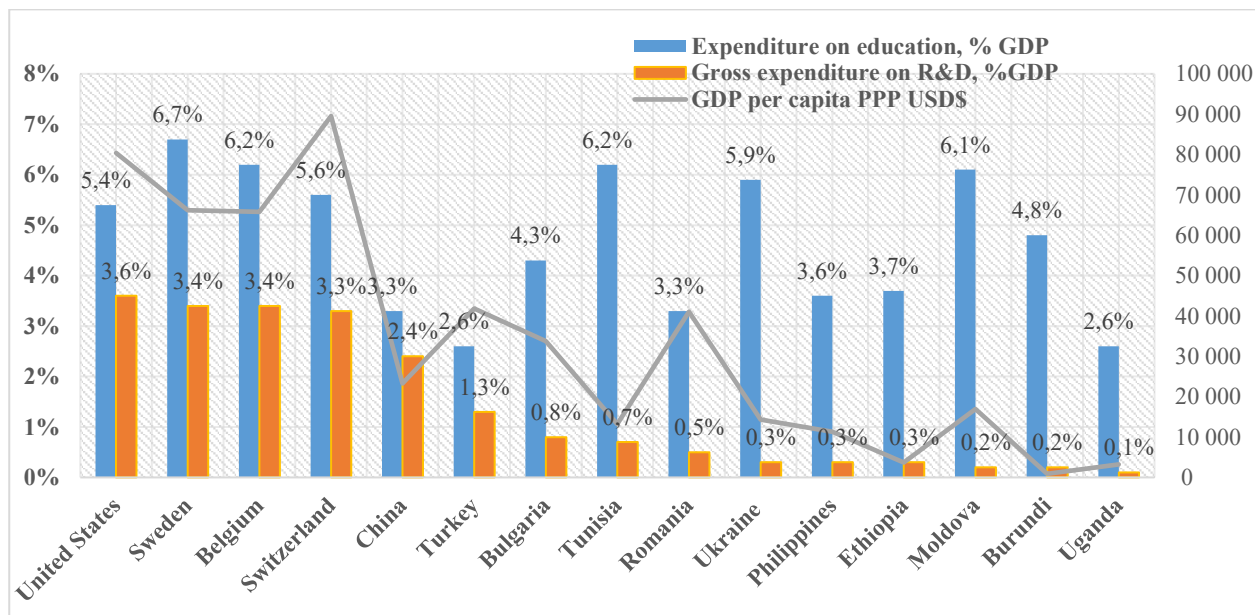
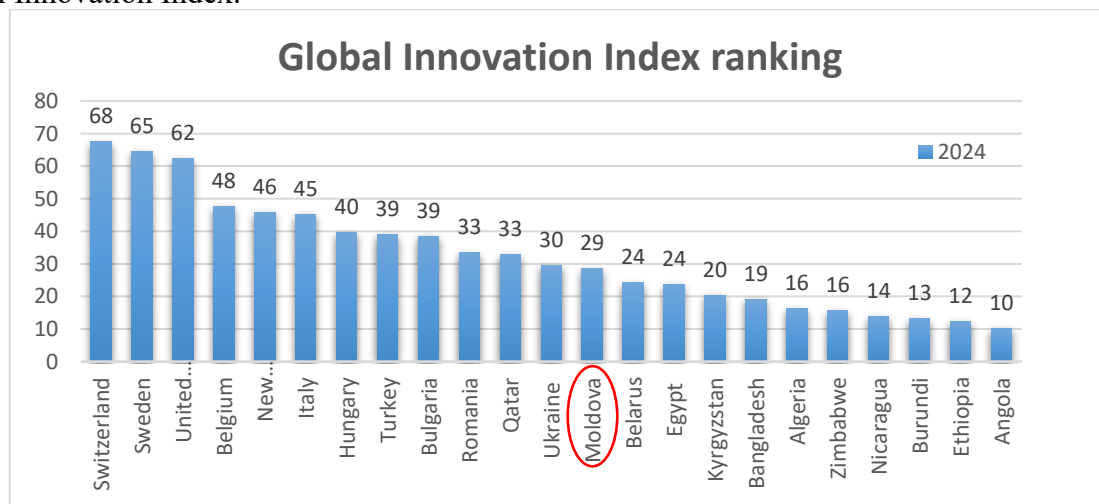


Figure 4. Expenditure on education (%GDP), expenditure on R&D (%GDP), and GDP per capita, 2024

Source: developed by the author based on World Intellectual Property Organization (WIPO) data

Along with these indicators and many others compose the Global Innovation Index Ranking gives an overview of a country's relationship with innovation progress and comparison with other economies. In the long term, it is expected that the Republic of Moldova will be a European country producing technology and innovations (relative to its size and economic capacity) and not just importing the existing technology. For this, the preparation of the PNCI also includes and follows the indicators with a significant impact, such as share of research expenditures to GDP and the improvement of Global Innovation Index.



Moreover, another important key element when designing the innovation policy is the relationship between digital payments integration and economic growth. In the last few years, digital payment has been a broader regional economic strategy with public sector support.

Implementation of FPS represents a major step towards digitalization and contribution to the innovation ecosystem to help and ensure a more efficient and accessible financial system, which can bring a variety of benefits for the government, individuals, and businesses. In the Republic of Moldova instant payment (MIA) has launched in 2024 by National Bank of Moldova, the willingness involvement of central bank in enhancing the payment infrastructure come along with the responsibility, as overseers, to ensure trust in money for all stakeholder participant in financial

market, both the public and private sector. Consequently, the central bank has consolidated the efforts in ensuring proper governance and risk management to guarantee that FPS is safe, secure, resilient, and efficient.

Instant payment has the potential to drive financial inclusion, reduce the cost of financial transactions, and make more affordable and accessible payment options for individuals and businesses; additionally, it can be associated with greater productivity and economic development.

Integration of fast payment has increased across many jurisdictions; economic literature has shown that digital payments can accelerate economic growth, for instance, through e-commerce, due to cheaper and faster transactions, which can facilitate online purchases. Literature also provides evidence that once an individual builds up a track record of formal payment, afterwards can access financial services beyond payment, resulting in higher levels of access to credit from financial institutions.

3. Conclusions

This study investigation examines the determination of which is more important from a policy analysis perspective: the expenditure on education or the expenditure on R&D. And why are some countries more advanced and others are left behind. As we can see from the last chart, there is a stronger correlation between expenditure on R&D, rather than expenditure on education. Even if the government allocates sufficient financial resources to develop the education system, to this must be added other factors in order to increase the economic competitiveness and standard of living. Investing in infrastructure, regulation, and other aspects aims to establish an innovative-friendly environment, it is also important. Another important aspect that should consider in a country's plan of growth is the prioritization of industrial policy and STI system that can shape industrial development. Additionally, it should give importance to R&D efforts in the pursue of GDP growth, based on results, innovation efforts would have better performance in the high-technology industry. As we can see, among countries income group, the expenditure on R&D from total GDP is almost two times that of upper-middle-income countries.

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BIAS-DRIVEN INVESTING IN EMERGING CAPITAL MARKETS: A BLUEPRINT BASED ON FAMILIARITY, ANCHORING, AND RECENCY

DOI: <https://doi.org/10.53486/dri2025.36>

UDC: 330.322: 336.76

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Abstract: *Behavioral finance serves as an essential method for illustrating how mindset and perception shape investment choices since conventional wisdom on capital market operations logically and insufficiently captures the reasons behind investors' sometimes irrational actions. This paper aims to explore investor behavior across two emerging stock markets, Romania and Turkey, affected by anchoring, familiarity, and recency biases over the last five years, framed by major shifts in the global environment. Average prices of benchmark stock market indices, intercorrelated with the COVID-19 crisis and the Russian-Ukrainian conflict, form the basis of the data in the study. The framework uncovers the effects of psychological variables on stock markets as coefficients and statistical significance tests. The findings reveal meaningful differences between the two capital markets: in post-pandemic Turkey, the negative familiarity index alerts investors' growing knowledge of the stock market, driven by an inflated sense of confidence about it. The anchoring effect in the Romanian post-COVID era has a notable positive impact on prices, implying a more pronounced attenuation in choice-making tied to previous experiences. In contrast, the presence of anchoring bias within the Turkish market has a substantial influence that leads to more rational investment decisions. Recency bias exerts a weaker influence in Romania than in Turkey. The paper highlights the behavioral variations between the markets studied and recommends more studies to clarify the emerging market's mechanisms.*

Key words: *behavioral finance, emerging capital markets, familiarity bias, anchoring bias, recency bias.*

JEL: D91, F37, G41.

1. Introduction

Thaler (1999) argues that the controversy over behavioral finance is fading as researchers recognize the validity of this approach, which integrates systematic investor behaviors and errors into financial models. Ricciardi and Simon (2000) explore the impact of cognitive and emotional factors on decision-making, and important notions include overconfidence, cognitive dissonance, regret theory, and prospect theory. Ritter (2003) argues that behavioral finance elevates the traditional assumption of utility-maximizing rational investors in an efficient market to translate speculative bubbles in the market. Statman (2014) pursues the integration of elements from classical finance into behavioral finance, starting with behavioral portfolio theory and behavioral asset pricing models. Chang (2025) builds a conceptual model based on equational structure analysis to examine the relationship between cognitive/emotional biases and the mood effect in financial behavior. The study explores the impact of behavioral factors such as herd effect, mood effect, blue-chip equity bias, and overconfidence on risk perception and financial literacy, distorting investment decisions (Almansour et al., 2025).

According to Cao et al. (2003), investors avoid unfamiliar options for fear of change, preferring familiar choices, leading to behaviors such as lack of diversification and preference for local or already owned stocks. Bulipopova et al. (2014) demonstrate in an experiment that investors exhibit greater reluctance to take losses when managing familiar assets, creating a doubling of the willingness to hold loss-making stocks. This behavior manifests as familiarity bias that amplifies the disposition effect. In 2018, Liu et al. show in their paper that foreign investors exhibit familiarity bias behavior by being on the list of favorites of emerging markets they are familiar with, thus minimizing the potential for efficient international diversification with these suboptimal investment choices. Dong et al. (2021) edify the negative influence of familiarity bias in earnings-based stock valuation. Lei and

Mathers (2024) discuss investment decision bias, where investors tend to choose familiar or owned stocks, which is influenced by education, income, gender, age, and risk tolerance.

Tlili et al. (2023) explores investment behaviors and the impact of psychological factors in MENA equity markets, highlighting herding and anchoring biases that shape investors' decisions, especially during market downturns. Owusu and Layrea, in 2023, start a study showing that Ghanaian investors are significantly influenced by mental anchoring when it comes to mutual fund investment decision-making. Nguyen's (2024) study shows that large language models (LLMs), including GPT-4 and Claude 2, are affected by anchoring bias in predictions. The study by Sumantri et al. (2024) analyzes the effects of representativeness, availability, and anchoring on investment decisions, finding that representativeness and availability significantly influence these decisions, while anchoring has no significant effect.

Recency bias partially explains the volatility of the US stock market before and after the global financial crisis in the formation of investors' dividend expectations (Gandr , 2020). According to Durand, Patterson, and Shank (2021), NFL bettors are under the influence of recency bias, betting on teams that have won recently, thus creating a chain of irrational decisions exploited by bookmakers. Open-source visual-linguistic models are under attack by recency bias, marking human cognitive biases and extrapolating concerns about their applicability in critical domains (Xiao et al., 2024). Kotomin and Varma (2025) discuss how individual investors reduce their recency bias in December, when, for tax reasons, they evaluate all previous losses in their portfolio and no longer limit themselves to recently purchased securities.

This paper is arranged as follows. Part 2 delineates the methodology applied to fulfill the objectives of this study, specifying the techniques utilized in modeling the three independent variables: familiarity, anchoring, and recency. Part 3 underlines the empirical findings and examines the ramifications of these behavioral characteristics on market price kinematics. The last part summarizes the main insights of investment behavior under the pressure of cognitive errors.

2. Modelling independent variables: familiarity, anchoring, and recency.

The motivation of this paper is to analyze the behavioral factors that explain the fluctuations in transaction prices in two emerging stock markets, Romania and Turkey. The intention is to trace the impact of investors who are characterized by behavioral errors, as independent variables, on the average trading price, as a dependent variable. The time corridor analyzed covers the last five years, from March 2020 to October 2024, covering two of the significant events of the last years, namely, the beginning of the COVID-19 pandemic and the beginning of the war in Ukraine, fueled by global inflation, and incorporates the daily values of the most important stock market indices traded in both markets, namely BET for Romania and BIST 100 for Turkey, together with the daily trading price of the two indices.

During the five years of the study, we have surveyed the impact of two global events, namely the COVID-19 pandemic (March 11, 2020– February 23, 2022) and the war in Ukraine, along with global inflation (starting February 24, 2022), on stock markets, highlighting the effects on global economies and market volatility. We have selected a quarterly analysis, dividing these events into four-month periods to highlight market developments and the effects of each crisis on investor behavior and trading volume.

The bias exposure of investment behavior makes its modeling a complex one, treated in a psychological manner. The proposed model combines familiarity bias, anchoring effect, and recency bias in processing the average trading price.

The anchoring of the investor in the first information offered in the market makes his investment decision disproportionately influenced by that initial reference point; thus, the decision process is prone to cognitive errors on the background of over-reporting.

In highlighting the anchoring effect, we relied on the following hypothesis: if the current price in the market is higher than the price at the time of the event trigger or anchor price, i.e., for the pandemic,

March 11, 2020, and for the war in Ukraine, February 24, 2024, then investors remain anchored to the initial price and do not open investment positions in the stock market; the investor tends to avoid the investment, perceiving it as a favorable opportunity already lost, not perceiving it as a real growth opportunity in the future.

The investor's likelihood of investing decreases as the current price is further away from the reference price. The mental anchor causes any change in the market to be seen by the investor as below the initial one.

$$\begin{cases} \text{if } P_t > P_a, \text{ there will be no trading} = \text{anchoring effect inactive.} \\ \text{if } P_t < P_a, \text{ there will be trading} = \text{anchoring effect active.} \end{cases} \quad (1)$$

$$\text{Anchoring index} = \text{average (population of anchors).}$$

The familiarity bias refers to the investor's tendency to opt for investments considered safe for him, familiar, in the absence of his preference to invest in unfamiliar securities or to go out of his comfort zone.

In considering the quantification of the investor's familiarity index as inversely proportional to price volatility, we considered that an asset with low price volatility denotes stability, hence familiarity. Exponential familiarity increases investment probability, even when returns are not exceptional. Investors prefer investing in the familiar because it gives them a sense of security and control; even if the assets have the same real risk, the investor perceives the familiar asset as less risky.

$$\begin{cases} \text{if volatility increases, the familiarity index decreases.} \\ \text{if volatility decreases, the familiarity index increases.} \end{cases} \quad (2)$$

$$\text{Familiarity index} = 1/\text{volatility.}$$

Recency bias is perceived to be a cognitive error whereby people attach greater importance to recent events compared to those in the distant past; thus, recent information is incorporated into the price, whether it is relevant or less significant. So, an investor will be influenced by the recency bias when buying an asset just because its price has risen recently, believing that it will continue to rise, or avoiding an asset in the long run because it has had a recent decline. Investors see the recent rise in price as a positive signal, and the recency bias gives them the impression that the trend will continue tomorrow, thus creating a form of FOMO, and traders decide to enter the market while the price is still going up. Unrealistic expectations stimulate optimism and involve the investor in a string of trades.

$$\begin{cases} \text{if } P_t > P_{t-1}, \text{ there will be trading} = \text{recency effect active.} \\ \text{if } P_t < P_{t-1}, \text{ there will be no trading} = \text{recency effect inactive.} \end{cases} \quad (3)$$

$$\text{Recency index} = \text{average (recency population).}$$

The study has integrated the average price as the dependent variable because it focuses on the market evolution and is influenced by rational expectations and investor behaviors such as familiarity, anchoring, and recency.

$$\text{Price} = \beta_0 + \beta_1 * \text{Familiarity index} + \beta_2 * \text{Recency index} + \beta_3 * \text{Anchoring index.}$$

3. Empirical results.

The regression analysis serves to underscore how rational expectations and behavioral biases shape trading activity across the two emerging capital markets under investigation.

Table 1 shows the coefficients of the independent variables for event 1 (the COVID-19 pandemic) for the Romanian and the Turkish capital markets. The results report coefficient, t-statistic, and R² values for each variable.

Table 1. Coefficients of independent variables for Event 1 (the COVID-19 pandemic)

Capital market	Independent variables	Coefficients	t-statistic	R-square
Romania	Constant (Average Price)	5.222202594	0.044069345	0.494818773
	Familiarity	-0.211892751	-0.115950768	
	Anchoring	-6.276438583	-0.061106918	
	Recency	2215496292	0.610074458	
Turkey	Constant (Average Price)	208429.2412	9699222921	0.996844033
	Familiarity	-49402.8623	-1.755037469	
	Anchoring	-205567.3721	-8.958257141	
	Recency	-1004.354845	-0.451153941	

Source: Author's contributions

After reading the table, it can be highlighted that in Romania, during the pandemic period, the coefficient for the constant is 5.22, with a t-statistic of 0.044, which denotes a low significance of this term in the model.

The familiarity index is negative, which indicates an inversely proportional relationship between the familiarity of investors and the average price in the market; thus, in the Romanian market, more experienced investors or those more familiar with market developments become more cautious or more reluctant to make significant investments.

The negative anchoring bias suggests that the anchoring effect is also inversely proportional to the average price. In other words, investors do not accept transactions at prices higher than the anchor price, which creates a price decrease due to a conservative attitude of investors in the Roman market. The recency coefficient is a positive 22.15, accompanied by a t-statistic of 0.610, which marks a significant relationship between recency bias and average price. In other words, investors respond positively to new stimulus, which generates a price increase, where recent information influences investors' perceptions to a quick and positive market reaction.

In the Turkish stock market, a significant negative relationship exists between familiarity and average market price, as shown by the coefficient of familiarity at -49402.86 and the t-statistic at -1.76; as investors become more familiar with the market, prices tend to decrease.

The anchoring effect is at -205567.37, accompanied by a t-statistic of -8.96, which shows a significant influence of anchoring on the average price, where investors rely too much on previous reference prices, thus triggering a decrease in market prices.

The recency error of -1004.35, with a t-statistic of -0.45, indicates a weakly significant negative relationship between the variable "recent" and the average price in the Turkish market. In other words, Turkish market investors do not seem to react much to recent market changes.

In general, the R^2 is much higher for Turkey (0.997) than for Romania (0.495), indicating a higher degree of explicitness for price changes in the case of the Turkish market of behavioral indicators.

Table 2 reports the coefficients of the independent variables, i.e., coefficients, t-statistics, and R^2 , for the second event (the Ukraine-Russia war, coinciding with global inflation) on the Romanian and Turkish stock markets.

Table 2. Coefficients of independent variables for Event 2 (the Ukraine-Russia war)

Capital market	Independent variables	Coefficients	t-statistic	R-square
Romania	Constant (Average Price)	14.9012728	2.135070632	0.771567289
	Familiarity	0.115068227	0.343010327	
	Anchoring	4.99097425	3.283484919	
	Recency	-6.905732145	-0.544066614	
Turkey	Constant (Average Price)	17424.176	8651409412	0,939854613
	Familiarity	-1543194.155	-4.93892525	
	Anchoring	0	65535	
	Recency	-13410.1784	-3.627029181	

Source: Author's contributions

On the Romanian market, the dependent variable (average price) indicates a significant relationship with the independent variables in the model, which is a satisfactory explanation of the price variation. The positive familiarity bias of 0.12, with a t-statistic of 0.34, shows a positive relationship between investors' familiarity and the average price.

The anchoring effect of 4.99 with a significant t-statistic of 3.28 signifies a positive and significant anchoring effect on the average price, where investors are influenced by the previous reference prices in the Romanian market.

The recency bias of -6.91, with a t-statistic of -0.54, assigns a weak negative relationship with the average price, where recent events do not seem to impact the prices of the Romanian stock market.

In the Turkish market, during the Russian-Ukrainian war, the familiarity index of -1543194.16, accompanied by a t-statistic of -4.94, suggests a significant negative relationship between familiarity and average price, indicating that higher familiarity could lead to lower prices, a more cautious attitude on the part of investors, or a less favorable reaction to familiar information.

The coefficient of recency bias of -13410.18, with a t-statistic of -3.63, indicates a significant negative influence of the variable on the average price in the Turkish market, which could mean that recent events have a significant negative impact on stock prices.

Overall, with a higher R^2 for Turkey (0.94) than for Romania (0.77), it suggests a better ability of the model to explain price changes in Turkey.

4. Conclusions.

By comparing Romanian and Turkish stock markets between March 2020 and October 2024 to explore how investor behavior was impacted by anchoring, familiarity, and recency biases, we found that the Turkish market model has a higher power to explain the price relationship with these biases. In this market, the recency bias in the Russian-Ukrainian war period shows a significant negative effect on prices, suggesting that recent events negatively influence investors' perceptions and stock prices.

Also, the negative market familiarity index in Turkey in the post-pandemic period suggests a higher investor familiarity with the market, due to overconfidence or overly optimistic market perception.

In the post-pandemic period, the anchoring effect is significantly positive and influences the average price in the Romanian capital market so that investors are more likely to be informationally anchored in their decision-making. In contrast, the Turkish stock market's anchoring coefficient indicates that this factor has no effect on the market, suggesting that investors are more rational and less influenced by external anchors.

Compared to the Turkish market, where recent events or external factors may have a greater impact on market behavior, the Romanian market's recency bias is not as significant.

Finally, the analysis shows that the capital markets in Romania and Turkey behave differently and that each country's stock prices may be impacted differently by behavioral, anchoring, familiarity, or recency variables. I believe that the model explains the evolution of the Turkish market, while further analysis is needed in Romania to clarify the influences of independent variables on prices.

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THE IMPACT OF PUBLIC EXPENDITURE MANAGEMENT ON RESPECT FOR HUMAN RIGHTS

DOI: <https://doi.org/10.53486/dri2025.37>

UDC: 336.5:341.231.14

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Abstract: *In the context of socio-economic challenges in the Republic of Moldova, the study of the impact of public expenditure management on human rights is particularly relevant, since the effectiveness of budget policy directly affects citizens' access to basic services. The analysis of budget priorities allows us to identify the extent to which the state implements its human rights obligations, including the right to education, health care and social protection. The findings of the study reflected in this article contribute to the development of recommendations for improving the transparency and accountability of public expenditure, which is critical for strengthening democratic institutions and protecting citizens' rights. The purpose of this study is to identify the relationship between the factors that determine the effectiveness of public expenditure management and the level of human rights. The article pays special attention to the implementation of economic, social and cultural rights, such as the right to education, health care and a decent standard of living. The international PEFA (Public Expenditure and Financial Accountability) methodology, which allows assessing the quality of public finance management, is used as an analytical basis. The study included a comparative analysis of data for Moldova and a number of other countries with comparable income levels, using the Human Rights Measurement Initiative (HRMI) indicator, adapted to the economic capabilities of the state. HRMI allows assessing how effectively a country implements socio-economic rights, taking into account its resource potential, and not only in absolute values. The findings of the study highlight the need to integrate human rights principles into the planning and execution of the state budget. This requires increased accountability, increased civil society participation in budget processes and strengthened mechanisms for monitoring the targeted use of public funds. The results may be useful for policymakers, human rights defenders and international organizations seeking to ensure a more equitable distribution of resources.*

Key words: *budgetary responsibility efficiency, public budget, public spending*

JEL: H5, K38, O15

1. Introduction

In a modern state, especially in an unstable economic and political environment, as is the case in the Republic of Moldova, effective management of public expenditure plays a key role in ensuring and protecting human rights. This is especially true in the area of economic, social and cultural rights (ESCR), since it is through budgetary financing that the state fulfills its obligation to citizens to ensure a decent standard of living, education, health care, social protection and cultural development (UNDP, 2022).

Assessing the impact of public financial policies on human rights helps to understand the extent to which the state adheres to the principles of fairness, equality and accountability. Without transparent, targeted and equitable distribution of resources, the most vulnerable groups suffer, which leads to systemic human rights violations. For example, insufficient funding of the health sector can lead to limited access to health services for rural populations, the elderly and persons with disabilities, which violates their right to health care.

In a context of limited resources, especially in post-soviet countries with developing economies, it is extremely important to study how public expenditure is prioritized and whether these priorities correspond to the real needs of society. The Republic of Moldova, as a state that has undertaken obligations under international treaties, such as the International Covenant on Economic, Social and Cultural Rights, is obliged to implement these rights to the maximum extent possible, based on the

available resources. Therefore, assessing the effectiveness of budget management becomes not only an economic task, but also a human rights instrument.

In addition, conducting such research helps identify systemic gaps in budget policy, including cases of misuse of funds, corruption, or insufficient focus on the needs of vulnerable groups. For example, if a significant portion of the budget is allocated to servicing public debt, to the detriment of funding social programs, this can directly undermine the implementation of ESCR. Thus, an evidence-based assessment of the impact of fiscal policy on human rights helps reorient public spending towards a more equitable distribution. It is important to emphasize that the protection of economic, social and cultural rights is impossible without a sustainable institutional mechanism based on the principles of good governance. Research in this area also serves as a tool for monitoring and pressuring government bodies to increase transparency and accountability. In addition, they provide civil society and international organizations with objective data that can be used to advocate for reforms and revise public policy priorities.

This line of research is of particular importance in the context of Moldova's integration into the European legal and economic space. European standards imply a high level of human rights protection and social justice, which means that effective public finance management should not only be an instrument of economic growth, but also a mechanism for ensuring social stability and equal opportunities. Thus, these studies contribute to convergence with European standards of governance and legal culture.

Finally, a systemic assessment of the impact of fiscal policy on the implementation of the ESCR is of strategic importance for the country's long-term development. Only by ensuring the observance of basic human rights can the state count on sustainable growth of human capital, a reduction in poverty and social inequality. This, in turn, creates the preconditions for increasing trust in government institutions, strengthening democracy and forming an inclusive society.

Thus, studies aimed at assessing the efficiency of public expenditure management in terms of respect for economic, social and cultural rights in the Republic of Moldova are not only relevant but also necessary. They help to ensure a balance between economic rationality and social justice, strengthen democratic control mechanisms and create a basis for sustainable and equitable development of the state. Neglect of such studies leads to politically motivated or inefficient decisions that can aggravate social tensions and undermine the legitimacy of state institutions.

2. Justifying the need to assess the impact of public expenditure management on human rights

To prove the need to evaluate the influence of the quality of government expenditure management on the level of human rights compliance, the authors used a cumulative index developed and measured by the Human Rights Measurement Initiative (HRMI) - an international initiative to measure human rights compliance indicators in countries around the world.

To demonstrate the need to assess the impact of the quality of government spending on human rights compliance, the authors used the "Quality of Life" index — a composite index developed and measured by the Human Rights Initiative (HRMI), an international initiative to measure human rights in countries around the world.

The index is estimated from two points of view: a) in % of the income-adjusted benchmark in the estimated country and b) in % of the best benchmark achieved in the world. In the first case, the answer to the question «What level of productivity is fixed in the country compared to what is known to be possible to achieve, based on the income level of the country in question?» Each country can reach 100% on this indicator if it effectively uses available resources, including state financial resources. It is obvious that with any value less than 100%, the output should indicate that it is not only necessary, but also possible to improve resource management, including state financial resources.

In the second case, we can formulate an answer to the question "What are the performance indicators of the assessed country compared to the world average, including the level achieved by the most developed countries in the world?"

The index assessment scale is from 0 to 10, where: "10" - full observance of human rights, "0" - complete violation.

As can be seen from Table 1, the "Quality of Life" parameter is assessed based on the level of observance of the right to education, health, food, housing and work.

Thus, in 2021, the income-adjusted quality of life indicator in Moldova was recorded at 85.5%. We remind you that in this case, the resources of the Republic of Moldova are taken into account and how effectively it uses them to ensure the realization of the right to quality life by citizens. In particular, this conclusion will also indicate the effectiveness of public finance management, and indirectly, public expenditure.

Table 1. The level of the Human Rights Measurement Initiative Index recorded by the Republic of Moldova in 2021

	in % of the income-adjusted benchmark in the assessed country	in % of the best benchmark achieved globally
Quality of Life, Aggregate index	85.5	83.6
<i>Right to:</i>		
Education	82.2	76.7
Food	95.7	94.3
Health	76.9	74.5
Housing	73.1	73.1
Work	99.6	99.6

Source: developed by the authors based on the 2024 HRMI Rights Tracker.

The value of 85.5% shows that Moldova achieves only 85.5% of what would be possible with the resources it has. Therefore, Moldova must make continuous efforts to meet its immediate obligations in the field of economic and social rights, including by optimizing the management of public expenditure. Compared to the benchmark obtained on the basis of the level recorded in the best countries in the world, the value achieved by the Republic of Moldova is 83.6%, which is lower than the one explained above. The results of the study show that Moldova needs to promote and successfully implement sustainable policies to achieve the best standards in the world in terms of full satisfaction of the right to food, education, health, housing and jobs for all its citizens.

3. Determinants of the impact of public expenditure management and their relationship with economic, social and cultural rights

The quality of public expenditure management can be assessed using the Public Expenditure and Financial Accountability Framework (PEFA) methodological tool, which is based on international standards and best practices in public financial management. According to the author, the quality of public expenditure management is determined by the level at which the highest government bodies responsible for public financial management achieve results in the following seven areas:

- a) Budget credibility;
- b) Transparency of public finances;
- c) Management of assets and liabilities in the public sector;
- d) Policy-based fiscal strategy and budget strategy;
- d) Predictability and control of budget execution;
- e) Accounting and reporting in the public sector;
- g) External control and audit.

The table below presents the relationship between the pillars of public expenditure management and the main characteristics of human rights.

A credible public budget means that budget parameters (government revenues and expenditures) change in line with budget forecasts, are executed as originally planned by the government and

approved by the legislature. Budget credibility has a direct impact on public financial management, on central and local government, on citizens and indirectly on the observance of human rights, in particular the observance of economic, social and cultural rights.

Table 2 shows the relationship between budget credibility and observance of human rights.

Table 2. Budget credibility: essence and impact on human rights

Indicators Measuring Budget Credibility	Indicators Measuring Budget Credibility	Indicators Measuring Budget Credibility
<ul style="list-style-type: none"> • Total Expenditures Executed • Structure of Expenditures Executed • Revenues Collected 	<ul style="list-style-type: none"> - Initiatives or other spending decisions subsequent to the adoption of the budget, outside the annual budget process; - Significant reallocations of funds between ministries and programs; - Overly optimistic revenue estimates; - Grants and other forms of budget support provided by development partners outside the annual budget cycle; - External shocks (natural disasters, adverse regional or international conditions). 	<p>In general, a reliable budget ensures the regular and relatively sufficient provision of basic public services (education, health, social protection, culture, justice), ensuring respect for human rights. On the other hand, a budget that is not credible, not implemented in accordance with the law, and not transparent, generates unequal access to rights, especially for vulnerable groups.</p>

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

Public finance transparency argues for the role and importance of public access to budget information and reports on the execution of the public budget and the role and importance of citizen participation in the budget process (especially at the level of administrative-territorial units) in strengthening citizens' trust in the proper use of public finances. In this regard, Table 3 develops the link between public finance transparency and respect for human rights.

Table 3. Transparency of public finances

Indicators that measure the transparency of public finances	Indicators that measure the transparency of public finances
<ul style="list-style-type: none"> • Budget classification • Budget documentation • Central government operations not recorded in the financial statements • Transfers to local government • Information on the performance of public services • Public access to budget information 	<p>A transparent budget allows the general public to know the financial priorities of the public administration and to analyze the correspondence of the allocation of resources with the state obligations in the fields of education, health, social protection, housing, culture, etc. Consequently, transparency is a key premise for monitoring by citizens and civil society the correctness of spending public money and identifying possible embezzlement of funds and/or possible failures in the efficient use of public finances. Finally, the problem of compromising the provision of fundamental services for the exercise of human rights can be solved. In turn, central and local public administration institutions become accountable to citizens.</p>

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

The management of public assets and liabilities ensures the stability of public finances, promoting the principle of continuity and universality in the exercise of human rights (Table 4). Respect for human rights is positively correlated with the country's capacity to develop sound macroeconomic

and fiscal projections, which in turn lead to the promotion of sustainable fiscal strategies (Table 5). Specialized public authorities must demonstrate strong capacities to successfully estimate the impact of changes in the economic and social context on budgetary parameters. Medium-term forecasts must be reflected in annual budgets. All relevant stakeholders must effectively participate in the budget preparation process in an orderly and prompt manner. At the same time, it is of critical importance to apply prompt parliamentary control over the annual budget.

Table 4. Asset and liability management in the public sector

Indicators that measure the quality of asset and liability management in the public sector	Indicators that measure the quality of asset and liability management in the public sector
<ul style="list-style-type: none"> • Budget risk reporting • Public investment management • Public asset management • Debt management 	<p>Proper assessment and reporting of budgetary risks allows for the anticipation of economic and social shocks that have the potential to affect expenditures associated with the respect of human rights.</p> <p>Efficient management of public investments supports the targeting of funds towards social and cultural infrastructure objectives, contributing to the respect of economic, social and cultural rights.</p> <p>The management of public assets, by maximizing their value, determines savings of resources that can be reinvested in services associated with fundamental rights.</p> <p>Debt management through the lens of prudence determines fiscal sustainability and the avoidance of curtailment of public services during repayment periods.</p>

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

Legislative procedures governing the examination of the budget must be properly established and respected. Strict assessment of the rules governing the amendment of the budget during the financial year without prior approval by the legislature is required.

Table 5. Fiscal strategy and budgetary strategy based on public policies

Indicators measuring policy-based fiscal and budgetary strategy	Indicators measuring policy-based fiscal and budgetary strategy
<ul style="list-style-type: none"> • Macroeconomic and budgetary forecasts • Budget strategy • Medium-term perspective for expenditure budgeting • Budget preparation process • Legislative review of budgets 	<p>The fiscal and budgetary strategy developed in accordance with the public policies of the state allows for the efficient and predictable mobilization of resources, including to guarantee fundamental human rights. Compliance with macroeconomic and budgetary forecasts when developing and implementing the fiscal and budgetary strategy ensures financial stability, thus ensuring one of the essential conditions for the continuous provision of public services associated with human rights. This planning strengthens the state's capacity to anticipate social needs and allocate resources according to priorities connected to human rights. At the same time, the risks associated with austerity measures that may compromise respect for human rights are reduced. Therefore, ensuring proactive and balanced management can strengthen the protection and progressive respect for human rights.</p>

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

Predictability and control of budget execution, as a pillar that determines the quality of public expenditure management, directly influences the level of respect for human rights (Table 6). In conditions of unpredictability and uncertainty, providers of public services associated with human rights cannot function effectively. In the absence of monitoring and control, money intended for public services necessary for the respect of human rights risks not reaching the target recipients. This pillar explains the method of budget execution. The national public budget and its components must be executed within a system based on standards. The processes associated with budget execution must be predictable and carried out efficiently for the purposes provided by the public administration and approved by the legislative body. Internal controls of budget execution must be effective, ensuring the acquisition and use of resources according to their destination.

Table 6. Predictability and control of budget execution

Indicators that measure predictability and control of budget execution	Indicators that measure predictability and control of budget execution
<ul style="list-style-type: none"> • Revenue Management • Revenue Accounting • Predictability of Funds Availability for Expenditure Commitments • Expenditure Arrears • Payroll Control • Procurement Management • Internal Controls on Non-Salary Expenditures • Internal Audit 	Predictable public budget execution ensures the stability of public financial resources allocated to sectors that determine the respect of economic, social and cultural rights. Consequently, the continuity of the provision of associated public services and their quality is guaranteed. In turn, budget execution control identifies, explains and contributes to resolving discrepancies between the planned and the actual level of public spending. Misappropriation of funds, waste or corruption can be avoided, thus strengthening the impact of public finances on the respect of human rights.

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

The level of respect for economic, social and cultural rights correlates positively with the quality of accounting and reporting in the public sector. Accounting and reporting are basic premises for ensuring transparency in the use of public financial funds. Respect for human rights is all the more coherent, the more accurate and reliable data are maintained in accounting records and reports, and the more accounting and financial reports are generated and disseminated promptly to meet decision-making needs. Good management of public expenditure requires up-to-date, relevant and reliable financial information. As Table 7 explains, transparent and accountable management of public expenditure strengthens public trust, promoting respect for and protection of human rights.

Table 7. Accounting and reporting in the public sector

Indicators that assess accounting and reporting in the public sector	Indicators that assess accounting and reporting in the public sector
<ul style="list-style-type: none"> • Integrity of financial data • Annual reports on budget execution • Annual financial reports 	Accurate accounting helps to verify the compliance of the allocation of public financial funds for public services related to human rights (health, education, ecology, housing) with the state's commitments. In turn, public reporting allows for oversight by citizens, civil society, human rights organizations and parliament, mitigating the risks of corruption or waste that compromise the exercise of human rights. Consequently, these public financial management tools strengthen the accountability of public decision-makers.

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

The "External control and audit" pillar assesses the extent to which public finances are independently monitored and the extent to which there is a system of external monitoring of the implementation by the executive of recommended improvement measures.

The effectiveness of external audit and legislative review of audit reports contributes to holding the executive accountable for its budgetary policy, expenditure policy and their execution. The way in which this pillar can influence the level of respect for human rights is reflected in Table 8.

Table 8. External control and audit

Indicatorii care evaluează controlul și auditul extern	Impactul asupra respectării drepturilor omului
<ul style="list-style-type: none"> • Indicators that assess external control and audit • Impact on respect for human rights 	<p>External monitoring and audit play a crucial role in promoting respect for human rights by providing an independent assessment of how public funds are managed and policies are implemented. These processes help to detect instances of financial mismanagement, corruption or non-compliance with regulations that could directly or indirectly affect the realization of human rights. By identifying weaknesses in systems and making recommendations for improvement, external audits can strengthen the transparency and accountability of public institutions. The publication of audit reports allows civil society, human rights organizations and the general public to hold authorities accountable for their performance and impact on fundamental rights. Ultimately, rigorous external oversight and audit help ensure that public resources are used efficiently and ethically, thereby promoting a more human rights-friendly environment.</p>

Source: developed by the authors based on their considerations and Volume II: PEFA Assessment Fieldguide. Second edition, December 2018. PEFA Secretariat, Washington, DC, USA.

3. Conclusion.

Effective management of public expenditure is essential for the realization of human rights, in particular in the area of economic, social and cultural rights. Components such as fiscal sustainability, transparency of public finances and strategic budgeting form the basis for the equitable distribution of resources and the sustainable financing of fundamental rights and freedoms. Budgetary reliability ensures the correspondence between planned and actual expenditure, which is essential for the stable functioning of systems such as healthcare, education and social protection. The discrepancy between what is promised and what is delivered undermines trust in the state and violates the rights of vulnerable groups that depend on social services. Transparency of public finances allows citizens and independent organizations to monitor spending priorities, identify corruption risks and achieve a more equitable and accountable distribution of funds. Open budgets promote the exercise of the right to participate in public affairs, guaranteed by international norms. A policy-based fiscal and budgetary strategy allows for the real needs of the population to be taken into account and ensures sustainable financing for programs aimed at protecting human rights. If the budget is developed without taking into account social priorities, this leads to chronic underfunding of key areas, such as healthcare or affordable housing. Predictability and control over budget execution, in turn, allow government agencies to plan their activities over the long term, which ensures the stable provision of public services. The lack of control leads to delays, inefficiencies and direct violations of the rights to access quality services. Accounting and reporting in the public sector are mechanisms that ensure the transparency of government actions and prevent the misuse of funds. Deficiencies in this area encourage evasion of responsibility and reduce the efficient use of public resources, which undermines the realization of rights. Asset and liability management helps to avoid fiscal crises that could lead to drastic cuts in social spending. Financial instability has a direct impact on the right to an adequate standard of living, education and healthcare. Finally, external control and audit serve as

the last line of public control and provide an independent assessment of compliance with financial discipline. They help to identify systemic violations, try to address them and build a culture of accountability, which is essential for the protection of human rights.

Therefore, there is a direct relationship between the quality of public expenditure management and the level of respect for human rights. Efficient, transparent and accountable management of public resources not only improves macroeconomic indicators but also represents the foundation of a sustainable and equal society, in which the rights of each person are truly guaranteed.

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TRANSFORMING THE FINANCIAL SYSTEM TOWARDS SUSTAINABILITY BY INTEGRATING ADVANCED INFORMATION TECHNOLOGIES

DOI: <https://doi.org/10.53486/dri2025.38>

UDC: 336.71:004.78(478)

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Abstract: *The article addresses the issue of integrating advanced information technologies at the level of financial institutions, arguing the importance of these technologies for sustainable development. The research results result from the application of a complex methodology, the authors applying the method of synthesis, abstraction, induction and deduction. At the same time, an important place in the applied methodology belongs to the expert method. The main conclusion derived from the research conducted within this publication is that the advanced information technologies evaluated by the authors (digital experience platforms for banks, blockchain, chatbots and artificial intelligence, robotic process automation) are important for ensuring the sustainability of the financial system in the Republic of Moldova, although in different proportions. At the same time, the technologies with the greatest potential to contribute to the consolidation of the financial system in accordance with the needs of sustainable development are digital experience platforms for banks and blockchain technology.*

Key words: *Information technologies, financial system, sustainability*

JEL: G2, M15, Q5

1. Introduction

New technologies are emerging and changing all over the world. The availability of internet connectivity accompanied by smartphone support services has made it easy for a wide range of people to access high-speed technological advances.

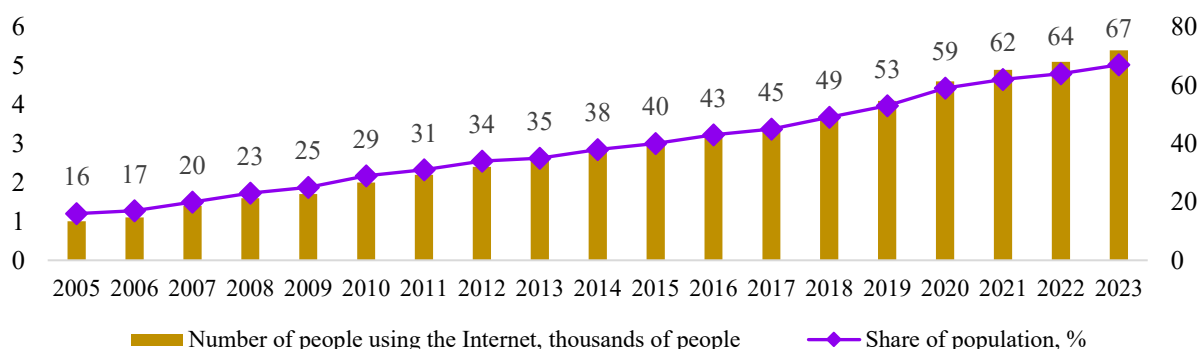


Figure 1. Number of people using the Internet

Source: developed by the author based on the Statistics of the International Telecommunication Union.

According to the International Telecommunication Union (ITU), approximately 5.4 billion people, or 67% of the world's population, used the Internet in 2023 (Figure 1). This is 24% more than in 2019, with an estimated 1.1 billion people connecting to the network during this period. However, 2.7 billion people are still offline.

As can be seen from Table 1, the share of individuals using the Internet in the total population of the Republic of Moldova in 2017 was 76%, which is below the level recorded by Israel and developed

countries. At the same time, according to this indicator, the Republic of Moldova is at the average level recorded by the Central European and Baltic countries.

Table 1. Individuals using the Internet (% of population)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Israel	70.8	70.3	75.0	77.4	79.7	81.6	83.7	86.8	90.1	n/a
Moldova	43.4	60.0	67.0	69.0	71.0	76.1	n/a	n/a	n/a	n/a
High-income countries	74.8	76.2	77.9	79.4	83.8	85.3	86.9	88.3	89.4	n/a
Lower-middle-income countries	14.4	16.1	18.5	20.9	23.8	26.8	30.1	36.1	45.0	n/a
Middle East and North Africa	31.2	35.2	40.1	44.5	50.0	56.9	61.1	67.2	75.5	n/a
Central Europe and the Baltics	61.7	63.5	66.5	67.3	71.3	73.4	76.0	78.7	81.8	84.7
Europe and Central Asia	63.9	66.3	68.9	70.0	72.4	74.5	79.1	81.4	83.8	86.5

n/a – data not available

Source: developed by the author based on World Telecommunication/ICT Indicators Database.

According to the International Telecommunication Union (ITU) database, the indicator expressing the share of individuals using the Internet recorded a value of 63.5% in the Republic of Moldova and 91.9% in Israel in 2023. For comparison, in the same year, this global figure was 67.4%.

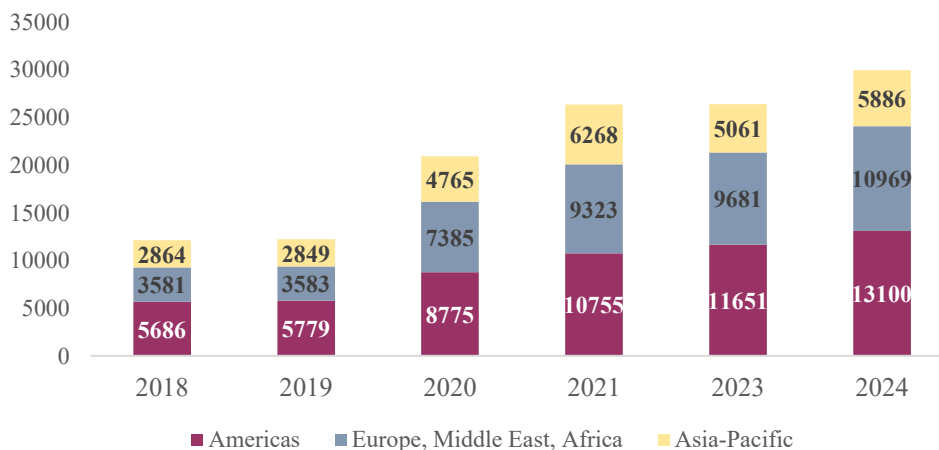


Figure 2. Number of fintech startups worldwide from 2018 to 2024 by region

Source: Statista Database.

This dynamic creates favorable conditions for the development and implementation of innovative technologies at the level of the financial system of the Republic of Moldova.

Mobile and digital payment systems remain a key driver for Fintech. The number of Fintech companies is growing rapidly worldwide, offering service options in many areas, such as payment systems, asset management, credit solutions and insurance services. This technology is well designed to support businesses, and is well adapted to regulatory standards and principles.

As of May 2024, there were 13,100 fintech startups in the Americas, making it the region with the largest number of fintech startups in the world. In comparison, there were 10,969 such startups in the EMEA (Europe, Middle East, and Africa) region and 5,886 in the Asia-Pacific region (Figure 3.11).

1. Financial Technologies (Fintech): Nature and Scope

The restructuring of the banking and financial sector entails the interplay of financial technologies (Fintech) and blockchain technologies. Fintech is considered one of the most significant revolutions in the financial industry. It has progressed at an accelerated pace, partly due to the sharing economy, favorable legislation, and advances in information technology. Finance and technology have been involved in a long-term process of developing Fintech based on new technologies.

Fintech refers to the application of innovative technological solutions in the financial services industry.

Fintech adoption varies geographically depending on several factors. Naturally, the level of internet penetration plays a major role, especially mobile internet usage. Trust in technology firms also influences adoption, as well as trust and access to traditional financial services. Finally, access to capital depends on the local volume of investment in fintech, which also depends on regional variables. Table 2 presents the number of automated remote service systems in the Republic of Moldova. As can be seen from the data in this table, the annual growth of this indicator is significant, which indicates significant prospects for fintech technologies in the Republic of Moldova.

Table 2. Banking automated remote service systems (ARSS) in the Republic of Moldova

Quantitative indicators of ARSS	2017	2018	2019	2020	2021
Total number of ARSS holders, thousand	545.9	898.3	1600.2	2085.9	2572.6
Number of active ARSS holders, thousand	138.1	230.5	384.2	626.6	787.8

Source: developed by the author based on the Annual Reports of the National Bank of Moldova.

Table 3 shows the distribution of holders of automated remote service systems (ARSS) in the Republic of Moldova depending on the type of systems used. Thus, of the total number of holders of ARSS, the largest share is for Internet payments, although this value is decreasing. Mobile payments occupy the second position and are constantly growing.

Table 3. Distribution of holders of banking ARSS by type of systems used, %

System type	2017	2018	2019	2020	2021
Internet payments	71.7	70.9	55.7	56.1	56.5
Mobile payments	16.1	21.4	40.6	41.1	43.4
PC payments	1.8	1.2	0.1	0.1	0.1
Phone payments	10.4	6.5	3.6	2.7	0

Source: developed by the author based on the Annual Reports of the National Bank of Moldova.

Fintech provides an online platform that can electronically increase the convenience of access to such services. An e-wallet makes payment transactions directly to transfer cash from one wallet to another, simply with a mobile phone number as a key identifier. No account details are required to transfer funds.

FinTech solutions are better equipped than banks and other lending institutions to provide quick access to cash reserves and loans for people with low or no income (Ozili, 2018).

FinTech has also changed the traditional position of a financial investment adviser. FinTech companies in this position can provide high-tech advice related to money through a digital platform, helping clients invest in financial products.

2. The Future of Fintech in Banking

The banking and financial industry is a dynamic industry with intense competition for products and services. Accordingly, banks are constantly determined to grow and transform to avoid being outpaced by competitors.

The banks of the future aim to become efficient, technologically advanced branches where bottlenecks are no longer present and where services will be provided through self-service machines. Online services will be targeted at consumers, who are the primary target of the bank.

The future of banking will involve digital technologies to transform traditional banking into digital banking. Banking and customer relationships will remain the focus (Mekinji, 2019).

The use of digital technologies has prompted traditional banks and other financial institutions that have traditionally been at the forefront to upgrade their skills and knowledge (Iman, 2019).

The rise of fintech in the past few years has changed the way we do business. It is helping cash-centric countries to move towards cashlessness. Therefore, FinTech customers must change their values and morals in light of the adoption of new digital practices (Pousttchi, 2018).

FinTech creates innovative products and services to meet customer needs that are not met by traditional financial institutions. The obligation of FinTech implementers is to implement business practices that are responsible for consumer protection. FinTech aims to provide bank customers with continuous access to financial services. Therefore, the banking sector must focus on confirming more secure transactions, since the privacy of their customers' data can be hacked. FinTech has begun to offer efficient and dynamic solutions for banks and financial service providers such as loans, money transfers, insurance, and remittances. Financial services and banks are experiencing an increasing need to achieve strong, fast, and flexible results.

Parallel technology performs the best functions of FinTech. Blockchain technology is currently being considered for its impact on banking and financial services in a general context with other industries and sectors. Blockchain technology is decentralized, transparent, anonymous (or pseudonymous) and immutable. Blockchain uses encryption technology to form digital currencies, a new favorable medium of exchange that is safer and better than cash. Blockchain technology has the potential to change the financial services sector in many ways. This technology can undoubtedly reduce problems, failures and failures in many aspects of fintech service, so blockchain should be considered as a promising technology to solve significant problems in the banking and financial sector that have hindered the development of the industry for many years.

In order to develop a common transmission scheme (common transmission mechanism) of the potential benefits of information technology to financial institutions in a way that promotes sustainable growth, authors applied the following methodology:

- In the first stage: Identify the advanced information technologies used in the financial systems of developed countries. Identify the benefits of these technologies in terms of supporting sustainable economic growth;
- In the second stage: Identify the characteristics of a financial system that promotes sustainable economic growth;
- In the third stage: Identify the advanced information technologies that can best realize and enhance the characteristics of a financial system associated with sustainable economic growth.

Stage One. Advanced information technologies used in financial systems of developed countries and the benefits of these technologies for sustainable economic growth. New information technologies used in the financial sector change the interaction between consumers of financial services and their money.

At the same time, the impact of these technologies on the work of financial institutions depends on the type and functions of these technologies, which must be well studied and adapted to the specifics of a particular institution in order to obtain maximum benefit.

Analysis of international experience in the use of advanced information technologies in financial institutions of developed countries allowed the author to identify the following types of advanced information technologies used in the financial systems of developed countries and the benefits of these technologies that contribute to sustainable economic growth:

Digital Experience Platforms for Banks. New technologies allow financial institutions to adopt relatively new platforms, such as hybrid platforms, which are able to offer consumers privacy and accessibility, intelligent data integration in real time (digitization, personalization, and advanced

analytics in real time). Application Programming Interface (API) platforms are one of the most important changes, allowing customers to integrate their banking data into other applications (for example, applications related to budget services and the use of money management tools) and vice versa. Notably, many US financial institutions have abandoned platforms related to APIs. At the same time, since EU regulations oblige organizations to offer open API platforms, US financial institutions have adopted this practice.

Blockchain. Blockchain technology is relatively uncommon in the financial sector, not least because it is difficult to access. At the same time, the financial industry recognizes the key role of blockchain technology in generating new revenue for financial institutions, reducing risks and increasing operational efficiency of these organizations, improving the experience of end users, etc. It is worth noting that blockchain is the technology that underlies Bitcoin. According to a report by Accenture, blockchain technology can help the world's largest investment banks reduce infrastructure costs by \$8-12 billion per year by 2025. This conclusion is based on an analysis of the costs of eight of the ten largest investment banks in the world. Given the trend of rapid adoption of blockchain over the past few years, it can be assumed that this technology can quickly become an important solution in the field of payments, fraud prevention, loan processing, etc.

Chatbots and Artificial Intelligence. Chatbots and other artificial intelligence-based solutions are becoming increasingly popular among financial institutions of all sizes. According to a recent study, 48% of bank customers now manage their accounts using apps and other mobile devices. Financial institutions are increasingly turning to chatbots (computer programs that stimulate human conversation through text and voice commands) as a cost-effective solution for managing accounts online. Advanced chatbots in the financial industry use natural language processes, powered by machine learning and artificial intelligence, to gather information about past interactions and improve responses. Chatbots answer questions asked by customers, with these questions being common and repetitive. Typically, questions relate to deadlines, transactions, and payments. Customers have access to instant answers, rather than having to wait several business days to get an answer to their question. It is worth noting that chatbots are the most visual version of artificial intelligence. At the same time, artificial intelligence is influencing and changing the risk management, product and service delivery, marketing, and back office activities of financial institutions.

Robotic Process Automation. In the financial sector, robotic process automation allows you to save the most important resource - time. Fixed and repetitive processes are subject to automation. Automation uses a simple set of rules to obtain relatively simple and reliable results. The main function of robotic process automation is data recording, report generation, logging, automation of repetitive processes. Robotic process automation offers financial institutions the following benefits: digitalization and automation of tasks, avoidance of errors in processes, automation of documentation and standardization, achieving greater efficiency. The following possibilities of using robotic automation in the financial sector can be noted: collection and distribution of supplier invoices; data collection, report generation, calculation of taxes payable and reconciliation of tax data; analysis of commercial proposals, customer loans, product orders, invoices and payments; simplification of automatic recording of journal entries, invoice reconciliation and management of daily transactions; creation of a workflow for customer accounts, verification of transactions and reporting of discrepancies; analysis of historical data, accumulation of financial statements and preparation of forecasts, etc.

Analysis of advanced information technologies used in the financial systems of developed countries allowed the author to identify the following advantages of these technologies for sustainable economic growth:

a) *Increased operational efficiency of financial institutions* can be achieved primarily through automation of financial operations and technologies. Information technology can be involved in customer service and transaction processing in these financial institutions. As a result, it is possible to optimize resource flow management, reduce the number of manual errors and increase labor

productivity. Automation of routine operations will lead to time savings, which will allow employees of these institutions to focus on other strategic and quasi-strategic activities.

b) Increased security and data protection. Financial institutions process huge amounts of confidential and sensitive information. In these circumstances, information technology can offer security solutions that will protect this information from various risks and unauthorized interference. Such solutions include, in particular, intrusion detection systems, encryption, etc. Regular updates and security audits play an important role in this regard.

c) Advanced data analytics. Advanced information technologies offer comprehensive solutions in the form of tools and technologies for data processing and analysis. The subject of analysis can be the following areas of activity of financial institutions:

- trends in various markets;
- risks and risk profile;
- customer behavior, etc.

Thus, financial institutions can make the following categories of decisions based on data:

- identifying growth opportunities;
- developing solutions to reduce potential risks;
- preventing fraud.

d) Scalability and flexibility. In the process of growth or restructuring, financial institutions can benefit from specialized IT solutions that provide flexibility and scalability. In this context, cloud computing stands out - a solution that allows expanding the computing resources of a financial institution to the required scale. Thus, the need for investment in infrastructure can be eliminated.

e) Seamless customer service. Information technology can provide financial institutions with customized solutions that they can in turn offer to their customers. Moreover, online banking platforms and mobile applications allow customers to use these solutions seamlessly, regardless of their location. Information technology, which underlies various customer management systems, allows financial institutions to monitor and track customer communications, transactions, and behavior, as well as track and control the behavior of their customers. This allows for targeted marketing campaigns and personalized financial service offers.

Stage Two. Characteristics of a Financial System Conducive to Sustainable Economic Growth. In identifying and formulating the characteristics of a financial system for sustainable growth, the author relied on his own definition explaining the concept of "sustainable finance": sustainable finance is a set of tools, methods, relationships, laws, national, regional and international financial institutions, regulations that ensure the integration of environmental, social and governance criteria into investment decisions. This approach to making investment decisions is aimed at combining economic profitability with their positive impact on society and the environment. Investment decisions are based on several factors, while factors related to social and environmental considerations are not taken into account sufficiently. This is explained by the fact that the risks associated with such investment decisions are likely to be realized over a longer time horizon. At the same time, it is important to understand that taking into account the long-term interests of sustainable development is economically justified and will not necessarily lead to a decrease in returns for investors.

From the above it follows that *the most prominent characteristics of sustainable finance are:*

- a) The integration of social, environmental and governance considerations into investment decision-making: - environmental issues relate to climate change mitigation and adaptation, as well as broader environmental issues and associated risks; - social issues relate to inequality, inclusion, labour relations, investment in human capital and communities. Social and environmental issues are often interlinked, as climate change in particular can exacerbate existing systems of inequality; - the governance of public and private institutions (governance structures, employee relations, executive remuneration, etc.) plays a critical role in ensuring that social and environmental aspects are taken into account in decision-making;

b) significant investment and a long-term time horizon for investment.

Against this background, the author believes that the following three areas of action need to be implemented:

- redirecting capital flows to sustainable investments to achieve sustainable and inclusive growth;
- managing financial risks arising from social issues, resource depletion, climate change and environmental degradation;
- ensuring transparency and a long-term vision of financial and economic activities.

Stage Three. Advanced information technologies that can best implement and enhance the characteristics of a financial system associated with sustainable economic growth. Having completed all three stages of the methodology proposed by the authors, the results were obtained, which are presented in the form of a three-dimensional matrix (formed by the interaction of three factors: information technologies used in financial institutions; the advantages of information technologies for sustainable growth; characteristics of a sustainable financial system) in Table 4.

Table 4. Transfer Map of Potential Benefits of Information Technology to Financial Institutions to Drive Sustainable Growth

Advanced information technologies applied in financial system institutions	Potential Benefits of IT for Financial Institutions					
	Increased operational efficiency	Enhanced data security and	Advanced data analytics	Scalability and flexibility	Privacy and availability	Uninterrupted customer service
Digital experience platforms for banks	5*	1, 2, 3, 4, 5			1, 2, 3, 4, 5	1, 2, 3, 4, 5
Blockchain	1, 2, 3, 4	1, 2, 3, 4		1, 2, 3, 4, 5, 6	1, 2, 3, 4	
Chatbots and artificial intelligence	1, 2, 3, 4					1, 2, 3, 4
Robotic process automation	1, 2, 3, 4, 5, 6		1, 2, 3, 4, 5, 6			

*Note:

Characteristics of a financial system that promotes sustainable growth	The number under which it is presented
Integration of environmental considerations into investment processes	1
Integration of social aspects into investment processes	2
Integration of governance issues into investment processes	3
Management of financial risks associated with resource depletion, social issues, climate change	4
Ensuring transparency of financial and economic activities	5
Ensuring a long-term vision of financial and economic activities	6

Source: developed by the author.

3. Conclusion.

The energy crisis, the effects of the pandemic, as well as the conflict in Ukraine, have led to major changes in the global economy and financial system. These aspects have also changed the attitude of customers towards financial institutions, so that consumers now prefer to become clients of financial institutions that can provide financial and banking services through various digital solutions. Currently, financial institutions are in the process of full digital transformation, and financial and banking platforms have become the main channel of communication and interaction with consumers. This is evidenced by the phenomena and trends observed in the financial system of the Republic of Moldova. Information technology (IT), due to the advantages it can provide, has great potential to

become one of the key factors determining the restructuring of the financial system so that it can play a decisive role in achieving the Sustainable Development Goals.

All four advanced information technologies assessed by the authors (digital experience platforms for banks, blockchain, chatbots and artificial intelligence, robotic process automation) are important for ensuring the sustainability of the financial system in the Republic of Moldova, although in different proportions. At the same time, the technologies with the greatest potential to contribute to strengthening the financial system in line with the needs of sustainable development are digital experience platforms for banks and blockchain technology.

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REDUCING INEQUALITY AS A VECTOR FOR SUSTAINABLE DEVELOPMENT: AN ANALYSIS OF SUSTAINABLE DEVELOPMENT OBJECTIVE 10 IN THE EUROPEAN UNION

DOI: <https://doi.org/10.53486/dri2025.39>

UDC: [330.59+330.567.6](4)

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Abstract: *This study aims to explore the literature on the realization of Goal 10, "Reduced inequality" of Agenda 30, and the extent to which reducing inequality contributes to sustainable development in 27 countries in Europe. The methodology used to achieve the proposed goal consists of observation, comparison, scientific reading. Multiple regression method was used to analyze the statistical data. It was determined that the independent variable is the GINI coefficient. For a rigorous substantiation, the study is supported in parallel by Pearson coefficient calculation and scatter plot. The results show that income inequality has a significant effect on carbon dioxide emissions in Europe and that there is an inversely proportional relationship between the level of GDP and income distribution. In its approach, the research provides useful information that can help inform policy decisions on pollution abatement measures in line with the level of income inequality. This research can serve as a springboard for tackling other areas of exploration to provide answers and solutions to sustainable development issues.*

Key words: *GDPPPS - Gross domestic product per capita, POV - Poverty rate, GINI - income distribution indicator*

1. Introduction

In capitalist economies, capital accumulation is the result of economic activities carried out by individuals in an economic cycle. The dimensions of inequality can be wide-ranging, but the focus of this article concentrates on income inequality.

This study analyzes the impact of income inequality (GINI) on sustainable development in the EU through three indicators: gross domestic product/capita(GDP/capita) poverty rate and CO₂ emissions. The analyzed elements try to explain whether income inequality in most countries in Europe have any influence on the level of poverty, living standards and the level of atmospheric emissions. The theories studied emphasize that poverty reduction and the promotion of fair wage policies are essential for sustainable development, but weak trade unions and technological change exacerbate economic disparities. Inefficient management of financial resources by governments leads to major inequalities between countries, while current fiscal measures fail to ensure a decent living for all. Studies show that capitalist inequality affects health and life expectancy, and genetic homogeneity could influence the fair distribution of income.

The aim of the article is to demonstrate the influence of income inequality on sustainable development. In this context, sustainable development is described with the help of three indicators: GDP, Poverty rate and Carbon emissions.

The structure of the study starts with abstract, abbreviations, theoretical framework, hypotheses and methodology, data analysis, presentation of results, discussion and conclusions.

The study aims to analyze how the parametric indicator GINI, influences sustainable development. The chosen research method is econometric. The multiple regression econometric analysis uses the GINI coefficient of 27 European countries as independent variable. The dependent variables on the change in this coefficient are GDP per capita, the poverty rate and the level of carbon dioxide emissions. Determining how inequality of income distribution affects the level of sustainable development is an important issue as today's society tries to return to economic stability before the coronavirus pandemic, the military war in Ukraine and the current political fluctuations around the world. This topic has been analyzed for the period 2016-2024, since at the beginning of 2016, the

Sustainable Development Goals were transformed into Agenda 30, which also introduced the goal No. 10 on reducing inequality. The scientific assumptions underlying the framework were based on the idea that Agenda 30 promotes a reduction in the poverty rate by up to 40% and the establishment of wage equity. In an inflationary context, the measures set by governments have also targeted various aspects of the income level of the population, such as raising the minimum wage, increasing taxes and charges and eliminating tax breaks for various categories of staff. The instruments through which sustainable development objectives could be supported and achieved should take into account changes in population income.

The results of the research show that income distribution does not significantly influence the poverty rate or the standard of living. Interestingly, income distribution has a significant impact on the level of CO₂ emissions. Sustained sustainable development and income equity require a balance between economic, social and environmental dimensions.

2. Basic content

Capitalism enables anyone who owns assets to multiply their value. Since ancient times, ownership of assets such as land has separated people into social classes. After the technological revolutions, industrial and technical plants have given people a new chance to rise up the socio-economic ladder. The use, maintenance, repair and control of assets required the emergence of new categories of assets such as know-how and stocks. Of course, the acquisition of stocks requires the holding of capital. Thus, the possibility of personal financial development that capitalism generated was the provision of knowledge-based services.

Social classes were further divided as wealth, i.e. capital accumulation, spread to those who did not own fixed assets. As a result of this economic system, income inequality spread faster and faster. Natural resources are the basis of transactions in capitalist markets. As a result, in 2000, the Millennium Declaration was signed which set 8 Sustainable Development Goals (MDG Report 2012, f.a.). Initially, those goals did not cover the issue of income inequality. In 2015, the Sustainable Development Goals were revised under Agenda 30 and new goals were added to form a continuous and effective economic, social and environmental cycle. One of the novelties brought by Agenda 30 was the realization that globally there is a problem of proportionality in the accumulation of income and that for sustainable development it is necessary to analyze and discover mechanisms that lead to an equalization of income. Equalization will be achieved gradually by reducing poverty rates by up to 40% within countries and promoting fair wage policies (Agenda 30). The need to reduce income inequality while reducing energy consumption is a priority to ensure a decent living for all (Millward-Hopkins & Oswald, 2023).

It can be observed that in order to achieve the goals set, human needs must be prioritized. Normality is given by the fact that no person can turn his or her attention to higher problems if basic needs are not met. Most of the income that the population attracts is wage income. In order to achieve the Sustainable Development Goals, it is paramount to thoroughly analyze the fundamentals of establishing them, having legal and social effects (Barford et al., 2025). Harmonizing the Sustainable Development Goals with the current economic reality could be one of the important issues that the European institutions could address. One of the problems in our society today is that the depletion of resources coincides with the increase in wealth by those who have managed to become rich. Wages have become insufficient to enable people to be rich. In this way, the crises of capital will become even more acute the more it accumulates and the more difficult it will be for it to meet the needs and demands of humanity (Roberts, 2020)

The reality of the century we live in outlines the need to create a sustainable financial existence for all the people of the globe. Capitalism has increased the rush for resources which has created a substantial financial imbalance in the chain of masses. The income of the population is largely derived from wage income.

One explanation could be the idea that labor unions are becoming less and less resounding which has led to a reduction in the possibilities for advantageous wage bargaining by employees (Hein, 2015). This has also been supported by other researchers who have presented the union as the most important factor influencing the wage level irrespective of the type of economy (Rueda & Pontusson, 2000). Technological developments also influence the level of income in that depending on the level of development at which the state is at, the accumulation of resources increases or decreases (Wu et al., 2024). However, this evolution only emphasizes certain social classes, it is a response of high demands. (Greenhalgh, 2005) Categorized as a system, capitalism has at its core, the financial resource. The way financial resources are managed at the governmental level determines majorly the level of inequality among states (Movahed, 2023). Thus, Nordic countries such as Sweden are among the leading countries in terms of economic freedom (Ydstedt & Zitelmann, 2025). The dynamics of human actions create environments and spaces in which it is difficult to combine sustainable development processes and create both competition and technological evolution. Even if there are fiscal measures that attempt to reduce the negative effects of capitalism, such as setting a minimum wage in economically developed areas, these wages will not be able to support daily living, and the labor force will be forced to migrate to areas where it can ensure its long-term development. For sustainable economic development, the state institutions could intervene with more effective measures to increase competition but at the same time provide the possibility of a decent living for the entire population. Capitalist inequality has been shown to have a negative impact on life expectancy and infant mortality. In line with the first Sustainable Development Goals, capitalism, through its effects, is a hindrance to achieving the highest possible sustainable development outcomes (Stevenson, 1982). All the levels that lead civilization towards evolution require equivalent factors in order not to generate imbalances. Human quality could be based on genetics. Thus, the more the evolutionary factors are genetically similar, the more development has a linear movement on all levels. Genetic homogeneity influences the level of trust between individuals and hence income equality (Kilinc & Kilinc, 2024). The need to change the capitalist system into a system based on sustainable development objectives has become increasingly real due to economic sectors that provide uncompetitive and insufficient wages for a decent living. Prioritization of profit margins through various methods, including the reduction of wage expenditures, have led to significant slippages between social classes. (Mesarić, 2010) The literature brings to attention that without sustained involvement of all actors on the economic scene, the sustainable development goals cannot be fully realized, because in the capitalist system, the core is capital, not man. Achieving Sustainable Development Goal 10, requires radical reform of the money circuit as well as the transformation of countries' debts into foreign aid (Bieri & Bader, 2023). An important component through which to adjust income inequality is the sustainable development component, the state of the environment. The gradual multiplication of climate change effects are difficult to manage. The severity of the climate situation can be measured by the response time, which results in increasing long-term economic costs. The lack of concrete measures aimed at reducing the negative effects of climate change may have an irreversible impact on the economy, especially in poor countries. The use of resources for climate recovery raises the question of prioritizing one's own needs in violent climate change scenarios. Prevention through pro-active measures is more effective in the long term than managing the effects. Climate change acts over a longer period of time and its effects are reflected gradually (Manzanedo, R. D., & Manning, P. (2020). In the case of generating crisis or climate hardship situations, phasing of public funds can be an important element in maintaining and reducing negative climate impacts. Identifying the real problems and setting up specially earmarked credit lines could be a pro-active solution to combat natural disasters. This could be done on the basis of the periodicity of the occurrence of the phenomena, the extent to which the effects affect society and the scale of the effects. By 2050, the European Union aims to reach 2% of GDP and implement rules on green government investments. Climate change issues could be dealt with in terms of budget deficits and carbon tax regulations that would reduce the burden on public budgets (Darvas, Z., & Wolff, G. (2021). Relaxing

public budgets and thus reducing inequality could be achieved by stricter carbon regulation measures and a reduction in the tax burden on companies that spend on green investments.

Political and ideological factors contribute to global climate change. Given that the effects of climate change are short-lived, people tend to focus less on these issues (Egan, P. J., & Mullin, M. (2017).

Carbon emissions are an important factor influencing the state of the global climate. At European level, public spending on environmental protection should be correlated with the level of development. In countries such as Romania and Poland, revenues from environmental taxes and environmental protection expenditures have the greatest influence on carbon emissions (Labenko, O., Sadauskis, A., & Lyman, V. (2024). In this context, this research adds value to the literature on the subject. The novelty of this study lies in the integrated approach to the three dimensions of sustainable development - economic (GDP/capita), social (poverty rate) and environmental (CO₂ emissions) - in relation to a single key explanatory factor, namely income inequality, measured by the GINI coefficient.

Unlike much previous research that separately analyzes the relationship between inequality and either poverty, economic growth or pollutant emissions, this study:

- Simultaneously integrates the three perspectives into a common analytical framework, allowing a comparative understanding of how inequality affects each dimension of sustainability;
- Uses recent data (2016-2024) and covers all 27 EU countries, which provides an up-to-date basis for analyzing the impact of Goal 10 of the 2030 Agenda;
- Highlights a significant correlation between inequality and CO₂ emissions, an issue rarely addressed in the European literature, providing a concrete argument for linking green transition policies with social equity policies.

Therefore, the study adds value to the literature by highlighting income inequality as a factor with not only social and economic, but also environmental impacts, an aspect that remains insufficiently explored in previous research.

The study will attempt to answer the question - Under Objective 10, "Reduced inequalities", European countries have adopted various policies to balance the income of the population leading to a reduction in the differences between social classes. Hypothesis set

H1: Income inequality influences sustainable development in Europe, as measured by poverty rate, GDP/capita and CO₂ emissions.

The study will present a comparison between the GINI indicator(the degree of inequality of disposable income of a population and the three dimensions of sustainable development. The economic dimension will be characterized by the GDP indicator, the social dimension by the poverty rate and the environmental dimension by carbon dioxide emissions.

In order to obtain the results, observational, scientific, comparative and historical reading methods will be used in combination with econometric methods such as multiple regression, Pearson correlation coefficient and scatter plot. Data were collected from the Eurostat database and processed using E-views. Data collected from Eurostat database were generated for the period 2016-2024 for 27 countries in Europe (Eurostat,2025). For a better exemplification, the averages of GINI, GDPPPS, POV and CO₂ indicators at the European level were calculated and scored as follows:

- X1 - GINI indicator at European level for the period 2016-2024;
- Y1 - European poverty rate for the period 2016-2024;
- Y2 - GDP at European level for the period 2016-2024;
- Y3 - European per capita gas emissions for the period 2016- 2024

The values of the data collected, transformed and processed for 27 countries in Europe are as shown in Table 1.

Table 1. Level of indicators at European level between 2016 and 2024

ANI	X1	Y1	Y2	Y3
2016	5.18	8627.33	84.75	2.26
2017	5.1	897.3	85.19	2.28
2018	4.99	9252.37	85.56	2.24
2019	4.9	9611	85.5	2.15
2020	4.84	10071.3	86.94	1.94
2021	4.75	10441.85	88.03	2.05
2022	4.67	10997.59	88.28	2.01
2023	4.69	111640.4	87.13	1.87
2024	2.55	8442.89	87.38	1.78

Source: processing by the author

After data collection and processing, the data were entered into the E-views program in order to perform multiple regression econometric analysis, supported by Pearson correlation coefficient and scatter plot calculations. In this analysis, the independent variable is income distribution and the dependent variables are poverty rate, GDP per capita and carbon dioxide emissions per capita. The units of measurement were as follows: - Poverty rate - average income/capita- reported in euro currency.

Gini indicator - population/year

GDP - gross domestic product/capita

Level of emissions of CO₂- tons/capita/year

Performing multiple regression involved calculating the links between X1 and Y1, X1 and Y2, X1 and Y3.

Calculation of the intensity between X1 and Y1 by the multiple regression method (Table. 2)

Table 2. Regression analysis between the poverty rate and the income distribution 2016-2024

Dependent Variable: Y1
Method: Least Squares
Date: 04/14/25 Time: 18:01
Sample: 2016 2024
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16343.87	76471.64	0.213725	0.8369
X1	789.2298	16301.83	0.048414	0.9627
R-squared	0.000335	Mean dependent var		19998.01
Adjusted R-squared	-0.142475	S.D. dependent var		34496.76
S.E. of regression	36872.41	Akaike info criterion		24.06145
Sum squared resid	9.52E+09	Schwarz criterion		24.10527
Log likelihood	-106.2765	Hannan-Quinn criter.		23.96687
F-statistic	0.002344	Durbin-Watson stat		2.160430
Prob(F-statistic)	0.962739			

Source: processing by the author

The model constructed is of the form $Y1 = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \epsilon$. Given that the probability that the income distribution significantly influences the poverty rate is 0.9627 and is greater than 0.05, and that the R-squared indicator is 0.000335 shows that the variation in the poverty rate is explained by income inequality by 0.03% which means that it is statistically irrelevant. The Durbin-Watson test values explain a good correlation of the data.

The correlation of data in a linear relationship was done by calculating Pearson coefficient to test the relationship between poverty rate and Gini indicator. The following results were obtained:

Table 3. Linear relationship between income distribution and poverty rate

Covariance Analysis: Ordinary
 Date: 04/14/25 Time: 18:08
 Sample: 2016 2024
 Included observations: 9

Correlation	Y1	X1
Y1	1.000000	
X1	0.018296	1.000000

Source: processing by the author

A coefficient of 0.018 may indicate that, in this particular case, income inequality and poverty are not directly and linearly related in Europe. Calculation of the intensity of the link between X1 and Y2 using the multiple regression method (Table 4)

Table 4. Regression analysis between GDP per capita and income distribution in the period 2016-2024

Dependent Variable: Y2
 Method: Least Squares
 Date: 04/14/25 Time: 18:09
 Sample: 2016 2024
 Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	89.81586	2.593972	34.62484	0.0000
X1	-0.709930	0.552970	-1.283849	0.2401
R-squared	0.190590	Mean dependent var		86.52889
Adjusted R-squared	0.074959	S.D. dependent var		1.300427
S.E. of regression	1.250738	Akaike info criterion		3.478475
Sum squared resid	10.95042	Schwarz criterion		3.522303
Log likelihood	-13.65314	Hannan-Quinn criter.		3.383895
F-statistic	1.648270	Durbin-Watson stat		0.565403
Prob(F-statistic)	0.240054			

Source: processing by the author

The changes in the structure and size of GDP per capita produced by the income distribution are not statistically significant because the level of the prob index is 0.2. The change in GDP is explained by income inequality by 19.05% which does not imply a relevant impact so that we can say so. To emphasize the existence or non-existence of a linear relationship between the way income is distributed and GDP per capita, the Pearson coefficient is calculated in table 5.

Table 5. Linear relationship between income distribution and GDP per capita

Covariance Analysis: Ordinary
 Date: 04/14/25 Time: 18:11
 Sample: 2016 2024
 Included observations: 9

Correlation	X1	Y2
X1	1.000000	
Y2	-0.436566	1.000000

Source: processing by the author

Since the coefficient is negative (-0.46), there is an inverse relationship between the two variables. In other words, as GDP increases, income inequality tends to decrease. In order to confirm the existence of this inverse relationship, a graphical expression was created using the scatter plot as shown in Figure 6.

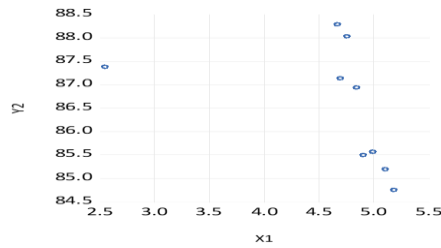


Figure 6. Scatter plot of the inverse relationship between income distribution and GDP per capita

Source: processing by the author

The graph shows that changes in GDP per capita tend to decrease when there is a positive trend in the gap between rich and poor. However, the collinearity of the points on the graph is not perfect, which indicates and supports the fact that there is no direct link between the standard of living expressed by GDP and income inequality.

Calculation of the intensity of the link between X1 and Y3 using the multiple regression method
 (Table. 7)

Table 7. Linear link between income distribution and CO2 emissions.

Dependent Variable: Y3				
Method: Least Squares				
Date: 04/14/25 Time: 18:14				
Sample: 2016 2024				
Included observations: 9				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.299626	0.272247	4.773698	0.0020
X1	0.165188	0.058036	2.846285	0.0248
R-squared	0.536465	Mean dependent var		2.064444
Adjusted R-squared	0.470246	S.D. dependent var		0.180355
S.E. of regression	0.131270	Akaike info criterion		-1.029995
Sum squared resid	0.120622	Schwarz criterion		-0.986168
Log likelihood	6.634980	Hannan-Quinn criter.		-1.124575
F-statistic	8.101336	Durbin-Watson stat		1.272888
Prob(F-statistic)	0.024820			

Source: processing by the author

The change in the income distribution produces statistically significant changes in the body of carbon dioxide emissions, given the prob index of 0.0248 and r-square, which describes the magnitude of the impact as 53.64%.

The Pearson collinearity coefficient was also checked, which has the following results presented in Table 8.

Table 8. Linear relationship between income distribution and CO2 emissions

Covariance Analysis: Ordinary		
Date: 04/14/25 Time: 18:15		
Sample: 2016 2024		
Included observations: 9		
Correlation	X1	Y3
X1	1.000000	
Y3	0.732438	1.000000

Source: processing by the author

A value of 0.73 does not prove a direct causal relationship between the two variables but suggests a strong relationship between them.

3. Conclusions

The premises of this research were that the way income is distributed in most European countries under the capitalist system has affected the poverty rate, the standard of living, characterised by GDP and the level of carbon dioxide emissions. The sustainable development materialised by the three dimensions presented in the introduction, linked to the principles in which incomes are constructed and received by the population is partially affected. Analysing the interactions between the GINI indicator and the poverty rate in Europe, we found that poverty could be significantly influenced by other components such as the health of the population, the education system, the number of jobs, which offers a new horizon for future research. The level of social transfers as well as fiscal and budgetary policies can play an important role in modifying the poverty rate as they are an important tool in maintaining the financial balance between social classes. In a context of volatile economic growth, incomes increase proportionally, the poverty rate follows the same pattern. Concluding from the above results, it can be concluded that income distribution does not have a statistically significant impact on the poverty rate in Europe. By its definition, GDP per capita reflects the sum total of quantities produced divided by the number of inhabitants. On the basis of the analyses carried out, no direct link between income distribution and GDP has been found to suggest that a change in this parameter could reduce income inequality. Factors such as investment, access to international markets, technological innovation could be more significant indicators in increasing or reducing GDP at European level. The concentration of financial resources at the top of the social pyramid does not bring major changes, as long as they invest and stimulate the economy. However, the results suggest that a broader analysis, even at the local level, could help to better understand this phenomenon of decreasing income inequality.

This study has highlighted that in European countries where income inequality is high, there are slowdowns in sustainable development. One possible explanation for these results could be that high income earners use their financial resources to purchase polluting goods and services. Oversized dwellings, frequent travelling, buying more cars than necessary could support the above. Another argument could be that, in the absence of sufficient financial resources, people turn to polluting sources of survival, such as wood heating. In addition to the fact that people with limited access to financial resources may use polluting sources to ensure their survival, access to green energy is more limited for them.

The transition to green energy sources could include more effective policies to tackle inequalities in order to maximise sustainable development. Investments in infrastructure could reduce the level of CO₂ emissions by enabling people to stop using personal cars. The legislative process of amending and implementing procedures for transition to green energy should bear in mind that by reducing income inequality the possibility of success would increase.

Another approach involves human resilience to the way in which inequality of income distribution arises. Under conditions of wastage of natural resources, people tend to find the most efficient ways to satisfy their needs. The reaction of individuals with high financial resources may be to misuse them excessively and without restraint, with negative environmental outcomes.

On the other hand, social groups that do not have sufficient financial resources to fulfil their needs do not pollute so significantly. Overall, because financial resources are limited and their consumption is limited. Policies to combat and reduce carbon emissions could be created on the basis of an analysis of the predominant social groups in the country concerned. Although programmes exist at European level to combat and reduce pollutant emissions in the atmosphere, such as replacing old and polluting cars, increasing energy efficiency through solar panels and creating environmentally friendly housing or improving rail transport, a broader analysis of the predominant social groups in each country in Europe in line with their income levels would be necessary so that policies applied at regional level do not further impact on the income of individuals. A balance needs to be struck between the way environmental taxes are applied and the reduction of income inequality so that the response of the financially majority population is positive.

The literature presents various indicators that have positive as well as negative effects on CO₂ emissions. The results of the present research can be validated by the method of comparison with other results that address the influence of income on the positive or negative evolution of carbon dioxide emitted into the atmosphere. At the European level, it has been reported that income levels increase carbon emissions, especially in the region of Turkey (Shan et al., 2021). The same is supported in another study conducted 16 years ago which mentions that income growth policy should have a carbon reduction policy as a supporting pillar (Halicioglu, 2009). Reduction policies in Europe should not be implemented through tax increases because the impact on carbon emissions is insignificant (Brzezinski & Kaczan, 2025). Setting them should be done according to the level of development each country is at (Methmini et al., 2025). Combining economic growth policies, with environmental policies and adapting them according to the specific level of development of each country could be the key to success in maintaining sustainable development (Prakash, 2025). At the Asian level, maintaining or decreasing income inequality, could be achieved by promoting renewable energy, another element of regulation of CO₂ emissions (Ali et al., 2025). Reducing income inequality in high-income countries can have reducing effects on consumption emissions and increase them in low-income countries (Coşkun, 2025). Antithesising the results of the present study with the findings of other researchers, income inequality has a statistically significant effect on CO₂ emissions depending on the level of development of the respective countries. Although programmes exist at European level to combat and reduce pollutant emissions in the atmosphere, such as replacing old and polluting cars, increasing energy efficiency through solar panels and creating environmentally friendly housing or improving rail transport, a broader analysis of the predominant social groups in each country in Europe in line with their income levels would be necessary in order to ensure that policies applied at regional level do not further impact on the income of individuals. A balance needs to be struck between the way environmental taxes are applied and the reduction of income inequality so that the response of the financially majority population is positive.

The conducted research has some methodological and analytical limitations:

1. Univariate model: Only one explanatory variable (GINI coefficient) was used, without controlling for the influence of other relevant factors (e.g. level of education, social expenditure, degree of urbanisation, etc.), which may lead to omitted variables error;

2. Aggregate data structure: The data used are aggregated (averages over the period 2016-2024) and do not reflect annual or regional variations. Thus, the advantages of a panel analysis, which would have provided more robustness to the results, are not exploited;

Future research directions

In order to consolidate and extend the results of the present research in the future, the research carried out may be extended as follows:

1. Extending the econometric model: introducing more relevant explanatory variables (e.g. level of education, degree of unionisation, public investment) to control more precisely for influences on poverty, GDP and emissions.

2. Panel data analysis: Use annual country-level data to allow the application of fixed or random effects models, which would provide a deeper understanding of the dynamic relationships between variables.

3. Comparison across EU regions: differentiated assessment of Western vs Eastern, Northern vs Southern European countries to capture contextual influences on income distribution and sustainable development;

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FINANCIAL LITERACY, EDUCATION, AND INCLUSION: INTERCONNECTIONS AND THEIR IMPACT ON ECONOMIC AND SOCIAL DEVELOPMENT

DOI: <https://doi.org/10.53486/dri2025.40>

UDC: 37.035:336

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Abstract: *This paper explores the correspondence between financial literacy, financial education, and financial inclusion, as well as the impact these interdependent concepts have on economic and social development. The research was structured into three main stages: a theoretical analysis of the concepts, quantitative research for testing the formulated hypotheses, and qualitative research to deepen the understanding of perceptions regarding the studied phenomenon. The results highlight that financial literacy provides the necessary foundations for individuals to understand basic financial concepts and make informed financial decisions. Financial education extends this understanding by developing advanced financial skills that enable individuals to apply financial concepts in complex contexts. Similarly, financial inclusion relies on financial literacy and financial education to ensure equitable access to financial services and to support the full integration of all individuals into the financial system. Thus, financial literacy, financial education, and financial inclusion are three fundamental, closely interconnected concepts that play an essential role in improving the economic well-being of individuals and society. While financial literacy forms the basis of the essential knowledge required for financial management, financial education builds upon this knowledge and develops advanced financial skills. Financial inclusion is a direct outcome of these processes, ensuring fair access to financial services and promoting a more balanced and sustainable economic system. The study emphasizes the importance of integrating these dimensions into public policies and sustainable development strategies.*

Key words: *financial literacy, financial education, financial inclusion, economic development, social inequalities, public policies.*

JEL Codes: G17, G32, G40, G50, G51, G52, G53, G59G17, G32, G40, G50, G51, G52, G53, G59

1. Introduction

Financial literacy refers to acquiring fundamental knowledge about basic financial concepts and tools necessary for the efficient management of personal finances. According to researchers, financial literacy is the ability to understand and apply basic financial concepts such as budgeting, saving, debt management, and understanding financial risks (Lusardi, 2019). Thus, financial literacy is essential to ensure that individuals comprehend and can apply fundamental notions, which is crucial for preventing economic risks such as uncontrolled debt or impulsive financial decisions.

According to the OECD, financial education includes acquiring the skills and knowledge necessary to make informed and responsible financial decisions, considering the long-term implications of these decisions (OECD, 2020). Financial education promotes not only the understanding of financial theories but also the development of sustainable and informed financial behaviors. Financial inclusion is a key factor in reducing poverty and promoting economic development (Demirgüç-Kunt & Klapper, 2012).

The interconnections between financial literacy, financial education, and financial inclusion are essential for understanding their synergistic impact on economic and social development.

The objective of this research was to explore these three concepts in depth, analyze the connections between them, and evaluate how they influence the economic development process — both at an individual and collective level.

The research process was based on a rigorous set of methods and investigative techniques aimed at providing relevant and useful results for the study. The research included 6 stages which helped to convey the importance and the purpose of the research: a theoretical analysis of the three concepts; a quantitative research to test the hypotheses used; a qualitative research used for adding clarity to

understanding and perceiving the concepts and finally, centralization and processing the collected data to aim a well-documented hypotheses and present a coherent overview.

2. Basic content

When global economies are marked by rapid change and economic uncertainties, financial literacy becomes an essential skill for personal and social development. Recognizing the importance of financial literacy can improve the development of financial education and, therefore, the stabilization of individuals and society.

The **financial literacy concept** is important in terms of social and economic relevance, which suggests that financial literacy is an important factor in developing the quality of individual life in society. The ability to understand basic financial concepts like budget, savings, debts, investments, etc. becomes essential in an increasingly financially complex world when the access to financial information is within everyone's reach.

In supporting the above statement, Lusardi and Mitchell (Lusardi & Messy, 2023), covered, in a summary article of the *Journal of Financial Literacy and Wellbeing*, topics reaching from the effects of individuals financial education, the importance of financial literacy in macroeconomy to the importance of promoting the use of basic financial tools like bank accounts, financial decision-making, crypto assets, etc. Moreover, the authors argue that financial knowledge is generally low and often inadequate for making the types of financial decisions required today, but they reiterate the importance of financial literacy as a means for people to make smarter financial choices and become less susceptible to external influences.

The fact that financial literacy influences investment decisions is supported by many other studies. A relevant example is a study based on 144 scientific papers and reports (OECD, 2020), which not only analyzes the impact of financial literacy on investor behavior but also offers suggestions for investor education programs.

The reaction of individuals in crisis situations becomes a solid basis for understanding the impact of financial literacy on individual and collective behavior, as well as raising awareness of the importance of financial education in the context of an increasingly complex economic environment.

Global economic crises (such as the 2008 financial crisis or the COVID-19 pandemic) have demonstrated the importance of solid financial education to cope with sudden economic shifts. Individuals who understand basic financial concepts are better able to manage economic uncertainty and make more informed financial decisions. Furthermore, in the digital era, where new financial products (online banking, cryptocurrencies, crowdfunding) are constantly emerging, financial education is essential to avoid financial pitfalls and promote sustainable decision-making. These crises have revealed that not all individuals are equipped with the necessary knowledge to handle financial challenges, which highlights the importance of long-term financial education initiatives (Moraru & Vacarciuc, 2022). The researchers' study emphasized the need to increase financial literacy, noting that the pandemic severely impacted the financial and banking sector, suggesting a need for financial education to better manage finances during times of economic uncertainty.

Financial literacy not only benefits individuals but can also contribute to the **development of more effective public policies**. For example, academic studies in the field can influence the implementation of national education programs that ensure access to financial education for all citizens, regardless of their socio-economic status. In addition, research in financial literacy can contribute to the development of more effective regulations in the financial institutions and capital market sectors, aimed at protecting consumers and promoting responsible financial behavior.

Financial literacy is an **interdisciplinary subject** that can be approached from multiple perspectives: education, psychology, economics, sociology, and even technology — creating a complex relationship between financial behaviors, formal and informal education, cultural factors, and the digital environment. These intersections between various disciplines can lead to innovative solutions for improving financial literacy on a global level. An increasing number of studies measure

individuals' well-being through the lens of financial literacy, noting that low financial literacy can contribute to economic problems such as excessive debt, personal bankruptcies, and financial risks — making it a subject of great interest for research.

For example, the work of Lusardi (Lusardi & Messy, 2023) explores the essential connection between financial literacy and the financial well-being of individuals. The authors argue that the level of financial education significantly influences how people manage their personal finances, make financial decisions, and ultimately achieve economic stability. Thus, a population with a strong financial education is better able to make informed financial choices, save efficiently, protect itself against financial uncertainty, and manage debt responsibly. Lusardi draws a direct link between financial knowledge and individual financial success, concluding that those with higher levels of financial literacy tend to have better financial conditions, save more, and make wiser choices regarding investments and pensions. The authors define financial literacy as a combination of theoretical knowledge of economics and practical skills such as budgeting, saving, investing, and understanding financial risks.

The increase of financial literacy is achieved through financial education. Financial education is also associated with higher returns on investments and investments in more complex assets. This finding has significant consequences for wealth accumulation, according to simulations conducted by Lusardi, Michaud, and Mitchell (Lusardi et al., 2017). A low level of financial literacy leads to vulnerable or even absent financial decisions. Just as the notion of literacy represents the process of training individuals to acquire the ability to read and write — a fundamental human right for the development of modern individuals ("*Literacy*," 2022) — financial literacy should also be implemented as a process of educating individuals to achieve financial security, offering concepts and solutions for financial issues, as well as achieving financial independence by applying financial principles and knowledge.

Financial education is defined as “the process by which financial consumers/investors improve their understanding of financial products, concepts, and risks so that, through information, instruction, and/or objective advice, they can develop the skills and confidence necessary to become aware of financial risks and opportunities, to make informed choices, to know where to seek help, and to take other effective actions to improve their financial well-being” (OECD, 2015). According to Lusardi (Lusardi & Messy, 2023) financial education remains low among high school students. Socio-economic, educational, and psychological analyzed factors lean to varying levels of financial stability and show whether today’s high school students are the adults of tomorrow.

In an academic framework, this statement can be developed in the form of a complex analysis of the relationship between the education during high school and economic integration in society.

Financial literacy is an interconnected concept with **financial education**, but each concept has essential nuances but distinguish, according to their crucial role on the individual's capacity of financial navigates. Although both refer to acquiring financial knowledge and skills, financial literacy is a starting point, and financial education is an advanced stage that builds on this foundation

Compared with financial literacy, financial education is a wide-ranging concept, indicating to the ongoing process of knowledge expansion and advanced financial skills. This statement involves the ability to apply various financial situations in an effectively mode based on a theoretical understanding of financial principles. According to OECD (2020), financial literacy includes “the acquisition of the skills and knowledge necessary to make responsible financial decisions, considering the long-term implications of these decisions”.

Financial education encourages not just the comprehension of financial theories but also the development of sustainable and informed financial behaviors.

Financial literacy represents the foundation upon which financial education is built, being essential for cultivating healthy and responsible financial behavior at both individual and collective levels. In an era where the global economy is becoming increasingly complex and interconnected, financial literacy becomes a central pillar in ensuring a correct and informed understanding of fundamental

financial concepts. Without this foundation, financial education could not be effectively implemented, and individuals would be unable to adopt rational and sustainable financial decisions.

The development of financial literacy is achieved through financial education. And financial education is associated with higher investment returns. This finding has significant implications for wealth accumulation, according to simulations by Lusardi, Michaud, and Mitchell (Lusardi et al., 2017).

Access to various financial products and services, including access to transaction accounts for people around the world, is also a priority for the *Global Financial Access 2020* initiative (UFA2020 Overview, n.d.), part of the World Bank Group. Its goal is to implement, on a global scale, the process of financial inclusion, by providing access to financial services through secure operations and objective information for both companies and individuals.

The efficient management of financial resources is part of the financial education process for the population. To understand the importance of this type of education — where the lack of an adequate level of financial preparedness among the population has led to undesirable outcomes — one can recall financial pyramid schemes through which millions of people lost their savings (Caritas, Gerald, Philadelphia, FNI, etc.), the inflation of the 1990s that almost entirely eroded bank deposits, and the excessive indebtedness in the period preceding the economic crisis, followed by overborrowing and the poor management of these debts (Tudor, n.d.). Financial education, and implicitly financial literacy, are at the center of today's academic research, attracting considerable attention, with increasing interest in studying the level of financial education among entrepreneurs.

Research on entrepreneurs' financial education has expanded in recent years, as they require financial knowledge in order to make sound financial decisions — decisions that can affect not only their employees but also have repercussions at the macroeconomic level. The Organization for Economic Co-operation and Development (OECD) has characterized entrepreneurs' financial education as a combination of mindfulness, knowledge, abilities, attitudes, and behaviors that a potential entrepreneur should possess in order to make effective financial decisions.

Financial inclusion refers to the access of all individuals, especially those from vulnerable groups to essential financial services such as bank accounts, credit, insurance, and other financial instruments. The importance of financial inclusion in economic and social development is not a new topic. The work of authors Sarma and Pais (Sarma & Pais, 2011) addresses this subject as early as 2011, analyzing how access to financial services can contribute to poverty reduction and the promotion of sustainable economic development, emphasizing the link between financial inclusion and the improvement of the quality of life for individuals and communities. According to the authors, financial inclusion is defined as the access to and use of financial services such as bank accounts, credit, and savings to meet the financial needs of individuals and businesses. Financial inclusion is not limited to access alone, but also involves the effective and sustainable use of these services.

The study "*Measuring Financial Inclusion – The Global Findex Database*", published by the World Bank, is one of the most important studies on global access to financial services (Demirgüç-Kunt & Klapper, 2012). The ideas of Sarma and Pais are also supported by Asli Demirgüç-Kunt and Leora Klapper, who highlight that financial inclusion is a key factor in reducing poverty and promoting economic development. Their article analyzes the data presented in the Global Findex database. Global Findex is a crucial tool that allows for monitoring progress and identifying gaps in access to financial services worldwide. The World Bank launched the Global Findex database, which contains the most comprehensive data on how adults save, make payments, and manage financial risks.

High-income countries benefit from developed financial infrastructure, providing access to financial services through digital financial technology. Key aspects of the integration of the population into the financial system are visible through the benefits of capitalized banks and the correct use of bank accounts, loans and savings services (Iqbal & Sami, 2017; Azimi, 2022; Sethi & Acharya, 2018).

Withal, the level of financial education is higher in high-income countries. Research shows that a higher level of financial literacy enables an understanding of available financial products and the benefits of using them. Studies show that financial literacy plays an important role in stimulating the

effective use of financial products and savings (Ouechtati, 2020; Jha et al., 2022). In differentiate, in low-income nations, the level of financial illiteracy is higher, which limits the population's capacity to explore the monetary framework and make educated monetary choices (Jha et al., 2022; Seifelyazal et al., 2023a).

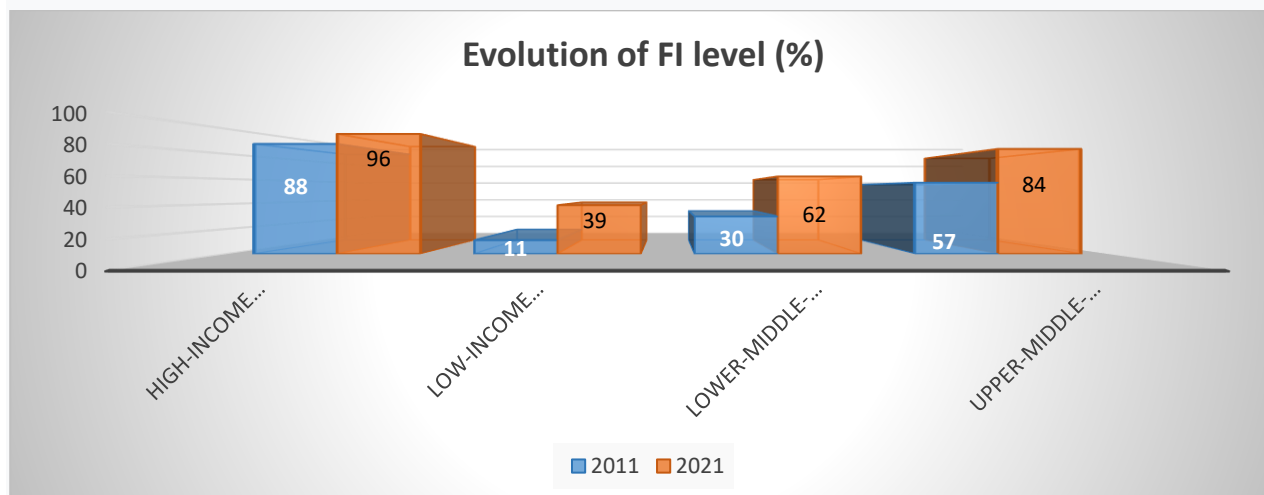


Figure 1: The evolution of Financial Inclusion Level, recorded from 2011 to 2021, based on GNI from different regions

Source: author's elaboration based on data provided by the World Bank,

<https://www.worldbank.org/en/publication/globalindex/Data><https://www.worldbank.org/en/publication/globalindex/Data>

The development of fintech is one of the main factors facilitating access to financial services through digital tools (Eldomiaty et al., 2020). Financial inclusion not only supports economic growth but also plays a crucial role in reducing social inequalities. Studies show that an inclusive financial system can improve the economic conditions of disadvantaged groups by providing them with better opportunities to access capital and vital resources for entrepreneurship (Eldomiaty et al., 2020; Ehiogu, 2022). Moreover, the adoption of proactive policies to improve financial inclusion, implemented by governments in high-income countries through the introduction of regulations and programs supporting financial innovation, has helped increase financial inclusion (Dao et al., 2024; Sari et al., 2023).

In conclusion, the transition from 88% to 96% in financial inclusion in high-income countries between 2011 and 2021 reflects a profound change in how financial services are accessed and used by individuals, contributing both to economic growth and to individual welfare development.

The rise in financial inclusion in low-income countries, from 11% in 2011 to 39% in 2021, has profound implications for poverty reduction and economic development. Thus, the nearly 28 percentage point increase over 10 years indicates mobilization of resources and efforts by governments and international organizations to promote initiatives that improve access to financing, including financial education programs that help individuals better understand financial products and their benefits (PANICA, 2023). By facilitating access to credit and other financial resources, individuals can invest, thus increasing social mobility and economic development. This expansion is closely linked to proactive economic policies and technological innovations (Tomşa et al., 2022).

In conclusion, the transition from 11% to 39% in financial inclusion in low-income countries between 2011 and 2021 is a sign of progress due to strengthened financial policies and support for initiatives that promote access to financial services, thereby contributing to fair and sustainable economic and individual development.

The significant increase in financial inclusion in lower-middle-income countries — by more than 30 percentage points — is largely explained by the adoption of public policies that have supported

the development of financial technologies (fintech), thus facilitating population access to various financial services (Murtaza et al., 2024; Adedokun et al., 2022). Studies highlight that the digitization of these services has led to a reduction in usage costs, which has contributed to the involvement of an increasing number of people in economic activities (Goenadi et al., 2022). At the same time, digitization has lowered financial barriers and expanded the economic participation of vulnerable groups (Seifelyazal et al., 2023b; Adedokun et al., 2022). Therefore, expanding access to financial services contributes to social mobility by giving disadvantaged people the chance to improve their living standards and benefit from economic opportunities (Adedokun et al., 2022). Increased access to financial resources strengthens individuals' capacity to actively engage in the local economy, supporting more equitable economic growth and social stability. In conclusion, the doubling of financial inclusion levels from 30% to 60% between 2011 and 2021 reflects the major impact of these measures on achieving sustainable development goals and improving living conditions in these regions.

Significant progress in access to financial services is also reflected in the **rise of financial inclusion in upper-middle-income countries**, from 57% in 2011 to 84% in 2021, with implications for economic development, financial stability, and social welfare. The impact of advances in financial technology (fintech) through the use of digital platforms, as mentioned earlier, is again evident. Recent research shows that the digitalization of financial services increases product accessibility, reduces associated costs, and encourages greater participation in personal finance and the overall economy (Demir et al., 2020). This suggests that investments in financial education are vital to continue the growth trend in inclusion and to facilitate more efficient management of financial resources among the population (Chiwira, 2021).

This growth in financial inclusion demonstrates that a combination of technological innovations, financial education, and supportive entrepreneurship policies is beneficial. The conclusion is clear: progress is visible, but much remains to be done in the most vulnerable areas. It represents both an opportunity and a responsibility for the public and private sectors.

The interaction between financial literacy, education, and inclusion is essential for economic empowerment. Financial literacy provides the foundation, financial education builds upon that foundation, and financial inclusion ensures that people can apply their knowledge in real-world scenarios. Together, these contribute to the overall financial well-being of individuals and communities. Financial literacy and financial education have a significant impact on financial inclusion, contributing to the reduction of economic inequalities and promoting a more equitable financial system. Financial inclusion increases through education and literacy, and promoting financial literacy and education is essential for building an inclusive and sustainable economy.

The diagram below can illustrate the connection between financial literacy, financial education, and financial inclusion:



Figure 2. Interconnection between FL, FE and FI

Source: author's elaboration

This graphic representation shows that financial literacy provides the foundation for the development of financial education. Similarly, financial inclusion is developed through financial literacy and education. These foundations of AI provide individuals with the ability to understand basic financial concepts. Financial education extends this understanding and develops the ability to use financial tools and services, and financial inclusion ensures equitable access to these concepts and services.

3. Conclusions

Integrating financial literacy and financial education within coherent financial inclusion strategies represents an essential approach for promoting sustainable economic and social development and the need to increase the level of financial education of young people becomes evident for the development of rational financial behaviors and increased well-being. Sabirin et al. (2023) demonstrate that early financial literacy improves financial management skills and lifelong financial outcomes. This dimension also extends to the community level, where volunteer-based educational initiatives can reduce financial knowledge gaps in low-income communities, providing significant support for local well-being (Ebirim et al., 2024).

Moreover, financial literacy is closely correlated with various socio-economic factors, influencing economic stability at both individual and family levels. Zhang and Chatterjee (2023) show that individuals with higher financial literacy manage financial stress more effectively, resulting in more stable financial conditions. The long-term effects of education on financial decision-making capacity cannot be overlooked, as they help reduce vulnerability to financial exploitation, especially among populations with low education levels. In this context, Davoli and Rodríguez-Planas (2021) highlight that educational achievements substantially contribute to increasing financial literacy, underscoring the importance of creating educational environments conducive to developing financial skills.

The specialized literature also points to disparities in financial literacy determined by demographic factors such as gender and socio-economic status. For example, Sarpong-Kumankoma et al. (2023) identify significant gender differences in financial literacy levels, attributing these variations to cultural and behavioral influences. Therefore, there is a need for personalized educational interventions that address these disparities and aim to equip all individuals—regardless of gender or background—with the knowledge necessary to navigate a dynamic and complex economic environment (Salem & Mohammed, 2019).

Additionally, financial behaviors vary considerably according to socio-economic stratification, directly affecting the pace and quality of economic growth. Chettri et al. (2024) support the idea that financial literacy contributes to accelerating economic development by increasing the efficiency of financial service usage and supporting informed decisions regarding saving and investing. This dynamic is amplified by external economic pressures and rapid transformations in the financial environment, which require continuous adaptation of financial education programs to meet emerging challenges (Vovchenko et al., 2018).

Thus, integrating financial literacy and education within coherent financial inclusion strategies represents an essential approach for promoting sustainable economic and social development. The interconnection of these components provides individuals with the necessary tools to strengthen their economic capacity, which can lead, in the long term, to favorable outcomes at both community and societal levels.

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Therefore, the interconnection of these components provides individuals with the necessary tools to strengthen their economic capacity, which can, in the long term, lead to favorable outcomes at both community and societal levels.

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CRYPTOCURRENCIES, WEB 3.0, ARTIFICIAL INTELLIGENCE — TOWARDS A NEW PHILOSOPHY OF MONEY?

DOI: <https://doi.org/10.53486/dri2025.41>

UDC: [336.747.5:004.056.55]:004.89

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Abstract: *Computers and computing technology underwent unimaginable development in the second half of the last century, but all of this pales in comparison to what happened after the turn of the millennium. The 21st century, so far, showcased an unprecedented rise of new developments, like cryptocurrencies, Web 3.0, and artificial intelligence (AI), which besides turning our everyday life upside down, changed fundamentally the way we think about money and finances in general. Of all these, the most spectacular journey has been taken by AI, which after a humble beginning and a setback, is now practically conquering every facet of our lives. These three fiercely advanced technologies are now forcing us to reconsider ideas we have taken for granted for centuries or even millennia, such as the meaning of value in societies, the way trust operates in economies, or the role played by people in all of these processes. One of the most important tools that has been associated with these issues for a long time, partly expressing them, is money. Until less than two decades ago, the concept of money was traditionally linked to centralized institutions, like governments and banks, or even something more abstract like the gold standard. Money was also supposed to be neutral, a means to facilitate the exchange of goods and services or to serve capitalisation, but nowadays, with blockchains and programmable tokens, we are witnessing a radical shift in the core structure of finances. The effective functioning of a society requires that there be strong bonds of trust between its parts and individuals, and one of the most important of these is trust in money. Once being placed mostly in institutions, trust in money is turning now towards bare computer code, allowing people to enter into transactions directly with each other, without intermediaries. Web 3.0 is promoting the concomitant ideas of tokenization and decentralized control, which are shaking up older assumptions about ownership and identity. In such systems, where people can act pseudonymously, or even anonymously, value is being generated and exchanged in ways that radically differ from prior economic models. The third factor is the fulminant upheaval of AI, which adds another strange layer by fuelling machines that are now participating in economic systems, not just as tools but as creators or manipulators of value. That generates many difficult questions about who is doing the labour, who is responsible when an AI makes a decision, or what does authorship even mean. Thus, we are dealing with something bigger than just simple financial innovation, because these new technologies are reshaping the whole ecosystem in which people coexists with money. The once clear borders between work and automation, between value and information, between the individual and the system, are now getting blurry. It makes you wonder whether value is something inherent or just something conventional, or maybe even something that can be coded into existence. Our paper is a brief attempt to discern some of these paradigmatic shifts and the new kinds of philosophical questions they raise. We do not provide answers, we just try to line out how the scene is changing, and how money—once thought of as a stable, practical matter—is becoming something far more abstract, more fluid, and more tightly linked to the digital structures that increasingly shape how we live.*

Key words: *Philosophy of Money, Cryptocurrencies, Web 3.0, Artificial Intelligence, Paradigm Shift*

JEL: B260

1. Introduction

Money is one of the most sophisticated inventions ever made by human civilization, affecting nearly every aspect of life, from the mundane to the existential. It was always a highly important object of study for philosophy, economics, sociology, or even anthropology and often served as source of inspiration for diverse artworks from painting to music. Although being often reduced to an

oversimplified tool for trade and savings, the philosophy of money poses much deeper questions related to its ontological, epistemological, axiological, or ethical facets.

In the course of history, money has always been more than a bare medium of exchange, being a convoluted reflection of value, trust, power, and societal structure. The traditional, everyday conception of money, i.e., a state-backed, centralized, and tangible medium of exchange, is undergoing now a profound metamorphosis. The birth and development of cryptocurrencies, the rapid headway of Web 3.0, and the ubiquity of AI are not just bare technological trends, they generate unleashed philosophical forces, reshaping our knowledge on what money is, how value is created, and who controls it. The convergence of the three indicates a radical shift towards a new philosophy of money based on the concepts of decentralization, algorithmic trust, and post-human economic agency. These emerging technologies are not merely altering the usage of money, but they are reshaping its very philosophical foundations by challenging our traditional assumptions about value, authority, autonomy, and what it means to be part of an economy. In summary, they all together mark a shift from a centralized, institution-dependent paradigm to a decentralized, code-driven, and intelligent financial order.

2. Basic content

The Ontology of Money: What Is It?

According to an opinion that echoes countless times throughout history, at its crux, money is only a social construct without any intrinsic value, whose value emerges from mutual agreement. This opinion has its roots in Aristotle's *Nicomachean Ethics*, where by exploring the question of justness in exchange and the role of money in granting equitable transactions, he differentiates between **natural wealth** (consisting of life supporting things, like food) and **artificial wealth** (money). From this point of view the value of money is a symbolic one, because it is a conventional item, an invention (*nomos*), rather than a natural product. The role of money is to serve as a measure and a medium, linking different needs and goods, allowing unlike things to become commensurable and thus enabling fair exchange. He deals with the problematics of money in his *Politics* too, where he differentiates between **natural exchange**, like barter for necessities, and **chrematistics**, as the art of wealth acquisition, especially through trade for profit.

In 1900, Georg Simmel published one of his major pieces of work, *The Philosophy of Money*, a treaty that proved to be foundational in both sociology and philosophy. It explores the nature of money not just as an economic tool, but also as a cultural and psychological force that shapes modern life, arguing that money is a pure expression of abstract value—a **neutral intermediary** that makes all things commensurable. This abstraction brings power and paradox, on one hand enabling efficient exchange and complex economies, on the other one reducing qualitative differences to quantitative sameness, thus collapsing feelings, time, or labour into a price tag.

In Simmel's vision, exchange is not just an economic phenomenon, but a form of interaction between individuals that builds society. Due to its **abstract nature**, money transforms direct, personal exchanges into impersonal, mediated ones, altering the nature of human relationships, creating social distance, while increasing individual freedom and objectivity. According to our everyday perspective, money fosters individual autonomy by expanding the scale of personal choice and reducing personal dependence on specific people or institutions. Paradoxically, this increased degree of individual freedom is accompanied by alienation, due to the fact that interpersonal bounds and relationships between individuals and institutions become transactional and people are often valued in terms of economic utility.

It has now become a commonplace, that money promotes the **quantification of values**, thus making everything measurable and comparable in monetary terms. As a consequence, a shift from qualitative to quantitative thinking emerged, affecting everything, arts, ethics, relationships, and even identity included. One psychological effect of money, especially in the realm of urban life, is the *blasé* attitude—a form of emotional detachment, disengagement or indifference, generated by the

overexposure to stimuli, competition and the compulsion to comply. Using monetary valuation desensitizes people, leading to a loss of appreciation or emotional connection. What matters increasingly is not what something is, but what it costs and not who somebody is, but how much "worth" she/he is.

In Simmel's view, money is not as much a static store of value as something whose value lies in its circulation. Modern economy evolved into a complex network of interactions, where money acts like blood in a circulatory system, becoming a symbol of the fluidity of modern life, characterized by a constant movement.

Money and Morality: Can It Be Good or Evil?

Philosophers have wrestled with the moral implications of money since ancient times. Aristotle criticises excessive wealth-seeking and the unnatural accumulation of money, disapproving **usury** (charging interest), calling it "unnatural" because money is being used to reproduce itself, rather than facilitate exchange of real goods.

Christian thought often treated money with suspicion, associating it with one of the seven deadly sins—**greed** (avaritia), and the sin of usury. Thomas Aquinas addressed money primarily within the framework of Christian ethics, natural law, and Aristotelian philosophy. His key ideas are scattered throughout his major works, especially the *Summa Theologiae* and *Commentary on Aristotle's Politics*. Following Aristotle, he considered money being a **human invention** (artificiale) designed to facilitate exchange—instead of a natural good, its proper role residing in serving as a **medium of exchange** and **measure of value**, not as a good to be accumulated or augmented. As a good catholic, he firmly castigated usury—the practice of charging interest on a loan—as preposterous and wrongful, contending that money is sterile, because it cannot "produce" more money by itself. Charging interest for its use is thus exploiting the borrower and violating the principle of commutative justice—the idea that exchanges must be equal. Aquinas also developed the idea of a **just price**, a moral, not merely market-determined, value that reflects the worth of the good and maintains social harmony. Excessive profit beyond the just price is unethical unless justified by risk, necessity, or effort. Although wealth and money are not inherently evil but they must be used in accordance with virtue, encouraging charity, moderation, and stewardship, hence wealth should not be hoarded but used ethically. Aquinas classified **avarice** (greed for money) as a capital sin that estranges people from God and disrupts social justice.

At the time of the Industrial Revolution, German philosopher Karl Marx developed a profound critique of money as part of his broader analysis of capitalism. His ideas about money appear mainly in the *Economic and Philosophic Manuscripts of 1844* and later in the first volume of his *Capital*. By contrast to Christian ethics, he sees money not as morally flawed in itself, but as a vehicle of alienation under capitalism. In his **labour theory of value**, Marx asserts that all commodities have an intrinsic value because of the socially required labour-time embodied in them, so in his view, money transforms human labour into an asset, severing workers from the value they create. Money operates as the standard medium for measuring and conveying the worth of commodities, allowing exchange by abstracting from **use-values** (specific needs) and focusing on **exchange-values** (quantified labour). Because under capitalism, labour produces for wages, not for personal need or fulfilment, the worker is separated from the product, the act of production and their own potential, and money, as the form of wage payment, becomes the mediator of this **alienation**. As such, money is not just a means of exchange, but becomes self-expanding capital by buying a commodity (labour, inputs) only to generate more money (surplus value). This is the core idea of **exploitation** in Marx's critique: surplus value is extracted from workers' labour but appropriated by capitalists.

In contemporary ethics, scholars like Michael Sandel alerts of the **moral limits of markets**, by arguing that if everything is for sale, then even education, health, or prison cell upgrades, will become commodities. He exposes the main claim of his critique of the moral limits of markets, i.e., that money tends to corrupt the social good, turning civic duties into market preferences, especially in his 2012 book *What Money Can't Buy: The Moral Limits of Markets*. According to this, markets don't just

allocate goods, they also frame attitudes, values, and relationships, thus the penetration of money and market thinking into every sphere of life can corrupt or crowd out non-market norms, such as altruism, civic duty, or fairness. He makes a clear distinction between **market economy**, a tool for organizing productive activity, and **market society**, a society in which everything is for sale. He warns that our society ambles toward a market society, where money increasingly governs access to resources like education, health, political influence, and even procreation or human organs. In his opinion, **commodification** can corrupt people and generate injustice, especially when it meets inequality, because not every efficient or consensual act of exchange is also just or ethical.

Money and Identity: How Does It Shape Us?

In contemporary capitalist societies, our sense of self is deeply influenced by money, due to the fact that a person's social worth is often appreciated by her/his financial success. Erich Fromm critiqued this attitude in his very popular book *To Have or To Be?*. He is arguing that modern individuals are often defined by what they own, rather than who they are. According to his opinion, there are two basic modes of existence: **having**, as defining oneself by possessions, including money, status, and things, respectively **being**, as defining oneself by experience, creativity, love, and authentic expression. Influenced by Marx, Fromm saw money as a symbol of alienation, a means which transforms personal qualities and relationships into impersonal, exchangeable values. Thus, human beings are turned into assets judged solely by their economic value, while love, creativity or dignity are devalued because they cannot be monetized.

In *Escape from Freedom*, Fromm explains how modern individuals despite getting free from traditional authority, do still feel insecure and rootless. Under such circumstances, money may offer an illusion of security and identity and that is why people define themselves by income or consumption because deeper, intrinsic values are not fostered. Moreover, the pursuit of money can lead to existential contradictions by, on the one hand, promising freedom, on the other, imposing conformity. The modern condition is one where money is both a tool of autonomy and a source of dependence; while it enables choice, it can lead to obsession and anxiety. In *Man for Himself* and *The Sane Society*, Fromm describes the **marketing orientation** of man, when money becomes the primary means of self-evaluation, thus people come to see themselves as brands. As a consequence, identity is based on social approval and marketability, not inner values or truth.

Cryptocurrencies: Challenging State Monopoly and Decentralizing Trust

Historically, money has derived its legitimacy from sovereign institutions. However, Bitcoin and other blockchain-based currencies challenge this model by offering decentralized trust. Instead of central banks, cryptocurrencies use distributed consensus and cryptographic proof. As philosopher David Golumbia argues, Bitcoin's appeal lies in its radical departure from state-centric finance (Golumbia, 2016). But this philosophical break raises new questions, on the one hand, regarding the potential replacement of the trust in institutions by the trust in code, on the other, regarding how value systems governed by decentralized algorithms can be more ethical or inclusive than those controlled by human institutions. These topics invite to reconsider the originator of monetary legitimacy, which is no longer the sovereign or the state, but the ubiquitous network.

At the heart of cryptocurrency stays the radical idea of trust without intermediaries. Bitcoin was introduced in 2009 by the fictitious Satoshi Nakamoto, who recommended a peer-to-peer electronic cash system secured not by banks or governments, but by mathematical proof and distributed consensus. (Nakamoto, 2008) Philosophically, this introduces the idea that value can emerge from community consensus and algorithmic governance, severing money from state control. This process of decentralization aligns with Foucault's idea of **governmentality**, i.e., that economic control can shape how power is exercised. (Foucault, 1991) By replacing trust in institutions with trust in data and code, cryptocurrencies develop into a new locus of economic sovereignty, sparking debates over legitimacy, regarding who is entitled to define what money is: central banks or code, governments or communities?

Web 3.0: Redefining Ownership, Participation, and Value Creation

Web 3.0 embodies the vision of a blockchain technology-based, user-owned, decentralized Internet, capable of shifting power from platforms to individuals and communities. Through tools like non-fungible tokens (NFT), decentralized autonomous organizations (DAO), and decentralized finance (DeFi), Web 3.0 enables users to own and monetize their digital assets and even their online identities, and as philosopher Jaron Lanier has long argued, they may be compensated for the data they generate (Lanier, 2013). Now this is becoming feasible, in this new environment, because value can be directly tied to participation, instead of institutional affiliation or employment. The philosophical transformation in how money is earned, distributed, and tied to identity, generates a gradient movement from labour-based income to attention-, ownership-, and contribution-based economies. That poses several new questions regarding how individuals should be paid for their data or in what degree economic value is becoming more relational and communal than transactional. (Lanier, 2013) Web 3.0 envisions a decentralized Internet powered by blockchain, smart contracts, and token economies. Unlike Web 2.0, where users generate content for centralized platforms, Web 3.0 offers users actual ownership of their data and digital assets, often via non-fungible tokens (NFT) or governance tokens in decentralized autonomous organizations (DAO). This model reconfigures the philosophy of money by tying value to participation and contribution, not just scarcity or labour. In this world, being part of a network—voting, curating content, staking resources— generates value, echoing Marxist critiques of alienated labour, yet with a techno-utopian twist: value is now co-created and co-owned. (Buterin, 2014, Tapscott & Tapscott, 2016)

AI: Rethinking Trust and Control

Nowadays, AI challenges traditional monetary systems by automating decision-making in finance, thus reducing the need for human trust in institutions. Smart contracts and algorithmic trust (e.g., in DeFi) move authority from human intermediaries (banks, regulators) to code. This raises philosophical questions about the legitimacy and ethics of machine-governed value systems: Who decides what the code values? What if it reinforces bias or instability? (Schär, 2021)

AI is a means of central importance to the so-called digital surveillance capitalism, where personal data is monetized through algorithmic profiling and behavioural prediction. Philosopher Shoshana Zuboff argues that this monetization of attention and behaviour redefines the meaning of money itself, which is now tied to its predictive power rather than stored labour or material exchange. This transformation raises several questions related to autonomy, consent, and the commodification of human experience. (Zuboff, 2019)

Contemporary AI-driven financial markets and automated decision-making systems raise profound ethical concerns due to their potential to amplify wealth inequality by reinforcing biased algorithms or concentrating profits. The philosophy of distributive justice, as explored by John Rawls or Amartya Sen gains new urgency in answering the question of ensuring fairness in AI-shaped economies. This brings attention to algorithmic ethics, labour valuation, and whether money still reflects fair compensation in an automated age. (Eubanks, 2018; O'Neil, 2016) There is a serious debate among economists and philosophers regarding the potential of these technologies to empower everyone, or just an elite. The democratizing capacity of Crypto and AI are often praised, but one should not forget that access, literacy, and capital are unevenly distributed in society, so there is always a risk of deepening inequality, exclusion, or algorithmic discrimination.

AI and Post-Human Agency

Day by day, AI automates more tasks previously performed by humans, sparking intense philosophical debates over what money should reward: labour, creativity, attention, or data? These controversies raise the idea that Universal Basic Income (UBI) or data dividends may become necessary, shifting the moral basis of money from labour to citizenship or participation. (Susskind, 2020; Lanier, 2013)

With AI systems making trades, offering financial advice, or generating digital content that can be monetized, they act as quasi-economic agents. This raises a question regarding the rights and/or responsibilities that AI should/could have in economic transactions. Thus, we witness a shift in the

philosophy of money from an essentially human-centric state to a post-human machine-inclusive one. (Danaher, 2016; Pasquale, 2020) AI rattles the philosophy of money by automating the means of production. As it takes over tasks in finance, creative industries, and service sectors, traditional ideas of labour-for-wages are being undermined. In his *World Without Work*, economist Daniel Susskind envisions a future where human labour becomes economically obsolete (Susskind, 2020). This raises an uncanny question: if money has historically been a reward for human effort, what happens when machines take over labour, i.e., the process of generating value? Moreover, AI's evolving role in high-frequency trading, credit scoring, and DeFi governance raise uncountable troops of algorithmic economic agents—entities that make decisions about wealth without human oversight. This leads to deeper philosophical issues about economic agency and/or rights of AI agents and about the way human needs, algorithmic prediction, or network consensus determines value.

AI and the Automation of Value and Decision-Making

The rapidly growing army of AI-powered trading systems, robo-advisors, and decentralized prediction markets further disrupts the monetary paradigm by automating not just labour, but economic decision-making itself. The process raises profound questions with regard to the responsibility for an AI's financial decisions or, more generally, the way non-human agents hold or transfer value. Moreover, AI is now capable to create new forms of economic value, such as synthetic media, generative art, and algorithmically curated knowledge. This addresses another philosophical question regarding value in a world where machines produce content, make investments, and even generate money without human input. Some thinkers argue this leads to a post-capitalist future where traditional labour is irrelevant, and income must be rethought, perhaps through UBI or data dividends (Susskind, 2020; Lanier, 2013). AI thus challenges the labour theory of value and invites humans to reimagine money not as earned commodity, but as entitlement or digital citizenship.

Emerging Ethical and Existential Questions

Emerging new technologies like cryptocurrencies, Web 3.0, and AI are profoundly reshaping not only our economies and societies but also raising deep ethical and existential questions. Many of these investigations cut across economics, philosophy, law, and human identity, challenging foundational assumptions about identity, agency, value, autonomy, and meaning in human life. They not only reshape systems of power and value, but also challenge what it means to be human in a decentralized, automated, and hyper-digital world.

Web 3.0 enables trustless, decentralized networks (e.g., DAOs, smart contracts), which can democratize power but also obscure responsibility, raising the question of accountability (e.g., for frauds, biases, or exploitation) in decentralized systems without central authorities. AI systems can act autonomously in areas like financial trading, medical diagnostics, or warfare. They displace human judgment, but the question of deciding who will be morally accountable for the damages and/or casualties is still open. (Floridi, 2014) Smart contracts and DAOs can significantly reduce human oversight, but the issue of moral intention of the code is unsolved. AI and blockchain technologies often claim neutrality, but as scholars like Cathy O'Neil and Shoshana Zuboff argue, they frequently reproduce existing power dynamics under a veneer of objectivity. Thus, the new philosophy of money must be critical as well as innovative—recognizing that code is not law, but politics in disguise. (O'Neil, 2016; Zuboff, 2019)

One of the most frightening existential questions raised by the confluence of these new technologies is one referring to the meaning of being human in an economy of data and automation. Crypto incentivizes new digital identities (e.g., pseudonymity, tokenized personas), challenging traditional ideas of work, value, and identity. Web 3.0 enables self-sovereign identity—users can control their own data and digital reputation, but does this strengthen identity, or fragment it? AI-generated avatars, bots, and deepfakes challenge traditional boundaries between real and simulated selves. Web 3.0 and NFTs may promote a culture of hyperfinancialization of life, where everything, from art to reputation, develops into a financial asset, tokenized or monetized. Such processes raise serious concerns about the moral limits of markets and the commodification of life. (Sandel, 2012)

A main source of concern is how individuals can maintain autonomy in systems designed to extract value from data. Although Crypto promotes pseudonymity, AI and Web 3.0 platforms still aggregate and monetize data, raising questions of informed consent, surveillance, and the right to digital self-determination. When algorithms curate our information and wealth, what happens to democratic choice and truth? AI recommendation systems and algorithmic bias can entrench social inequality and misinformation. Decentralized networks aim to reduce centralized power, but often concentrate influence in hidden ways (e.g., via token whales or governance capture).

We also have to take into consideration the environmental ethics and tech responsibility aspects of the problem, namely: how can we justify high-energy tech like Bitcoin or large language models in a climate crisis? Cryptocurrencies (especially Bitcoin) have been criticized for their massive carbon footprint and AI training also consumes huge energy resources. All this leads to a more general and comprehensive question: is innovation morally sustainable if it harms the planet?

New Philosophical Pathways and Paradigm Shifts

Cryptocurrencies like Bitcoin reawaken old philosophical debates. What gives money its legitimacy? Is it trust in a state, a technology, or a shared narrative? These innovations challenge centralized monetary systems and raise new ethical issues about transparency, inequality, and environmental cost. At the same time, universal basic income, cashless societies, and digital banking provoke us to rethink not just how money functions, but what role it should play in a just and humane society. In the next table, these evolutionary paths and their corresponding philosophical themes are presented in a concise manner.

Path	Philosophical Themes
Trust & automation	Legitimacy of non-human agents
Economic agency	Post-human ethics
Data monetization	Autonomy, consent, commodification
Inequality	Distributive justice
Labour redefinition	Value, purpose, and UBI

The emergence of cryptocurrencies, Web 3.0, and AI has produced a significant paradigm shift in the philosophy of money, challenging foundational ideas about what money is, how it acquires value, which controls it, and what it means for human identity, trust, and social order. The following table synthesises these transformations.

Dimension	Old Paradigm	New Paradigm	Key Philosophical Shift
Trust	Institutional	Decentralized algorithmic	From authority to code
Value	Static and symbolic	Programmable and dynamic	Money as process
Identity	Human-labour tied	Tokenized, datafied	Self as asset
Labour	Source of value	AI/automation driven	Post-labour economy
Sovereignty	National	Global peer-to-peer	Stateless economics

These shifts reflect what Georg Simmel foresaw in his *Philosophy of Money*: money is not static—it evolves with our social relationships, technologies, and moral frameworks.

3. Conclusions: Towards a New Philosophy of Money

Philosophical enquiries about money reveal that this ancient phenomenon is not just an economic tool but also a mirror of human values and contradictions. It reflects human desires, fears, and social arrangements. Examining money from a philosophical perspective means not only to ask what it is, but also to question what humans are becoming in relation to it. As technology and society evolve, so must the ethical and conceptual understanding of this powerful abstraction evolve too. As humanity moves forward, philosophers, technologists, and policymakers must collaborate to safeguard that the powerful new systems built do not only boost performance, but also uphold justice, promote dignity, and endorse human well-being in this thoroughly reinvented monetary future.

Cryptocurrencies, Web 3.0, and AI are not simply financial or technological innovations, but they mark a philosophical shift in how we understand money, value, and human agency. By decoupling money from the state, reassigning ownership of data, and automating value creation, these systems force us to rethink the foundational questions of economics and ethics.

These technologies together suggest that we are moving toward a post-human or post-institutional philosophy of money—one where value is defined not solely by governments or gold, but by networks, algorithms, and participation. This shift offers exciting possibilities for democratization and innovation, but also dangers, like the loss of regulatory oversight, deepening inequality, and the rise of opaque techno-authorities.

As these technologies mature, philosophers, economists, and technologists must work together to answer not just what money is, but what it should be. In doing so, we move beyond money as currency, toward money as a mirror of human—and artificial—values. Bringing together these technological revolutions, we will be able to outline several emergent principles in the new philosophy of money:

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SECTION 4: ACCOUNTING

TRENDS IN THE ECONOMIC ENVIRONMENT – MANAGEMENT ACCOUNTING

DOI: <https://doi.org/10.53486/dri2025.42>
UDC: 657.1:005.53

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Abstract: *This paper explores the impact of digitalization on management accounting in the context of a changing economic environment. Emphasis is placed on how modern technologies improve decision-making processes through better data access and integration. The research uses a systematic literature review and qualitative analysis to identify key opportunities and challenges that digitalization brings to managerial accounting.*

Key words: *digitalization, management accounting, decision-making, performance, competitiveness*

JEL: M41

1. Introduction

The economic transformations generated by digitalization have a significant impact on management accounting, redefining the way financial and operational information is collected, analyzed and used. In an environment characterized by uncertainty, complexity and competitive pressure, companies are forced to adopt digital solutions that support strategic and operational decision-making processes. The topic of the paper is relevant in light of the growing need to adapt management accounting to new technological and information realities.

Management accounting, also known as management accounting, has the role of providing relevant information for planning, controlling and making internal decisions within an organization. It differs from financial accounting by its exclusive orientation towards the internal needs of management, emphasizing cost analysis, budgeting, forecasts and performance evaluation. In the current context, marked by accelerated digitalization, management accounting must integrate new technological tools and adopt a proactive approach in generating information to support strategic decisions.

Over time, management accounting has evolved from a cost-control-oriented system based on traditional methods to a flexible system focused on supporting strategic decisions. The first stages were marked by the use of standard costing techniques, variance analysis and budgetary control. Subsequently, the emergence of concepts such as activity-based costing (ABC), value chain analysis and strategic accounting contributed to the expansion of the functions of the management accountant. Currently, the evolution is accelerated by digitalization, which facilitates the collection and processing of large volumes of data in real time, thus supporting an analytical and predictive approach to management decisions.

The role of the management accounting professional has expanded significantly in this new digital paradigm. He is no longer perceived only as someone responsible for monitoring costs or preparing internal reports, but as an analyst and strategic consultant. The accounting expert must have solid digital skills, the ability to interpret complex data and the skills to communicate effectively with management teams. In this new context, he actively contributes to decision-making, risk assessment and the design of financial solutions that support long-term business objectives.

Optimization of management processes is one of the most important directions of action of modern management accounting. By using digital technologies and automated solutions, organizations can streamline internal activities, reduce the time allocated to repetitive tasks and improve the accuracy of information used in the decision-making process. The integration of information systems allows for continuous monitoring of performance indicators, generating an increased capacity to react to

changes in the business environment. Thus, management accounting becomes an active tool to support management in strategic planning, operational control and adaptation to market requirements. The relevance of this work lies in the need to adapt management accounting to the accelerated transformations of the economic and technological environment. In an era of digitalization, characterized by large volumes of data, information speed and increased decision-making complexity, the role of the management accountant is no longer limited to internal reporting, but involves a strategic contribution to management processes. This paper provides a current view on how emerging technologies influence the organization, analysis and use of accounting information to sustainably support the performance and competitiveness of enterprises.

The main purpose of the paper is to analyze the impact of digitalization on management accounting, by highlighting the transformations brought by new technologies in decision-making processes, accounting practices and value creation for organizations. The specific objectives aim to identify the opportunities and challenges generated by digitalization, as well as the means by which management accounting can contribute to improving economic performance.

The central question guiding this research is: How does digitalization influence management accounting and what is its impact on the decision-making process, performance and competitiveness of organizations?

The methodology used consists of applying a systematic review of relevant specialized literature from the period 2015–2024, complemented by a qualitative analysis of the most significant academic works and research reports. This approach allows for the synthesis of the most important emerging trends and practices, providing a solid theoretical framework for assessing the implications of digitalization in the field of management accounting.

A synthesis of the research stages carried out highlights an approach structured in several phases. In the first stage, an extensive documentation of the specialized literature was carried out, with the aim of understanding the evolution of management accounting in the context of digitalization. Subsequently, relevant sources published were selected, including scientific articles, international reports and case studies. The second stage consisted of a qualitative analysis of these sources, identifying the main concepts, trends, advantages and difficulties related to the implementation of modern technologies in accounting. Finally, the data were synthesized to outline coherent conclusions and to propose future research directions.

The contribution of the paper consists in outlining an integrated perspective on digitalization in management accounting, by correlating it with managerial decisions, optimizing internal processes and creating sustainable added value.

2. Basic content.

The Evolution of Management Accounting in the Context of Digitalization

Digitalization has accelerated the transition of management accounting from a reactive system, based on the collection and reporting of historical financial information, to a proactive system, focused on anticipating trends and supporting strategic decisions. Although initially management accounting had a predominantly accounting character, oriented towards cost control and operational efficiency, technological transformations have determined the expansion of its functions towards analysis, forecasting and decision-making support.

The role of the management accounting professional has expanded significantly in this new digital paradigm. He is no longer perceived only as someone responsible for monitoring costs or preparing internal reports, but as an analyst and strategic consultant. The accounting expert must have solid digital skills, the ability to interpret complex data and effective communication skills with management teams. In this new context, he actively contributes to the formulation of decisions, the assessment of risks and the design of financial solutions that support long-term business objectives. The adoption of integrated information systems, advanced analysis tools and technologies such as artificial intelligence or machine learning has allowed the rapid collection and processing of large

volumes of data. Thus, management accounting has become an essential source of relevant and up-to-date information, providing support for operational, tactical and strategic decisions. This evolution has redefined the role of the professional in the field, who is increasingly becoming a business partner and consultant in decision-making processes.

Opportunities for digitalization in management accounting

The benefits of digitalization are multiple and essential for the evolution of management accounting. First of all, digitalization contributes to increasing the efficiency of accounting processes, by reducing processing times and eliminating redundant activities. This allows for better control over costs and more efficient use of resources.

Secondly, digitalization supports the quality of decisions by increasing the accuracy, consistency and updating of the data provided to management. The information is available in an understandable, easy-to-interpret format, favoring the making of quick and well-founded decisions.

Thirdly, digitalization increases the ability of organizations to react in real time to changes in the external environment and to implement strategies based on concrete data. Thus, management accounting becomes not only a support tool, but an essential pillar in the formulation of competitive strategies and in supporting organizational sustainability.

Digitalization significantly contributes to the improvement of management accounting practices by introducing modern methods of analysis, reporting and control. By adopting advanced information systems, management accounting becomes an essential support in the decision-making process, not only by providing historical data, but also by generating predictive information and alternative scenarios, which offer the possibility of anticipating the impact of decisions in various economic contexts, of assessing the associated risks and of selecting the optimal options according to the strategic objectives of the organization.

Relevant examples of modern methods that support this process include: activity-based costing (ABC), customer and product profitability analysis, performance-based budgeting, key indicator control (KPI dashboarding), dynamic financial modeling and the use of interactive dashboards. These tools contribute to transforming management accounting into a strategic function, oriented towards value and organizational adaptability.

Digital technologies allow the analysis to be extended from the cost level to aspects related to profitability, efficiency and sustainability. At the same time, digitalization facilitates interdepartmental collaboration and increases transparency in the decision-making chain, which contributes to the alignment of accounting objectives with the strategic ones of the organization.

Digitalization offers a wide range of opportunities for improving management accounting practices, contributing to the efficiency of the decision-making process and strengthening competitive advantage. One of the most significant opportunities is the automation of repetitive processes, such as data collection, expense classification or the generation of periodic reports. By reducing human errors and time consumed by manual tasks, accounting becomes more efficient and oriented towards strategic analysis.

Real-time access to financial and operational information allows managers to monitor performance and respond quickly to market changes. The use of integrated platforms, such as ERP (Enterprise Resource Planning), facilitates the integration of data from different departments and provides a complete picture of resources, costs and results, is already a practice adopted in Romania. For example, the Arctic company uses the SAP ERP system to integrate financial and operational functions, ensuring clear tracking of information flows and processes and real-time reporting.

The implementation of this system has allowed for better monitoring of production costs, more efficient resource planning and a significant improvement in the speed of reaction to market orders. Automobile Dacia – part of the Renault Group – also uses a customized ERP platform that integrates modules for cost management, production control and optimization of procurement processes. Through this solution, Dacia has managed to ensure transparency throughout the supply chain, reduce

production downtime and maintain competitiveness in an extremely dynamic industrial sector. Other companies, such as Banca Transilvania or Rompetrol, have integrated ERP solutions to support decision-making and improve control over financial and logistical data. In the case of Banca Transilvania, the ERP system facilitates the centralization of accounting data, the generation of complex financial reports, and compliance with financial regulatory requirements. Rompetrol uses ERP to track financial and commodity flows in real time, thus optimizing the logistics chain and maximizing operational performance.

Table 1. Use of ERP

Company	Reporting time (days)	Budget accuracy (%)	Market reaction (score 1-10)	ERP type
Arctic	30	85	8	SAP ERP
Dacia	25	88	9	Customized ERP
Banca Transilvania	20	90	9	Integrated Banking ERP
Rompetrol	15	87	8	Logistics & Financial ERP

Source: own projection

Also, modern technologies such as artificial intelligence (AI), advanced data analysis (advanced analytics) and visualization tools (e.g. Power BI, Tableau) offer the possibility of identifying trends, predictive models and alternative scenarios. They support the foundation of better informed and faster decisions, in a volatile and complex economic environment.

Digitalization also allows for better personalization of the information provided to management, depending on the hierarchical level, strategic objectives or type of decisions. In this way, management accounting becomes a dynamic tool, able to adapt to the specific needs of the organization.

The challenges of digitalization in management accounting

Although digitalization offers many benefits, its implementation in management accounting is not without its challenges. One of the main challenges is the high costs associated with the acquisition and maintenance of high-performance digital solutions, including ERP platforms and the necessary IT infrastructure. These investments can be difficult to sustain for small and medium-sized enterprises.

Another significant obstacle is the resistance to change among staff, who may be reluctant to adopt new technologies due to a lack of digital skills or fear of replacing the human role with automation. In this regard, the continuous development of the skills of accounting professionals through training and the adaptation of educational programs to new market requirements is essential.

Data security risks are another important challenge. With the transfer of sensitive information in digital environments, organizations are exposed to cyber attacks, data loss and privacy breaches. In this context, it becomes imperative to adopt clear cybersecurity policies, as well as comply with data protection regulations (such as the GDPR). For example, organizations must ensure the explicit consent of individuals for the processing of personal data, implement appropriate technical and organizational measures to protect this data and be able to provide transparency and access to information for users. In addition, individual rights must be respected, such as the right to erasure of data ("right to be forgotten") and the obligation to notify in the event of a security breach. In addition, integrating new technologies in a coherent way with existing processes can encounter technical and organizational difficulties. Effective implementation requires good planning, the involvement of all stakeholders and the adaptation of the organizational culture to support innovation.

A good practice example of applying digitalization to management accounting is the case of Siemens, which has implemented an integrated Business Intelligence and predictive analytics system for its

finance departments. The company uses the SAP HANA platform combined with Tableau to unify internal data sources and enable real-time access to reports and performance indicators. The system allows Siemens managers to create customized dashboards, visualize budget deviations, anticipate financial risks, and simulate the impact of various strategic decisions.

Table 2. Performance indicators

Performance indicator	Before digitization	After digitalization (SAP + BI)
Financial reporting time (days)	14	9
Budget accuracy (%)	82	91
Scenario simulation capacity (score 1–10)	6	9

Source : Own Projection

For example, financial reporting time was reduced from 14 to 9 days, and budget accuracy increased from 82% to 91%. The ability to simulate multiple scenarios was internally rated 9/10, reflecting the decision-making flexibility gained through digitalization. By using platforms such as SAP and visualization tools such as Tableau, the company was able to integrate financial and operational data in real time, enabling detailed performance analysis across each line of business.

The results included reducing financial reporting time by over 30%, improving budgeting accuracy, and increasing the ability to simulate complex economic scenarios. This model can serve as a benchmark for other organizations by highlighting an integrated, scalable, and efficient approach to digitizing accounting processes. In particular, companies looking to improve data transparency, optimize decision-making, and reduce reaction time to market changes can adapt similar solutions. Implementing ERP and BI systems, such as SAP and Tableau, can significantly contribute to transforming management accounting into a strategic partner of management, both in large companies and in SMEs with digital growth ambitions.

3. Conclusions.

Answering the research question – How does digitalization influence management accounting and what is its impact on the decision-making process, performance and competitiveness of organizations? – the research confirms that digitalization has a profound and multidimensional effect on management accounting, simultaneously influencing the information structure, the tools used, the necessary professional skills and the strategic role of this function.

It transforms management accounting from a system based on retrospective control and reporting into a dynamic mechanism for analysis, anticipation and decision support. This transformation involves not only a technological update, but also a reconfiguration of the management paradigm, in which data becomes strategic resources, and the management accountant becomes an active partner in the formulation and implementation of organizational strategies.

Firstly, digitalization significantly contributes to the transformation of management accounting from an operational function into a strategic partner of management. Process automation, the use of ERP, BI and AI systems, as well as real-time access to quality data, support fast, accurate and informed decision-making.

Secondly, the integration of digital technologies allows for improved performance by reducing reporting times, increasing budgetary accuracy and optimizing control over resources. The analyzed good practice examples, including the case of Siemens and Romanian companies such as Arctic, Dacia, Rompetrol or Banca Transilvania, demonstrate the added value of digitalization in the current economic context.

At the same time, the paper highlights digital challenges, such as implementation costs, lack of digital skills, resistance to change and data security risks. These must be managed through clear training, security and strategic alignment policies.

In conclusion, the digitalization of management accounting is not just a trend, but a necessity in the current context. Organizations that effectively leverage digital technologies can achieve significant competitive advantages, better adaptability and economic sustainability. Future research can investigate in depth the impact on specific sectors, the efficiency of digital tools or the correlation between digital maturity and the financial performance of enterprises.

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THE REFORMS BROUGHT BY IFRS 17 AND THEIR EFFECTS ON FINANCIAL SUSTAINABILITY IN THE INSURANCE INDUSTRY

DOI: <https://doi.org/10.53486/dri2025.43>

UDC: [657:006.32]:368.021

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Abstract: *IFRS 17 has introduced a fundamental change in the way insurance companies recognise and measure contracts, with significant implications for financial sustainability. While the main purpose of IFRS 17 is to increase the transparency and comparability of financial statements, it may also impact the long-term sustainability of the insurance sector. This article examines how the application of IFRS 17 can contribute to greater social and environmental responsibility among insurers, supporting the integration of ESG (environmental, social and governance) principles into their risk management strategies and financial models. The results highlight that, despite the challenges, the new standard can lead to a more stable, predictable and future-oriented insurance industry.*

Keywords: *IFRS 17, financial sustainability, ESG (environmental, social, governance), corporate governance*

JEL: M41

1. Introduction

IFRS 17, issued by the International Accounting Standards Board (IASB), replaces IFRS 4 and introduces a uniform and principles-based approach to accounting for insurance contracts. The main purpose is to ensure the transparency, comparability and accuracy of the financial statements of insurance companies, thus contributing to strengthening the confidence of investors and other stakeholders. The need to adopt IFRS 17 resulted from the significant limitations of IFRS 4, which allowed for different accounting treatments, limiting comparability between entities and countries. In addition, the post-financial crisis economic context has determined the need for a more robust accounting framework, adapted to the requirements of sustainability and financial responsibility (Glaum et al., 2022). The insurance sector plays a key role in maintaining global economic stability, providing financial protection against risks and supporting sustainable investments. However, conventional financial reporting in this area has been frequently challenged due to the lack of transparency, high complexity and challenges in comparing performance across companies and jurisdictions (Bischof & Daske, 2021; Glaum et al., 2022). In this context, the International Accounting Standards Board (IASB) adopted in 2017 the IFRS 17 "Insurance Contracts", which became operative in January 2023, replacing the old IFRS 4 standard (IFRS Foundation, 2020). Unlike IFRS 4, which allowed the application of national practices, IFRS 17 requires the use of updated cash flow estimates, risk adjustments and the gradual recognition of profit through the Contractual Service Margin (CSM) mechanism. The adoption of IFRS 17 has implications both in terms of accounting compliance and in terms of financial sustainability and corporate responsibility. In an era where governance, transparency and ESG (environmental, social, governance) requirements are becoming increasingly stringent, IFRS 17 proposes a framework that can support a long-term, forward-looking strategy (Willis Towers Watson, 2022; Mazars, 2022). This paper aims to analyze to what extent IFRS 17 contributes to the long-term sustainability of the insurance sector, both through financial transparency and by more effectively integrating risks into decision-making processes. We will explore the accounting foundations of the standard, its implications for corporate

governance and the challenges associated with implementation, providing an integrated picture of its impact on the stability of the insurance industry.

2. Basic content

To understand the long-term impact of IFRS 17 on the insurance industry, it is essential to explore the fundamental elements that define this standard and its implications from multiple perspectives. In the following, the rationale behind the introduction of IFRS 17, the core accounting principles of the standard, the correlations with transparency and ESG factors, as well as the challenges, opportunities and financial risks associated with the implementation process are analyzed. Each of these components contributes to a clearer picture of how IFRS 17 can support a sustainable transformation of the insurance sector.

Accounting fundamentals of IFRS 17 and financial sustainability

IFRS 17 introduces a completely new accounting framework for insurance contracts, based on the measurement of future obligations using a prospective model. It replaces historical approaches that allowed for inconsistent, often arbitrary, estimates. The new framework is built on four fundamental components:

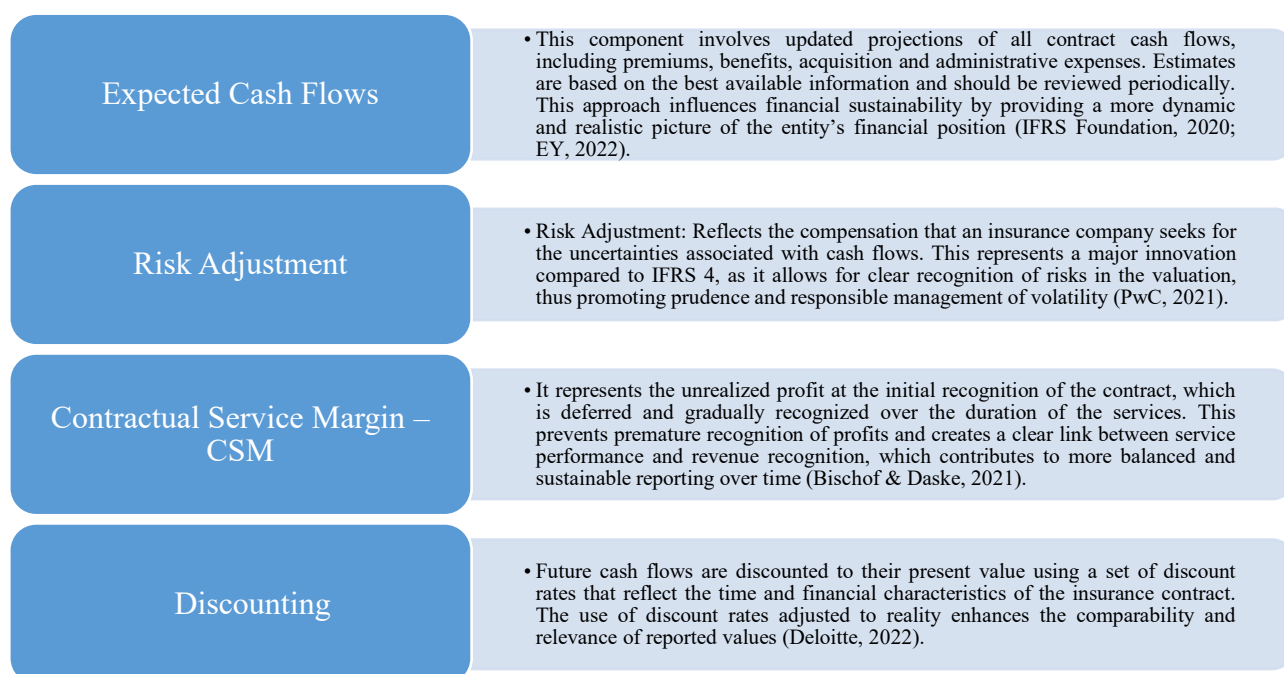


Figure 1. Fundamental components of IFRS 17

Source: Own processing based on IFRS Foundation, 2020; EY, 2022; PwC, 2021; Bischof & Daske, 2021; Deloitte, 2022.

In addition, IFRS 17 requires the grouping of contracts based on profitability and timing of issuance, which reduces the possibility of unjustified offsetting between profitable and unprofitable portfolios. This promotes transparency, better governance and performance control at the level of contract categories. To better understand how the structure of IFRS 17 supports financial sustainability in the insurance sector, the table below summarizes the main components of the standard and their specific contribution to more responsible reporting over the long term.

Table 1. Structural elements of IFRS 17 that support sustainability

IFRS 17 element	Description	Impact on sustainability
Estimating cash flows	Updated projection of inflows and outflows over the contract period	Ensures a realistic long-term image
Risk adjustment	Reflects uncertainty surrounding cash flows	Promotes caution in taking risks

IFRS 17 element	Description	Impact on sustainability
Contractual Service Margin (CSM)	Unrealized profit recognized gradually	Prevents overestimation of initial profit
Discounting	Updating values based on time value	Increases the relevance and comparability of data
Grouping contracts	Classification by profitability and temporality criteria	Promotes transparency and loss control

Source: Own processing IFRS Foundation (2020), PwC (2021), Bischof & Daske (2021)

These fundamentals transform financial reporting into an active risk management and strategic planning tool. By properly implementing IFRS 17, insurance companies can improve their financial forecasting, manage capital more effectively, and demonstrate a commitment to good accounting and governance practices – all of which contribute to real and lasting financial sustainability (Willis Towers Watson, 2022; Nobes, 2022).

Governance, transparency and ESG under IFRS 17

With IFRS 17, reporting becomes more rigorous and based on clear principles. Companies must justify the actuarial methodologies and assumptions used, strengthening governance and transparency towards investors and authorities (Mazars, 2022). This transparency supports the integration of ESG criteria, as it allows for a better assessment of the social, environmental and governance risks impact on performance. Thus, IFRS 17 becomes a catalyst for sustainability, in an increasingly responsibility-oriented economic landscape (Willis Towers Watson, 2022). The implementation of IFRS 17 does not only represent a technical change in accounting, but contributes to the profound transformation of the way in which insurance companies approach corporate responsibility and transparency. This standard obliges entities to adopt detailed, realistic and explicit financial reporting, which has significant consequences for governance and for the way in which ESG (Environmental, Social, Governance) criteria are applied in economic activity. One of the main merits of IFRS 17 is that it requires the use of documented, validated and regularly updated assumptions in the calculation of insurance obligations. This requirement stimulates more efficient administration, as it implies a rigorous process of approval, monitoring and auditing of actuarial models. The risk committee and internal control functions become essential in ensuring the link between actuarial estimates, economic assumptions and management decisions (Mazars, 2022; EY, 2022). Transparency is reflected in the requirements for publishing information on the valuation methods, sources of uncertainty and assumptions used, which allows investors and other stakeholders to better understand the financial performance and sustainability of the entity. IFRS 17 eliminates the “opacity” generated by IFRS 4, in which accounting treatments were uneven and difficult to compare (Glaum et al., 2022). In the ESG context, this transparency has significant added value. Evaluating financial performance on a well-documented basis contributes to greater responsibility in capital allocation. In addition, the forward-looking approach of IFRS 17 facilitates the integration of climate and social risks into financial models, which allows the incorporation of risk scenarios related to energy transition, natural disasters or demographic changes (Willis Towers Watson, 2022; EIOPA, 2021). To support more rigorous and relevant reporting, IFRS 17 introduces a series of mechanisms that directly contribute to increasing transparency and accountability in the insurance sector. These mechanisms have important implications not only for the reliability of financial information, but also for the integration of ESG (Environmental, Social, Governance) principles. Figure 1 illustrates how the key requirements of IFRS 17 – such as justification of assumptions, forward-looking estimates and detailed reporting – correlate with ESG objectives, thus strengthening sustainability and stakeholder confidence in the performance of insurance companies.

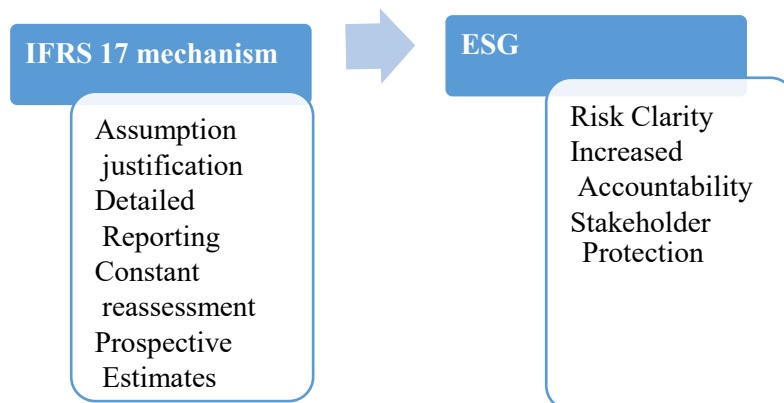


Figure 2. IFRS 17 transparency mechanisms and correlation with ESG

Source: Own processing after Mazars (2022), Glaum et al. (2022)

In the long term, improved governance under IFRS 17 can lead to a more accountable organizational culture where decisions are made based on transparent and rigorous data. This is essential not only to meet regulatory requirements, but also to attract investors who include ESG criteria in their decision-making.

Challenges and opportunities in the transition to IFRS 17

The transition to IFRS 17 is not without its challenges. Among the biggest challenges are the technical complexity, the need to recalibrate IT systems, and the training of employees in the new accounting and actuarial requirements (EY, 2022). At the same time, the new standard opens up important opportunities. These include increasing investor confidence, improving corporate governance, and adapting financial models to modern risk and return principles. The correct implementation of IFRS 17 can turn compliance with the standards into a competitive advantage (Accenture, 2021). Table 2 summarizes these challenges and opportunities, providing a clear picture of the dual impact of the implementation of IFRS 17 on the insurance industry.

Table 2. Challenges vs. Opportunities in the context of IFRS 17

Challenge	Opportunity
High implementation costs	Superior reporting quality
Technical complexity	Competitive advantage through transparency
The need for training and adaptation	Risk-oriented organizational culture
Reconfiguration of IT systems	Modernization of information infrastructure
Managing resistance to change	Alignment with international good practices

Source: Own processing based on Accenture (2021), Deloitte (2022) and KPMG (2020)

Financial risks associated with the implementation of IFRS 17

Although IFRS 17 requires greater transparency and consistency in financial reporting, the implementation process brings with it a number of financial risks that must be carefully managed. Among the most important risks are:

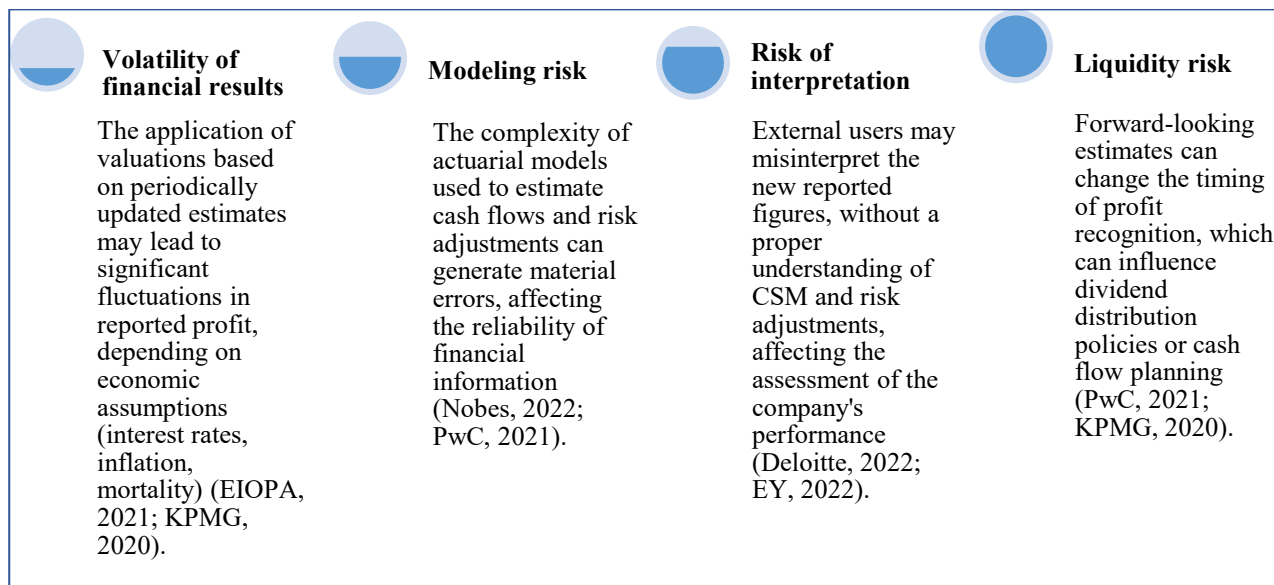


Figure 3. Main financial risks associated with the implementation of IFRS 17

Source: Own elaboration based on data from EIOPA (2021), KPMG (2020), PwC (2021), Deloitte (2022), EY (2022), Nobes (2022).

These risks can affect both the accuracy of reported information and the financial stability of insurance companies. Table 3 highlights the main categories of financial risk associated with IFRS 17, along with the recommended mitigation measures for each type of risk.

Table 3. Major financial risks in the context of IFRS 17

Risk type	Description	Mitigation measures
Volatility	Fluctuations in annual financial results	Establishing acceptable variation limits
modeling	Errors in actuarial projections	Periodic validation of models
Interpretation	Misperceptions of investors	Investor education and explanatory notes
Liquidity	Imbalances between the timing of income and payments	Rigorous financial planning

Source: Own elaboration based on EIOPA (2021), Nobes (2022)

Managing these risks involves close collaboration between finance, actuarial and risk management departments, as well as effective communication with stakeholders. Thus, the application of IFRS 17 becomes not just an accounting exercise, but also a test of financial and strategic maturity.

3. Conclusions

IFRS 17 is more than an accounting reform, it is a strategic step towards a more sustainable insurance industry. Through a forward-looking, realistic and transparent approach, the standard provides the necessary tools to effectively manage risks, increase market confidence and integrate ESG objectives. Companies that rigorously adopt IFRS 17 can enjoy a stronger competitive positioning and a better relationship with investors and stakeholders. In the long term, IFRS 17 facilitates better capital allocation and a more responsible approach to risks. By promoting transparency and sound accounting practices, this standard becomes a valuable tool in supporting financial stability and confidence in the insurance sector.

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LITERATURE REVIEW ON BUSINESS COMBINATION ACCOUNTING

DOI: <https://doi.org/10.53486/dri2025.44>

UDC: 005,591.452:001.891

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Abstract. *A captivating research topic that spans multiple academic disciplines is mergers and acquisitions. Depending on one's perspective, background, and area of study, these transactions can be understood in various ways. Relevant fields include human resources, psychology, marketing, accounting, auditing, economic analysis, management, finance, and jurisprudence. This project aims to explore intriguing subjects for researchers by making publications and journals freely accessible. It seeks to identify sensitive aspects, gaps, or dilemmas that have surfaced in previous studies and to highlight new research directions related to mergers, acquisitions, consolidations, and corporate reorganizations. To facilitate this, bibliometric analysis was conducted on a sample of 503 articles published in the Scopus database using Bibliometrix and VOS viewer tools. As a result, we can conclude that most publications are made in the US, their intensity is recently increasing, and the share of articles exceeds 68% of total resources.*

Keywords: *mergers and acquisitions, accounting, IFRS, goodwill.*

JEL: G34, M40, M41.

1. Introduction

Recently, mergers and acquisitions (M&A) have become the most frequently utilized business growth and diversification strategies. They involve the contribution of shareholders or founders, the employees of the participating companies, and others, such as experts, lawyers, bankers, or government specialists. The importance of these processes derives from the desire to strengthen the market position for companies, to restructure as a result of distortions in the production line, to extend the investment portfolio, or to grow their business into other markets.

Research conducted over the past century encompasses various aspects of mergers and acquisitions, the specific concepts used, the types and significant differences among them, the taxonomy of procedures, theories regarding business growth, the stages and processes involved, and multiple factorial studies on entities from different states or industries.

The mission of this paper is to determine the areas of interest for researchers using open-access publications and journals, to identify sensitive aspects, gaps, or issues, and to outline new research directions in mergers, acquisitions, combinations, and company reorganizations.

The purpose of the research includes identifying and systematizing the economic literature, consolidating an opinion regarding the level of study of the topic at the international and regional levels, as well as outlining new research specialties.

To achieve this scientific effort, we have structured the following research objectives: determining the level of knowledge of economic literature using electronic data processing tools, identifying the most relevant monographs and articles with a main impact on research, systematizing the literature according to certain analysis criteria, and outlining new avenues for potential research.

The research results were tangible through the use of multiple research methods. The constructivist

paradigm allowed us to use general methods of secondary data collection by accessing multiple electronic databases, such as Scopus, ResearchGate, EBSCO, and the Google Scholar search engine, to structure empirical data through the systemic analysis of open-access scientific articles and the book collection that have an essential impact on merger and acquisition accounting. As data processing tools and for the graphical presentation of the results were used VOSviewer and Bibliometrix. We applied induction and deduction to formulate generalizations and conclusions based on the researched articles, as well as to hypothesize certain particularities regarding a specific aspect of the research.

2. Basic content

Mergers and acquisitions (M&A) represent a research domain situated at the intersection of multiple disciplines. Various aspects or methodologies may be interpreted differently depending on the observer's perspective, their qualifications, and their specific research field. These transactions are closely linked to jurisprudence, management, finance, accounting and auditing, economic analysis, human resources, psychology, marketing, and others.

The earliest documented literature on this topic dates back to the 1920s. However, the last three decades have demonstrated a growing interest and popularity of the topic among researchers.

Literature resources focusing on mergers and acquisitions, business combinations, and corporate restructurings are readily available through open-access web databases, bookstores, and public libraries. Notable authors frequently cited in academic literature and highly impacted our study include DePamphilis D. ¹(2018), Campbell Daniel ²(2002), Gaughan Patrick A. ³(2017), Hurduzeu G. ⁴(2003), Sehleanu M. ⁵(2013), Anghel G. ⁶(2023), and Bâtcă-Dumitru C.G. ⁷(2024). These works span from comprehensive managerial guides detailing the full lifecycle of mergers to monographs including national frameworks, law system and the accounting treatment of such transactions.

A purely theoretical contribution was made by Candra A., Priyarsono D.S., Zulfainarni N., and Sembel R. ⁸(2021, pp. 1–12), who presented key terminology, types, motivations, and main theoretical actions pertaining to M&A.

Mengxin Yang ⁹(2024, pp. 617–643) offers a detailed analysis of the evolution of accounting literature over the past 70 years, utilizing Dirichlet probability distributions, where the theme of M&A is highlighted as a central area of focus.

Numerous studies address overbidding behavior and post-investment returns in correlation with accounting standards. Bartov E., Wu H., and Cheng A. ¹⁰(2020, pp. 1–47) examined the causal relationship between the exclusion of goodwill amortization following the adoption of SFAS 142 and the overvaluation of M&A offers. Their findings support the hypothesis that the removal of goodwill depreciation contributed to inflated offer valuations. This conclusion is substantiated by data drawn from two distinct samples in the U.S. and Australia, offering insights into the implications of applying IFRS 3 or SFAS 142 in managerial decision-making concerning offer valuations.

The comparability of financial reporting between acquirer and acquiree is another significant area of inquiry, as explored by Anagnostopoulou S. and Tsekrekos A. ¹¹(2024, pp. 1–54). Employing correlation models, the authors demonstrate a direct dependency between accounting compatibility and the realization of abnormal stock returns and capital gains over the three years following a merger, alongside increased group revenues.

Payment methods in M&A transactions were studied by Jie He, Jeffry Netter, and colleagues ¹²(2018, pp. 1–47), who analyzed the behavior of acquirer management teams in the context of incentive structures aimed at forecasting future transactions. The study focuses on mergers and acquisitions conducted through either cash or stock, emphasizing contrasts between these transaction types. The marginal tax rate per share was used as a financial indicator, and the findings indicate that management strategies in hostile takeovers often align with bidder expectations related to payment method, whereby pre-merger increases in equity or capital help reduce transaction costs ¹³(2018, pp. 24–25).

From a different viewpoint, Faccio M. and Masulis R.W. ¹⁴(2005, pp. 1345–1388) investigated the

financing methods employed in M&A transactions across Europe during the 1997–2000 period. Their classification reveals that when the acquirer's financial condition is unstable and the target entity is subject to threats to corporate control, cash payments are preferred in over 23% of cases. Conversely, target firms with deteriorating financial conditions tend to favor stock-based financing.

Accounting law, international financial reporting standards, and their specific provisions related to mergers and acquisitions are of specific academic interest. Polo-Garrido F. and Meliá-Martí E.¹⁵(2020, pp. 1–36) evaluated the applicability of IFRS 3 “Business Combinations” within the Spanish context. The authors propose an alternative to the acquisition method prescribed by IFRS 3, referred to as the “cost of business combination.” This value is calculated as the sum of net assets and goodwill (whether positive or negative), representing the issued capital and received ownership (Polo-Garrido & Meliá-Martí, 2020, p. 13).

A considerable number of recent studies have examined the deficiencies in goodwill recognition practices in business combinations from diverse research perspectives. Since 2019, such publications have exceeded sixteen academic articles.

The **International Accounting Standards Board (IASB)** recently issued a clarification addressing several problematic aspects identified in academic publications¹⁵(IFRS, 2024, pp. 1–14) during a session held in December 2024. One of the proposed solutions is the mandatory and optional disclosure of specific information in the notes to the financial statements. This measure could enhance the accuracy of forecasted financial indicators, both for investors or bidders aiming to assess the value of target companies during the pre-merger phase and for shareholders or founders of the acquiree.

Cross-border and transnational M&A remain an area of uncertainty for the Board, particularly concerning the geographic dislocation risks faced by the parties involved and the synergies that are successfully realized in only approximately 20% of all transactions. These synergies are crucial, as they directly impact revenue increases and the annual returns on equity instruments.

An **important contribution to research** comes from Moisescu F. and Golomoz A.-M.¹⁶(2018, pp. 51–72), who examined the application of IFRS 3 in Romanian M&A between 2011 and 2017. The authors emphasize that the acquisition method is the sole approach recognized under IFRS 3, highlighting the necessity of fair value measurement of assets and the recognition of goodwill. Their study provides a practical example of target company valuation based on a consolidated financial statement, as well as local fiscal regulations concerning the taxation of fair value adjustments.

Cumming D., Jindal V., Kumar S., and Padey N.¹⁷(2023, pp. 1464-1504) carried out a study to assess the extent to which the academic literature covers this topic, using data from the Scopus database, with a particular focus on information from A* and A class journals. Their analysis served as a practical source of inspiration for our research.

In this study, we have aimed to integrate as many sources as possible from the fields of accounting, auditing, economic analysis, finance, and management concerning business combinations, restructurings, mergers, and acquisitions published in the **Scopus database** since 1985. In the initial research stage, we searched for resources containing the keywords in title “**mergers and acquisitions**” in combination with “**accounting**.” We have obtained 676 articles. This sample was subsequently narrowed down to 503 articles belonging specifically to the economic field, excluding studies from unrelated domains such as medicine, chemistry, astronomy, and industry. Additionally, one article was withdrawn from publication during this process.

Interest in this subject has been rising since 1985, as illustrated in **Figure 1**, with a steady annual increase in publications. Remarkable surges were observed in 2004 with 15 publications, in 2006 with 29 publications, and most significantly in the past two years, with 31 publications in 2023 and 38 in 2024, which represents the growing interest among economic researchers in corporate mergers and acquisitions.

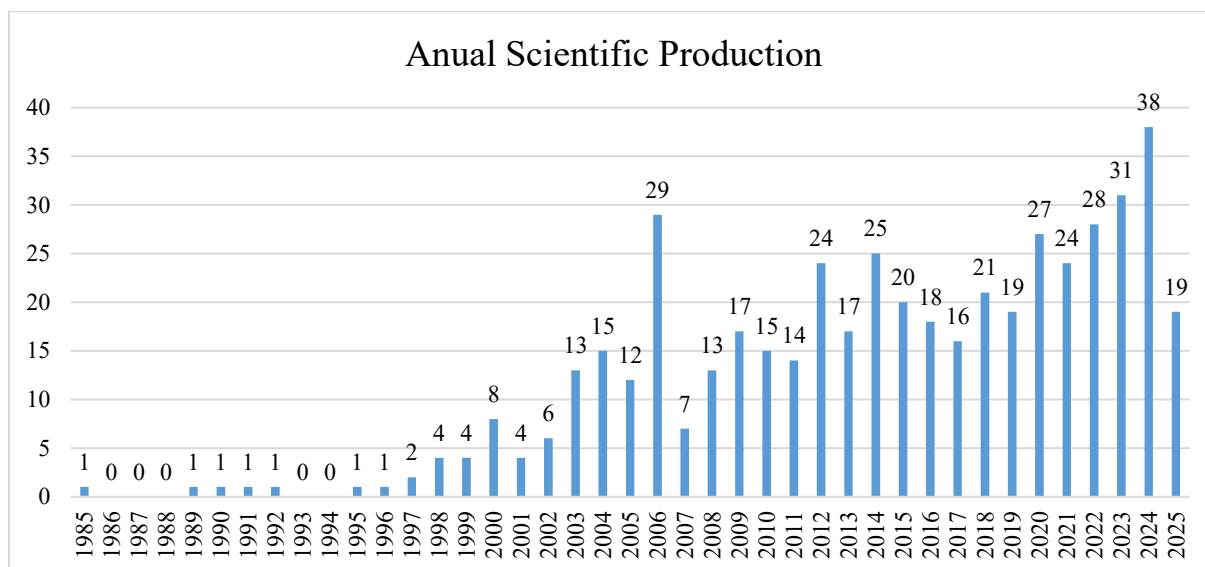


Figure 1. Evolution of Publications Over Time in the Scopus Database

Source: Compiled by the author using Scopus and Bibliometrix.

The country leading in terms of the number of publications is the United States of America (USA). In second place is China, followed by the United Kingdom (UK). India, Canada, Germany, Australia, France, Italy, and the Czech Republic also rank among the top ten countries contributing academic resources to the topic „mergers and acquisitions.” These rankings are noticed by the Scopus database and are exposed in Figure 2.

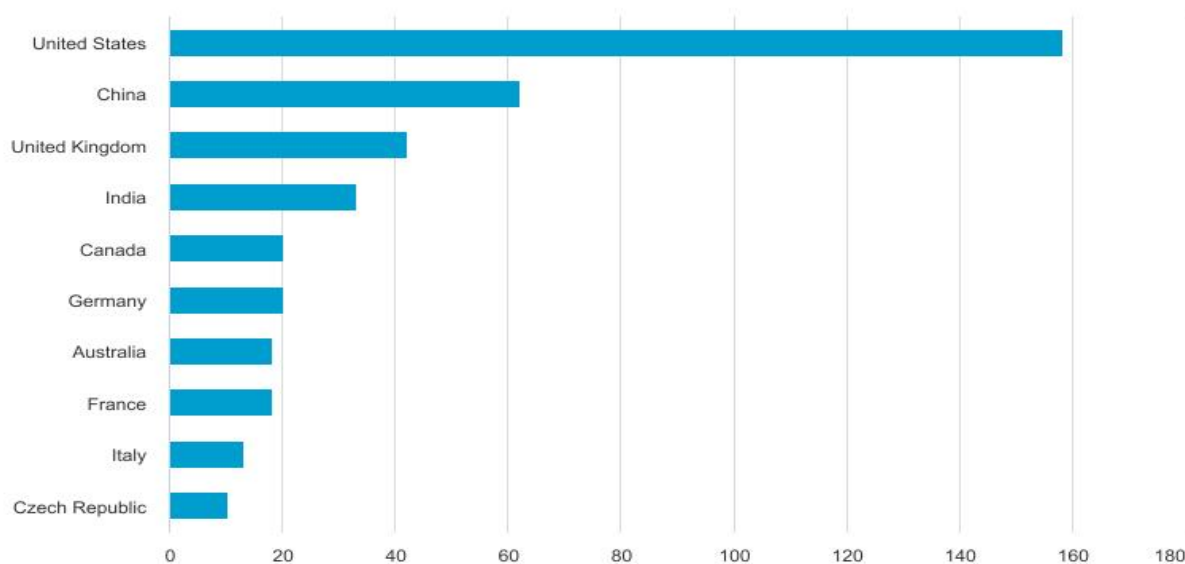


Figure 2. Geographic Distribution of Publications Indexed in Scopus

Source: Compiled by the author using Scopus.

The journal *Managerial Finance* (USA) is recognized as a leading publication in the field, having distributed 10 articles on the topic. A recent study published in this journal by **Ibrahimi M. and Meghouar H.**¹⁸(2019, pp. 1398–1415) analyzes the factors influencing the increase or decrease in value of **horizontal mergers**, based on a sample of 90 companies in France. The findings were derived using a model incorporating eight financial indicators. According to the authors, the main sources of value creation in horizontal acquisitions are **commercial synergies**, **cost synergies**, and **hybrid synergies** (Ibrahimi & Meghouar, 2019, pp. 1398–1415).

Another equally substantial academic source for this research is the *Journal of Accounting, Auditing, and Finance* (USA). Recent publications in this journal examine the impact of **management quality** and the **acquirer's team** on the profitability of mergers. Notable contributions include studies by **Liu Q., Sono H., and Zhang W.** ¹⁹(2019, pp. 44–63) and continue by **Dadant P. and Zhang Dana** ²⁰(2022, pp. 113–128).

Other important journals include *Jane's Defence Industry*, *Emerald Emerging Market Case Studies*, *Journal of Corporate Finance*, and *Accounting Review*, among others, as illustrated in **Figure 3**.

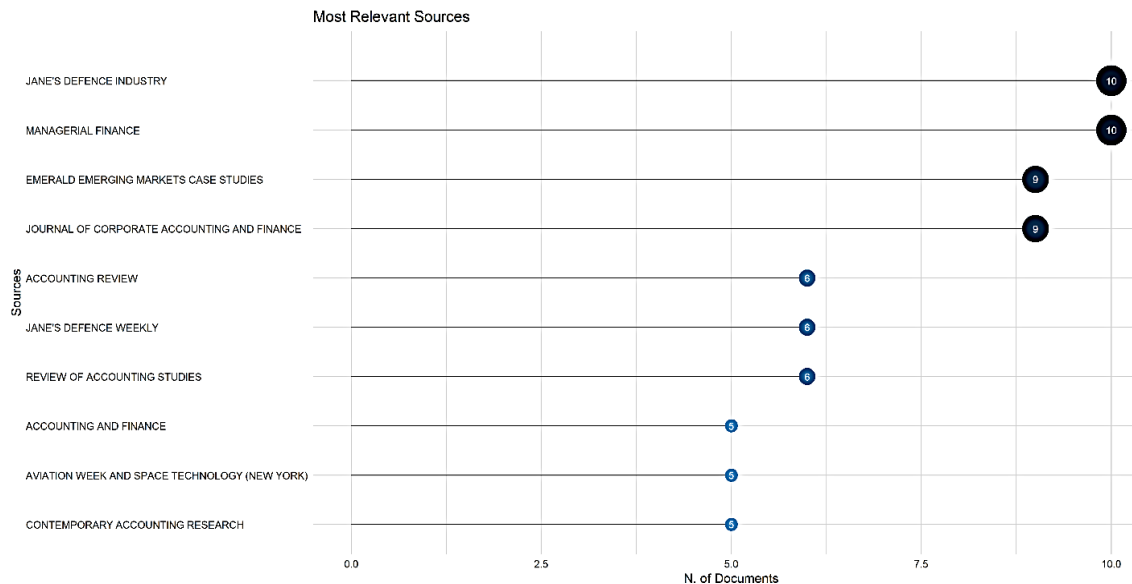


Figure 3. Number of Publications in Journals Indexed in Scopus

Source: Compiled by the author using Bibliometrix.

The previously mentioned 503 articles were authored by 1105 researchers. However, only one author has published a maximum of three articles. Tang Qingquan, along with several co-authors, conducted an extensive two-year study focused on the impact of accounting conservatism in China—first, on the valuation of target entities ²¹(2021), and later on the performance of contracts aimed at adjusting this value during mergers ²²(2022, pp. 1497–1517).

Another notable contribution is that of Paul Barnes, whose work between 1998 and 2000 focused on hostile takeovers and mergers in the USA and UK, exploring the influence of bankruptcy forecasting and stock price behavior on transaction efficiency using accounting data ²³(1998, pp. 573–591). In a separate study, he developed multivariate models based on financial statement data of target firms in hostile mergers in the UK ²⁴(2000, pp. 147–152).

A third significant contributor is Wangerin D.D., who investigated the impact of accounting methods on post-merger profitability ²⁵(2016, pp. 427–447), concluding that analysts and investors often fail to fully recognize assets, deferred revenues, and goodwill in the acquirer's financial statements. Years later, in 2024, he expanded this research by examining differences in the recognition of all intangible assets and goodwill in mergers and acquisitions, particularly when such assets can be separated from the core business ²⁶(2024, pp. 3838–3886).

Our study proceeds with an analysis of keywords used in the titles of the publications. Using bibliometric tools, the keywords were classified into four clusters: the first cluster is "Mergers and Acquisitions," the second is "Finance," the remaining two, much smaller, are "Accounting" and "Information Technology," comprising total of 1599 keywords.

A graphical representation of these terms can be found in Figure 4.

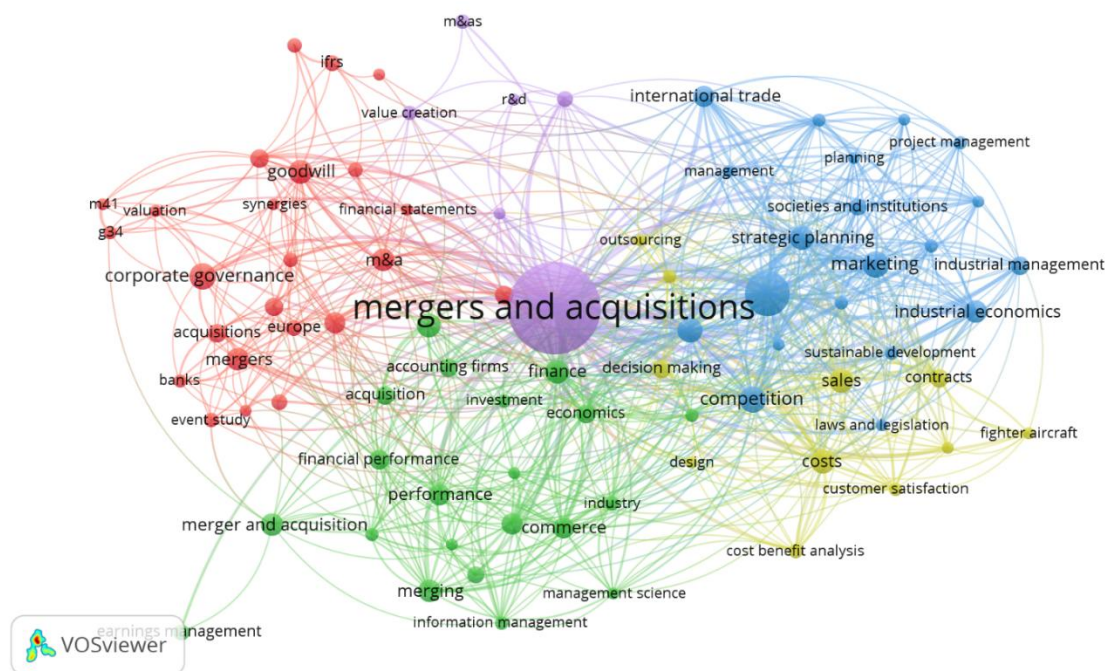


Figure 4. Keywords in Publications Indexed in Scopus

Source: Compiled by the author using VOSviewer.

Within the primary cluster, “Mergers and acquisitions,” 31 terms are identified. The most frequently used are: “mergers and acquisitions,” appearing in 150 instances, followed by “cost accounting” with 58 occurrences, and both “competition” and “marketing,” each appearing 21 times. Additional terms in this cluster include investment, sales, costs, industrial economics, strategic planning, and others.

The second cluster contains 13 keywords, highlighting “finance” in 16 instances, “merging” in 15 and “commerce” in 13.

The third cluster, titled “Accounting,” appears five times and includes only two keywords, another of which is USA.

The fourth cluster, “Information Technology,” features “information technology” (6 mentions) and “computer software” (5 mentions), consisting of just five terms totally.

Evaluating the typology and impact of bibliographic resources is a strategic research objective, as the quality and volume of these sources indicate the degree to which the topic has been studied in the literature. Upon analyzing the types of resources used, it becomes evident that journal articles are most prevalent, comprising 68.6% of the total bibliographic sources. These are followed by conference proceedings (12.3%), reviews (7.2%), and book chapters (4.6%). Books specifically focused on this topic represent 3%, as illustrated in Figure 5.

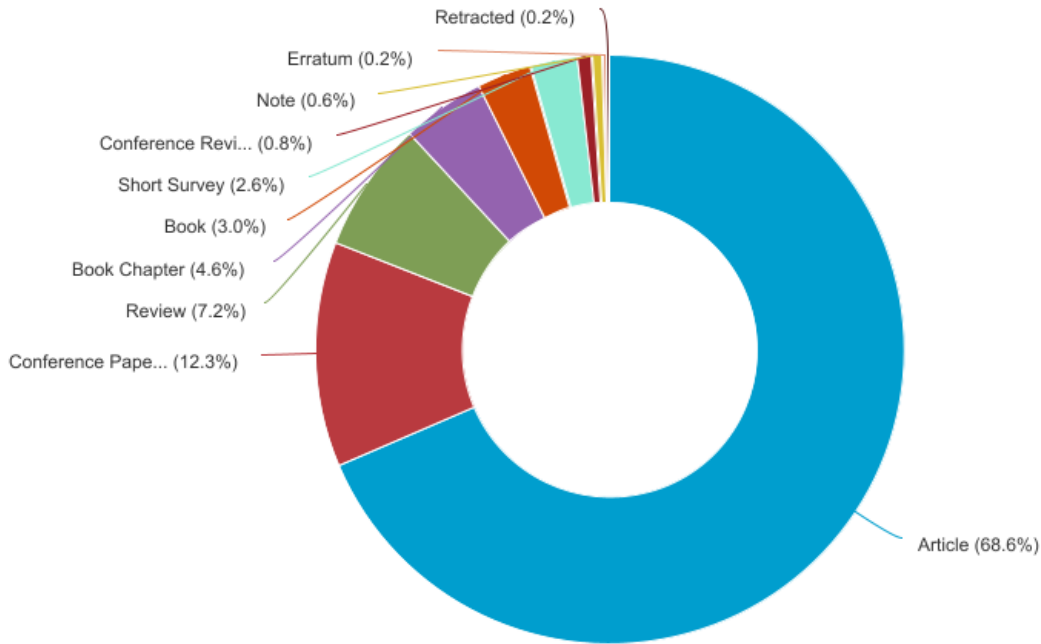


Figure 5. Types of Publications in Scopus

Source: Compiled by the author using Scopus.

Another crucial aspect of the analysis involves the citation indicators of the resources and publications. According to data from the Scopus database, 332 out of the 503 sources have been cited, accumulating a total of 8822 citations, with an H-index of 43. The most cited authors include Larsson R. (1999) with 917 citations, followed by Rossi S. (2004) with 688 citations, and Erel I. (2012) with 495 citations. These insights were obtained using the Bibliometrix tool. Our research stops expanding the bibliometric analysis.

The final objective of our research focuses on identifying and addressing the gaps and underexplored aspects within the field of M&A, aiming to define new research niches.

We reviewed and synthesized over 85 open-access articles published in the last five years, which allowed us to highlight certain problematic areas or less-studied topics. Based on this review, we have prioritized the following themes as potential directions for future research:

1. Cross-border and transnational M&A;
2. The legislative framework of different countries, including tax regulations;
3. Goodwill: recognition, impairment, and its impact on acquirer valuation and post-merger gains.

Specific research directions can be founded in Table 1.

Table 1. Research Gaps and Future Directions in Mergers and Acquisitions

No.	Author(s)	Title, Journal, Year	Research Gaps or Future Research Directions
1.	Emm E.E., Han B., Li B. ²⁷	Cross-border acquisitions: The case of SPACs, Pacific-Basin Finance Journal, in 2024	The authors emphasize the need for deeper studies on cross-border mergers and acquisitions, particularly involving SPACs (Special Purpose Acquisition Companies), their performance indicators compared to traditional deals, and alignment with international regulatory challenges.

No.	Author(s)	Title, Journal, Year	Research Gaps or Future Research Directions
2.	Choi, A., Kim, J.-B., Lee, J.J., et al. ²⁸	Market for corporate control and demand for auditing: Evidence from international M&A laws, Review of Accounting Studies, in 2023	The research identifies the relationship between international M&A regulations and auditing services demand as an underexplored niche. Suggested directions include comparative analysis of M&A markets and audit industries across jurisdictions and assessing audit quality and effectiveness in this context.
3.	Zhao X., Tham J., Mu Q. ²⁹	Goodwill impairment, surplus management and company performance: Empirical evidence from Chinese A-shares, International Journal of Applied Economics, Finance and Accounting, In 2023	The research paper identifies lacks analysis on long-term effects of goodwill impairment on firm performance and strategies for mitigating those effects. The study focuses solely on non-financial listed Chinese A-share companies, and the authors suggest exploring geographic dislocations and their influence on performance.
4.	Wang M., Zhang Y. ³⁰	Excess goodwill and enterprise litigation risk, Finance Research Letters, in 2024	The paper identifies a lack of comprehensive studies linking excess goodwill to enterprise litigation risk, suggesting that this relationship is underexplored. It highlights the need for empirical research to quantify the impact of excess goodwill on litigation outcomes, as existing literature is limited. There is a gap in understanding how different industries may experience varying levels of litigation risk associated with excess goodwill, indicating a need for sector-specific analyses. The paper calls for further investigation into the mechanisms through which excess goodwill influences litigation risk, which remains inadequately addressed in current research.
5.	Mahamuni P. N., Parkhi S., Sunder R. G., Karande K. P., Gadzo S. G., Singh P. ³¹	Does the merger improve the operating performance of the company? Evidence from the beverage industry in India, F1000Research, in 2023	The study indicates that financial measures alone are insufficient to capture the full impact of mergers on business performance, suggesting a gap in the metrics used to evaluate merger-related gains. There is a need for future research to develop alternative metrics that can better assess the benefits of mergers and acquisitions. The paper highlights the importance of understanding post-merger integration challenges, indicating a gap in research focused on the causes and trends of post-merger performance across different types of mergers and industries

6.	Sorrentino G., Situm M., Serpeninova P., Tumpach M., Juhászová Z. ³²	Supporting management decisions for M&A transactions based on the strategic allocation of intangible assets, Problems and Perspectives in Management, in 2024	The study highlights a gap in understanding the specific factors influencing the allocation of intangible assets, particularly in relation to enterprise value, which requires further exploration to enhance management decision-making in M&A transactions. There is a need for more nuanced insights into the impact of macroeconomic conditions and market-specific events on enterprise value, as these factors significantly influence asset allocation decisions.
7.	Zhang L., Peng L., Fu X., Zhang Z., Wang Y. ³³	Alternative corporate governance: Does tax enforcement improve the performance of mergers and acquisitions in China?, Corporate Governance: An International Review, in 2022	The paper identifies a lack of comprehensive studies on the impact of tax enforcement on mergers and acquisitions performance in China, suggesting that existing literature may not fully address this relationship. It highlights the need for empirical evidence to support the theoretical frameworks surrounding corporate governance and tax enforcement, indicating that further research could enhance understanding in this area. Additionally, the paper points out the limited exploration of alternative corporate governance mechanisms beyond traditional models, which could provide valuable insights into improving merger and acquisition outcomes.

Source: Compiled by the author using (27, 28, 29, 30, 31, 32, 33).

3. Conclusions

This paper has aimed to critically assess the current state of academic research on M&A, business regroupings, and corporate combinations at an international level. The reviewed studies clearly demonstrate a growing interest from the global academic community in this field.

A total of **503 articles indexed in the Scopus database** were identified and analyzed using **Bibliometrix** and **VOS viewer** bibliometric tools. Based on this dataset, it can be concluded that the **USA** leads in publication volume, with the number of M&A-related studies increasing significantly in recent years. Notably, **over 68%** of all resources analyzed were journal articles.

Moreover, the findings highlight **cross-border and transnational M&A, international taxes frameworks, and goodwill evaluation** as the most pressing topics for future research. These conclusions were drawn from the review of over **85 open-access articles** published in the last five years.

This study does have limitations—primarily the exclusive reliance on the Scopus database. However, other databases such as **Web of Science, AlexOpen, Lens, and EBSCO** also offer valuable resources and are widely used for academic dissemination.

In conclusion, business combinations remain a **multidisciplinary research topic**, encompassing **legal, accounting, managerial, financial, statistical, and even psychological dimensions**, all of which were briefly addressed in this paper.

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MAY CORPORATE GOVERNANCE LEAD TO BETTER PERFORMANCE? INSIGHTS FROM ROMANIAN SMEs

DOI: <https://doi.org/10.53486/dri2025.45>
UDC: 005.35:[334.012.63+334.012.64]

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Abstract: *The transition to a sustainable economy put SMEs under strain to implement improved corporate governance policies and practices in line with European and international sustainability frameworks, as well as legal requirements and social expectations. The aim of this research is to investigate the perceptions of SMEs' managers, investors, and operational employees regarding corporate governance mechanisms as performance drivers, as well as the relevance of implementing particular policies and practices related to audit characteristics. This empirical approach uses questionnaire as the main research method, with 130 responses that are analysed. To test the research hypothesis, an in-depth descriptive overview, frequency and reliability analyses, and regression estimation are performed. The main findings suggest that the respondents do not ignore the need for a strong internal control and risk management system in SMEs. Likewise, they draw attention to the valuable roles of auditors, being aware of their responsibilities such as ensuring financial statements' integrity, minimising risks and conflicts of interest, as well as guaranteeing the integrity of internal and external audit procedures. The results shed new light on a developing economy background, suggesting that SMEs may achieve performance through corporate governance policies and practices, designed for their needs and entrepreneurial traits. Thus, this study could be valuable for government and investors alike in creating plans and regulations for a sustainable economy and business environment.*

Key words: *corporate governance, SMEs, performance, audit committee, internal control, risk management*

JEL: G34, M41

1. Introduction

Small and medium-sized enterprises (SMEs) directly and positively contribute to the growth of the global socio-economic system. According to the literature (Jiang et al., 2023; Singh & Pillai, 2021), SMEs face several constraints in the adoption of sustainable business practices. These challenges could include lack of funding and technological know-how and limited exposure to international markets. In light of these circumstances, this study investigates how investors, managers, and operational employees of SMEs perceive various corporate mechanisms in performance achievement. Corporate governance policies and practices stand out as a crucial component for a better understanding of the long-term development prospects of SMEs in light of the social needs and legal obligations stipulated by governments. Corporate governance may be understood as a framework for ensuring accountability and coordinating company goals with those of its stakeholders (Teixeira & Carvalho, 2024; Ronowah & Seetanah, 2024; Nasrallah & El Khoury, 2021).

This study focusses on the relationship between corporate governance mechanisms, measured based on specific audit characteristics, and Romanian SMEs' performance, through the lens of management, investors, and operational employees. Hence, the respondents may be considered representatives of SMEs, having as main purpose the fulfilment of entrepreneurial objectives in a challenging economic environment. All responders are highly skilled professionals that work in financial business areas such as Accounting, Audit, and Tax consulting. A questionnaire is used as the basis for quantitative analysis. Summary of the main findings suggest that Romanian SMEs might support corporate governance, which would help create a more robust and sustainable socio-economic development. Therefore, according to the results, several recommendations could be formulated for SMEs and policymakers who should draw attention to designing policies and strategies for a sustainable business setting.

This research is structured as follows. Section 2 covers a summary of scientific literature review that justifies the research hypothesis. Section 3 presents the research methodology, primary data collection and processing, sample characteristics, variables, and empirical analysis conducted. Section 4 exposes the main findings, while Section 5 summarises the conclusions, limitations, and perspectives for future studies.

2. Literature review and research hypothesis

Corporate governance involves a system of guidelines, policies, and practices that management and leadership use to guide and control the entrepreneurial activities of the company. Corporate governance strikes a balance between the interests of different stakeholders such as society, management, shareholders, government, clients, and financial institutions, and has implications for decision-making processes (Teixeira & Carvalho, 2024; Singh & Pillai, 2021; Bhagat & Bolton, 2019).

Small and medium-sized enterprises (SMEs) are autonomous, non-subsidary businesses with a small workforce and manufacturing methods, whose number varies across different geographical regions. SMEs are important for emerging countries, since they are essential in increasing the rate of employment, economic growth, and career opportunities (Teixeira & Carvalho, 2024).

Compared to larger corporations, SMEs frequently have lower financial reporting and corporate governance mechanisms, given the scarcity of research in this field, and because the implementation of corporate governance policies and practices is still relatively new in many countries (Teixeira & Carvalho, 2024; Singh & Pillai, 2021). However, the need to scientifically explore SMEs from different perspectives may be underlined.

The scientific literature has different approaches on corporate governance and SMEs, the debates considering extensive backgrounds such as environmental, social, or financial, analysing various business fields. For example, Yip et al. (2024) conduct a qualitative analysis based on interviews, their main findings suggesting that environmental, social, and governance (ESG) reporting could be improved as a result of the influence exerted by most relevant stakeholders. Schifilliti and La Rocca (2024) emphasise the negative influence of board gender diversity on financial performance in SMEs. In contrast, Issa and Abbaszadeh (2023) expose that corporate governance protects shareholders' interests and leads to the maximisation of value creation in SMEs. Additionally, scientific environment investigates and debates non-financial dimension in SMEs considering in the analysis gender diversity (Hussain et al., 2024) and board characteristics (Roffia et al., 2022; Bennett & Robson, 2004).

Likewise, authors are interested in internal control and risk management system, as well as audit characteristics in SMEs. For example, Oppong et al. (2024) focus on the banking industry, applying a questionnaire. They find that financial performance is significantly impacted by internal control and corporate governance. Therefore, to improve the effectiveness of internal control systems and achieve financial performance, companies should strengthen their corporate governance practices. A comprehensive analysis based on bibliographic data, outlining the importance of risk management procedures for SMEs, is conducted by Sotamaa et al. (2025), whose final remarks support the idea that digitalisation and artificial intelligence may be used by SMEs in manufacturing business field as tools for risk management system.

For a thorough understanding of the topics studied, this research outlines a theoretical framework consisting of agency, stakeholder, and legitimacy theories that shape the main findings' discussion. Agency theory draws attention to the conflicts that may arise between managers and owners but could be reduced by corporate governance policies and practices (Adrian & Wright, 2018). Stakeholder theory is suited to explain the outcomes, since it allows stakeholders to effectively pull SMEs by offering them observable advantages, which leads to greater management support (Yip et al., 2024). One of the approaches of legitimacy theory may refer to using non-financial information disclosure to satisfy stakeholders and show adherence to accepted social norms (Yip et al., 2024).

Thus, the brief review of several studies from the scientific literature exposed above outlines that SMEs represent a challenging topic, given the extensive analyses performed considering sustainable development, corporate governance, in general, as well as through several mechanisms such as gender diversity (Hussain et al., 2024; Schifilliti & La Rocca, 2024) board of directors (Roffia et al., 2021), audit, internal control (Oppong et al., 2024), and risk management (Sotamaa et al., 2025). Consequently, prior studies support assertion of the research hypothesis, as follows. *RH1. SMEs' performance is positively and significantly impacted by corporate governance mechanisms, as perceived by managers, investors, and operational employees.*

3. Research methodology

3.1. Data collection and sample composition

This study is performed using primary data collected through a questionnaire, and validity of the research hypothesis is demonstrated based on quantitative analysis. This approach is comparable to Bojan (2024) and Wen et al. (2023). According to the literature, the questionnaire is an appropriate and trustworthy technique for examining behavioural patterns from a large number of respondents with comparable perspectives on company activity (Caraiani et al., 2023; Issa & Abbaszadeh, 2023). The digital form of the questionnaire was sent to respondents by email In the period between February and March 2024. The questions were addressed to a sample of management, operational employees, and investors with significant professional backgrounds in Accounting, Tax consulting, or Audit. Most of the respondents are members of Romanian financial-accounting professional organisations.

Research variables and analysis

The summary of questions addressed covers, first, demographic characteristics of the respondents, such as gender, age, professional experience, educational level, main activity of company, and number of employees. Second, the questions measure dependent and independent variables. SMEs' performance (SMEs_PERFORMANCE) is the dependent variable, while independent variables are represented by internal audit, risk management, and internal control approached both from their existence and their necessity in SMEs according to perceptions of the respondents. All research variables are shown in Table 1.

Table 1. Research variables

Variable	Description	Measurement
<i>Dependent variable</i>		
SMEs_PERFORMANCE	The respondents rated it considering several characteristics of corporate governance and financial performance	5-point Likert scale (average)
<i>Independent variables</i>		
RM_IC_EXISTENCE	Perceptions of the respondents about existence of risk management and internal control system in SMEs	5-point Likert scale
AC_NECESSITY	Audit Committee necessity in SMEs	5-point Likert scale
AC_ROLE	Audit Committee role in assessing conflict of interests between executive management and directors	5-point Likert scale
RM	The role of internal auditors in identifying and assessing risks	5-point Likert scale
IC	The role of internal auditors in 366inimizing and correcting deficiencies in the internal control system	5-point Likert scale
INTEGRITY	Integrity of financial reporting and the internal control system, including internal and external audit procedures	5-point Likert scale

Source: Author's own research adapted according to Corporate Governance Code issued by the Bucharest Stock Exchange

Respondents scaled corporate governance mechanisms on a 5-point Likert scale, where 5 = extremely important. Independent variables highlight the necessity of an Audit Committee in SMEs (AC_NECESSITY) and its role (AC_ROLE), complemented by the roles of internal auditors in risk management (RM) and internal control (IC). Muchmore, it is examined the way respondents perceive integrity of financial reporting and internal control system (INTEGRITY).

Statistical analysis and econometric estimation are performed in STATA18 to examine whether respondents consider corporate governance, measured through specific characteristics of internal audit, risk management, and internal control, leading to better performance in SMEs. Furthermore, in line with previous research (Oppong et al., 2024; Issa & Abbaszadeh, 2023; Wen et al., 2023), Cronbach Alpha is used to test the internal structure of the questionnaire, and the regression equation is exposed as follows:

$$SMEs_PERFORMANCE_i = \beta_0 + \beta_1*RM_IC_EXISTENCE_i + \beta_2*AC_NECESSITY_i + \beta_3*AC_ROLE_i + \beta_4*RM_i + \beta_5*IC_i + \beta_6*INTEGRITY_i + \varepsilon_i \quad (1),$$

where the constant is β_0 , coefficients associated with audit characteristics are β_1 to β_6 , and the error term is ε_i .

4. Results

4.1. Frequency analysis

Frequency analysis is intended to summarise demographic characteristics of the sample. According to the data presented in Table 2, it is emphasised that 60.8% of the respondents are women. Furthermore, most of the respondents are university graduates (94.60%) and have professional experience of more than 20 years (63.10%). The main activities of SMEs are focused on providing Accounting, Audit and Tax consulting services, and most of them have less than 9 employees. According to the Law no. 346, these companies are classified as micro-enterprises (Romanian Parliament, 2004).

Table 2. Frequency analysis

Demographic characteristic		Frequency	Percent (%)
Gender	Female	79	60.70%
	Male	50	38.50%
	I prefer not to respond	1	0.80%
Educational level	Pre-university studies	7	5.40%
	University studies	123	94.60%
Professional experience	Less than 2 years	1	0.80%
	2-5 years	5	3.80%
	6-10 years	9	6.90%
	10-20 years	33	25.40%
	More than 20 years	82	63.10%
Main activity	Manufacturing	7	5.40%
	Services	110	84.60%
	Trading	13	10.00%
Number of employees	Less than 9 (micro-enterprises)	82	63.10%
	10-40 (small enterprises)	28	21.50%
	50-249 (medium-sized enterprises)	20	15.40%

Source: Author's own research

4.2. Descriptive overview

Further, the main statistical indicators are computed. According to the results presented in Table 3, significant average values of the variables analysed are identified. The average range is between 3.269 and 3.50, suggesting that the respondents are aware of corporate governance mechanisms and their importance for SMEs' performance. First, they consider that SMEs need a system for risk management and internal control (RM_IC_EXISTENCE). Furthermore, the overall perception

regarding Audit Committee in SMEs (AC_NECESSITY) reflects that this committee may be considered a performance driver for SMEs.

Table 3. Descriptive statistics

Variable	Mean.	Std. Dev.	Min.	Max.	Skewness	Kurtosis
SMEs PERFORMANCE	3.808	0.897	1.00	5.00	-0.636	0.239
RM IC EXISTENCE	3.623	1.116	1.00	5.00	-0.502	-0.291
AC NECESSITY	3.269	1.262	1.00	5.00	-0.288	-0.807
AC ROLE	3.285	1.301	1.00	5.00	-0.331	-0.864
RM	3.569	1.30	1.00	5.00	-0.617	-0.650
IC	3.50	1.265	1.00	5.00	-0.548	-0.602
INTEGRITY	3.646	1.232	1.00	5.00	-0.836	-0.157

Source: Author's own research

Similarly to larger companies, in SMEs, conflictual circumstances may arise between executive management and directors. The main findings suggest that respondents recognise the roles of the Audit Committee (AC_ROLE) in preventing and solving these conflicts of interest, to achieve performance and competitive gain in the market. Additionally, taking into account respondents' perceptions, the responsibilities of internal auditors are emphasised in risk recognition and assessment (RM), as well as in minimising and fixing internal control system flaws (IC). Muchmore, the respondents consider that another key characteristic of audit consists in maintaining the accuracy of financial reporting and the internal control framework, which includes both internal and external auditing (INTEGRITY).

Skewness and Kurtosis indicators are used to assess univariate analysis, similar to Wen et al. (2023), and the results suggest that all values fell within the recommended ranges.

4.3. Correlation and reliability analyses

Table 4 presents correlation matrix for the dependent and independent variables. Pearson correlation coefficients illustrate that all corporate governance mechanisms related to audit, internal control, and risk management are positively and statistically significant correlated with SMEs_PERFORMANCE. Correlation diagnostics are comparable to Bojan (2024), who examine the influence of board and executive characteristics on the corporate governance-performance relationship.

Table 4. Correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SMEs PERFORMANCE	1.0000						
RM IC EXISTENCE	0.6471**	1.0000					
AC NECESSITY	0.7524**	0.6891**	1.0000				
AC ROLE	0.7401**	0.5871**	0.8873**	1.0000			
RM	0.7331**	0.6625**	0.8367**	0.8385**	1.0000		
IC	0.7469**	0.6618**	0.8275**	0.8310**	0.9099**	1.0000	
INTEGRITY	0.7237**	0.6356**	0.8095**	0.8274**	0.8726**	0.8953**	1.0000

** $p < 0.05$. Source: Author's own research

The reliability of the questions is evaluated using Cronbach's Alpha, whose results are shown in Table 5. The internal consistency of the scales used to measure the constructs is demonstrated by an Alpha value that is adequately above the minimal limit of 0.70. Given these findings, the questionnaire in this research is considered to have an appropriate internal structure (Issa & Abbaszadeh, 2023; Wen et al., 2023; Kim & Lee, 2022).

Table 5. Reliability analysis

Cronbach's Alpha	No. of items
0.958	7

Source: Author's own research

4.4. Regression estimation

Linear regression analysis is performed to test the research hypothesis. The findings are summarised in Table 6 and highlight that all independent variables are positively associated with SMEs_PERFORMANCE, but the statistically significant effects are exerted only by RM_IC_EXISTENCE and AC_ROLE, at the 0.01 and 0.1 levels, respectively.

Table 6. Regression analysis

Variable	β (t-stat)
Dependent variable: SMEs_PERFORMANCE	
RM_IC_EXISTENCE	0.166*** (2.65)
AC_NECESSITY	0.119 (1.239)
AC_ROLE	0.157* (1.716)
RM	0.017 (0.167)
IC	0.139 (1.283)
INTEGRITY	0.052 (0.546)
Constant	1.564*** (8.96)
Observations	130
R-squared	0.644

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: Author's own research

Thus, the regression model offers empirical support for the research hypothesis, highlighting that managers, investors, and operational employees of Romanian SMEs perceive corporate governance mechanisms related to audit, internal control, and risk management as central factors in achieving performance. Specifically, performance of SMEs could increase significantly if these companies are constantly focused on establishing and improving their internal control and risk management system. Muchmore, the significant impact of AC_ROLE outline that company performance is directly proportional to shrinking conflicts of interest between management and executive directors. These conflicts could rise given the divergent goals of the management that may be focused on personal purposes instead of company business objectives, and one of the responsibilities of corporate governance mechanisms is to prevent and avoid these inappropriate circumstances.

5. Conclusions

This paper examines the perceptions of management, investors, and operational employees with significant experience in the financial-accounting field related to the necessity of corporate governance mechanisms in Romanian SMEs and their influence exerted on performance. Corporate governance mechanisms are measured through audit characteristics, the questions being formulated according to the recommendations stipulated in the Corporate Governance Code issued by the Bucharest Stock Exchange (Bucharest Stock Exchange, 2025; Bucharest Stock Exchange, 2024) and prior literature (Issa & Abbaszadeh, 2023; Wen et al., 2023).

The questionnaire designed to collect primary data was distributed by email, and statistical and econometric analysis conducted suggests that respondents rated corporate governance mechanisms as determinants of SMEs' appropriate business activities and performance.

Frequency analysis, descriptive overview, correlation matrix, and reliability analysis are performed to examine the relationship between corporate governance and performance in SMEs from an emerging economy. Muchmore, the analysis is extended with regression estimation, offering empirical support and validating the research hypothesis (*RH1. SMEs' performance is positively and significantly impacted by corporate governance mechanisms, as perceived by managers, investors,*

and operational employees). The main findings shape a new perspective on corporate governance policies and practices through the lens of a specific category of companies and their representatives, suggesting that several corporate governance policies and practices could be designed and adopted for SMEs to achieve performance. All corporate governance mechanisms are positively correlated with performance, but several recommendations for SMEs could be formulated taking into account the internal control and risk management system, as well as the audit role in avoiding and preventing conflicts of interest.

This research may represent a valuable resource for entrepreneurial environment and academic representatives. First, the findings summary outlines that the performance of Romanian SMEs could be improved if corporate governance policies and practices that meet their needs are designed. Therefore, according to the perceptions of the respondents, SMEs should focus on a strong internal control and risk management system, as well as the establishment of an Audit Committee. These assertions are comparable to the previous literature (Wen et al., 2023; Roffia et al., 2022; Nasrallah & El Khoury, 2021).

Second, respondents understood that audit has crucial roles in preventing and avoiding conflicts of interest and risks, supporting the internal control system, and ensuring the integrity and veracity of financial reporting, leading to appropriate business activity, achieving performance, and strengthening relationships with stakeholders.

However, for this research, several limitations are identified in terms of sample composition and analysed period. Likewise, the empirical approach consists only of one regression model. Thus, future research horizons may consider a larger sample and an extended number of questions, complementing the analysis with multiple statistical tests and a comprehensive econometric estimation.

Acknowledgements

This paper was co-financed by the Bucharest University of Economic Studies during the Ph.D. program.

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THE CURRENT STATE OF RESEARCH ON THE TOPIC OF FINANCIAL AND ACCOUNTING INFORMATION – BIBLIOMETRIC ANALYSIS

DOI: <https://doi.org/10.53486/dri2025.46>
UDC: 657.1:001.891

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Abstract: *The need for a performance analysis of scientific publications is determined by the rapidity with which research evolves in all areas of life, but also by the social responsibility of the researcher to provide added value by conducting quality studies (Mateș & Pordea, 2021)*

In the specialized literature, three terms are used in this sense: accounting information, financial information and financial-accounting information. In the opinion of some authors, these three terms are similar, while from the perspective of other authors, the term financial-accounting information is more comprehensive, including the other two terms.

In the current era, also called the era of digitalization, in which immense resources are put into motion to collect, transmit and process huge amounts of data of any nature, economic and financial decisions still remain dependent on the ability of financial statements to represent the reality of economic transactions and events. Although the field of accounting meets the characteristics of an exact science, accounting information is not a precise notion and rarely meets the decision-making needs of all its users (Mateș & Pordea, 2021)

Key words: *accounting information, financial information, financial-accounting information, bibliometric.*

JEL: Times New Roman, 12 pt http://www.aeaweb.org/journal/jel_class_system.php.

1. Introduction: Review of specialized literature on financial and accounting information

The two international bodies: The International Financial Reporting Standards Foundation (The International Financial Reporting Standards Foundation – IFRS) and the International Accounting Standards Board (International Accounting Standards Board) Standards Board –IASB) have formulated as their mission to deal with the development of financial reporting standards through which to provide transparency, accountability and efficiency in financial markets, globally (Stoenoiu, 2014).

Bibliometric analysis of scientific publications is not new in research activity, being currently intensively used throughout the world. The method quantitatively evaluates relevant literature on certain topics of interest and provides results through information extracted from specific databases (such as Thompson Reuters – Web of Science, Scopus, ScienceDirect, etc.) (Mateș & Pordea, 2021). This method of studying literature encompasses two main purposes: on the one hand, scientific mapping (science mapping), which aims to determine the structure and dynamics of scientific fields, and on the other hand, performance analysis, which aims to evaluate the research and performance of institutions and authors of research papers (Abdullah et al., 2017).

Bibliometric research, citation analysis is a basic element, since it aims to expose scientific knowledge, recognizing the value of a previous publication. Garfield (Garfield, 1972) stated that one of the most important uses of such an analysis is found in political science and in the evaluation of scientific research. Citation analysis encompasses several research techniques, from determining the number of citations to studying the connection between authors through the prism of simultaneous citations (Lord, 1984).

Although citation analysis is a technique that can provide consistent information on research performance and productivity, (Luukkonen, 1990) points out that planning such studies and interpreting the results obtained from them requires expertise in the fields analyzed.

Bibliometric studies have seen an upward trend in several disciplines. In the economic field we find the use of this research methodology both in terms of the relevance of scientific journals (Card & DellaVigna, 2013) (Laband, 2013), as well as through the prism of the importance of authors and academic institutions (Kocher & Sutter, 2001).

Other authors in the academic literature (Merigó & Yang, 2017) conduct accounting research through a bibliometric analysis methodology, and their results show that the most influential research institutions in this field are American ones and that the most important scientific accounting journals are the Journal of Accounting and Economics, Journal of Accounting Research, The Accounting Review and Accounting, Organizations and Society.

2. Basic content. Methodology for conducting bibliometric analysis of financial and accounting information

For an in-depth analysis of the specialized literature, the Scopus platform was used to determine the current state of knowledge regarding scientific research related to the concept of financial-accounting information.

According to the investigation of the specialized research carried out, no studies were found that included the bibliometric analysis of the concept of financial accounting information, using the Scopus database and the Bibliometrix application. (Aria & Cuccurullo, 2017) . This application allows statistical analysis of data, their preprocessing, construction of the co -occurrence matrix, analysis of co -citation and bibliometric coupling, reflection of keywords, analysis of groups of documents, etc. (Aria & Cuccurullo, 2017) .

Scopus database was as follows:

- I used the key terms financial accounting information (financial-accounting information) in the documents section - article title, summary and keywords;
- then we refined the search to select only information about publications published between 2010-2024 in the categories: business finance, economics, management, business, social sciences interdisciplinary, public administration.

Thus, the statistical sample we obtained contains 1,330 scientific papers, all of which are written in English, as well as a number of 3,283 authors.

The exploration of the specialized literature produced in the last 14 years regarding the concept of financial accounting information and accounting evasion is carried out through the quantitative study of the bibliometric method.

A series of aspects regarding the particularities of the database subject to bibliometric investigation in interdependence with the concept of financial-accounting information can be viewed in Table 1.

Table 1 Description of the database based on the concept of financial-accounting information

Description	result
Main information about the data	
Time interval	2010:2024
Sources (magazines, books, etc.)	392
documents	1330
Annual growth rate %	10.48
Average age of documents	4.7
Average citations per document	13.74
reference	65996
Document content	
Keywords plus (ID)	559
Author keywords (DE)	3793
author	
author	3283
Authors of single-author documents	196
Author collaboration	
Documents with a single author	209
Co-authors on the document	2.77
costs %	24.51
Document types	
ware	1330

Source : own processing

One of the bibliometric indicators of the dynamics of research interest identified in the academic sphere and in the business environment is the one referring to the quantity of research materials written and dispersed through multiple dissemination channels (Botar, 2024) .

In the chart below, we have graphically represented the dynamic growth in the number of publications on financial accounting information and their annual distribution during the period 2010 -2024, an essential pillar for the in-depth exploration of the concept.

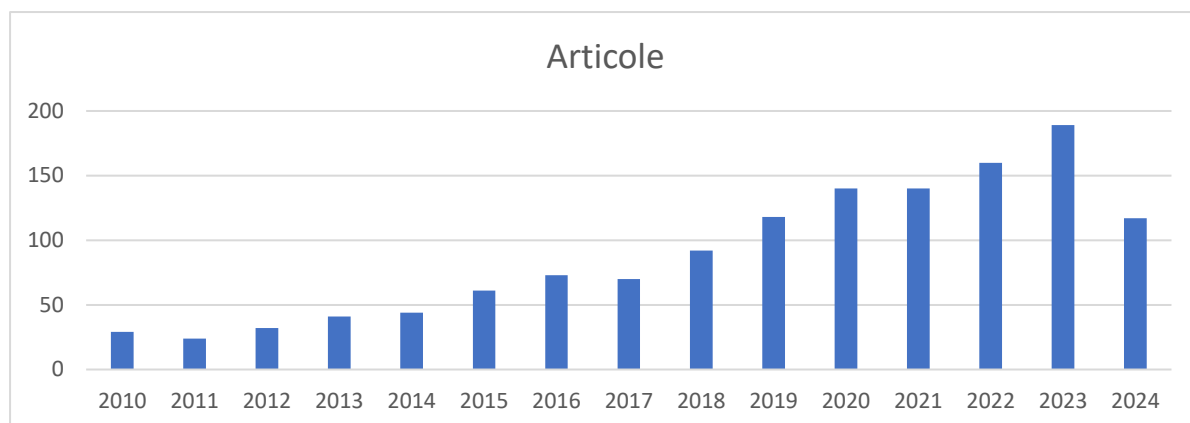


Chart 1. Financial and accounting information - Annual scientific production in the period 2010-2024

Source: own processing

Thus, it can be seen that the number of publications increases during the period 2019-2024, exceeding the number of 100 publications per year, with 2023 recording a number of 189 publications.

The next step consisted of exporting the 1330 results generated from the Scopus platform in csv format, which contains information regarding the author, title, source and summary (abstract) into the Biblioshiny application.

Analysis and interpretation of results using Bibliometrix software

Scopus database query, through the Bibliometrix software, thus the data obtained were imported into the Biblioshiny application.

Biblioshiny application allows for relevant bibliometric and visual analysis through an interactive web interface (Botar, 2024) . In this research, Bibliometrix and the Biblioshiny software package were used to analyze and visualize the research status, as well as to identify the scientific trend regarding the concept of financial-accounting information. (Botar, 2024) .

In Chart 2 We present the list of the most relevant authors who have shown interest in research in the field during the analyzed period. They are presented in descending order of the number of published works in the specialized literature.

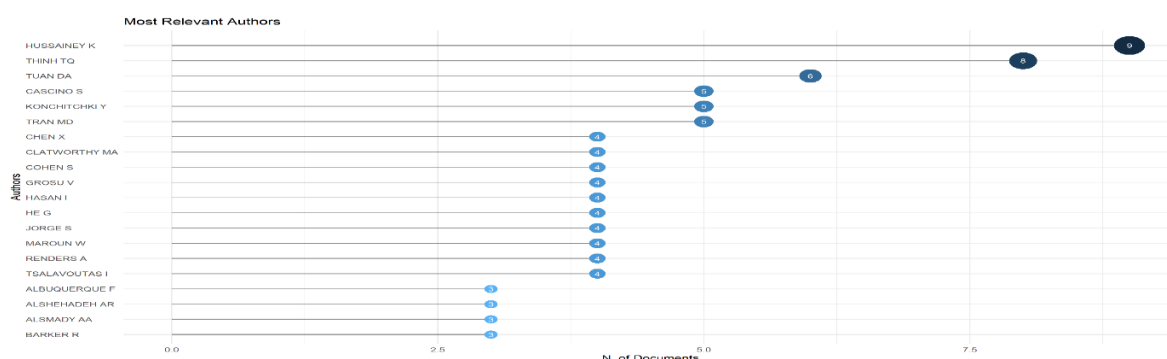


Chart 2. The 20 most relevant authors on the topic of financial-accounting information

Source: own processing based on Biblioshiny

In relation to the longevity of the authors from the point of view of the interest shown in the research subject, the most significant activity is noted in the case of HUSSAINEY K, followed by THINH TQ, and TUAN DA, aspects that can be visualized in Chart 3.

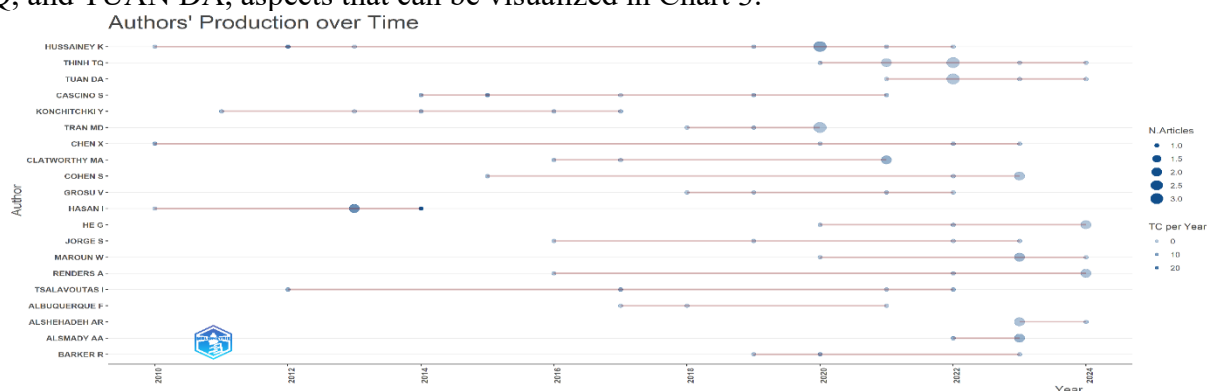


Chart 3. Scientific production per author in the period 2010-2024

Source: own processing based on Biblioshiny

Among the most relevant distinctive affiliations in expressing and outlining research interest regarding financial-accounting information and tax evasion in relation to the authors' affiliation to a specific institution, the National Economic University is identified, followed by the University of Pretoria, University of Zaragoza. These aspects are highlighted in the following graph.

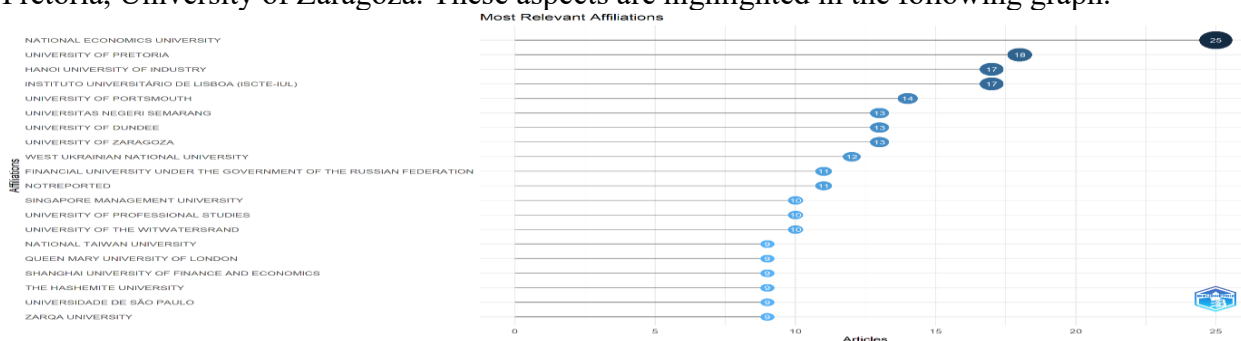


Chart 4. The most relevant affiliations in the research process of the concept of financial - accounting information (authors' affiliation to a specific institution)

Source: own processing based on Biblioshiny

Among the most cited regions in the systemic analysis of the concept of financial-accounting information in terms of the number of citations are the USA with a number of 2361 citations, the United Kingdom with a number of 2167 citations, Spain with a number of citations of 851, Australia – number of citations 667 and Italy – number of citations 532.

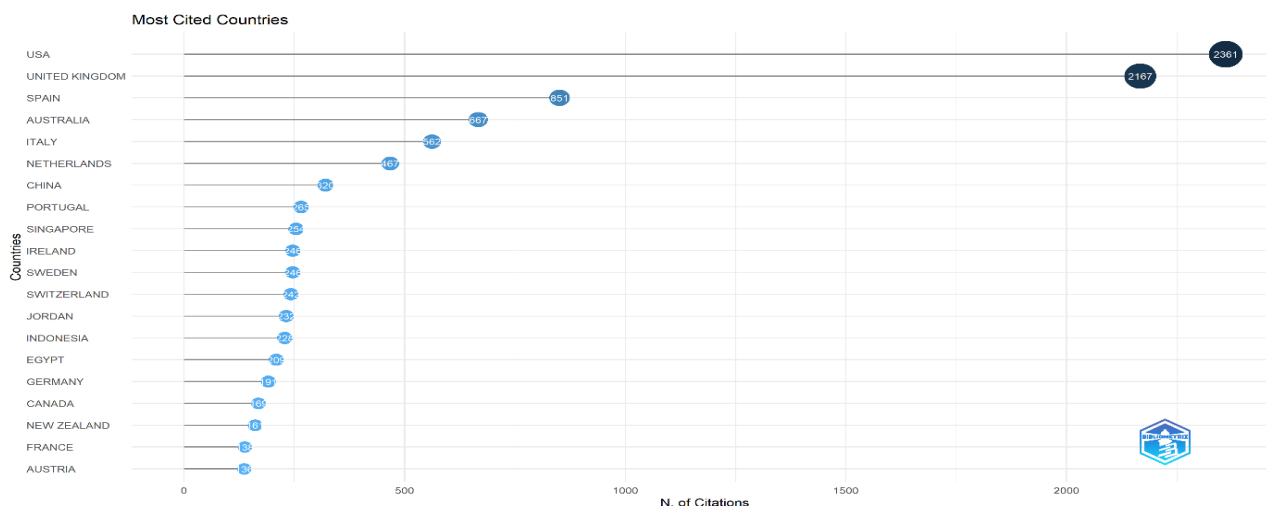


Chart 5. The most cited regions in the systemic analysis of the specialized literature on the concept of financial-accounting information

Source: own processing based on Biblioshiny

The first positions are occupied by developed countries in terms of implementing emerging technologies at the level of organizational processes.

The keywords that outline the universe of knowledge of the concept of financial-accounting information, in English, are related to the concepts of finance, decision making, stock market, commerce, particularities shown in the following graph:

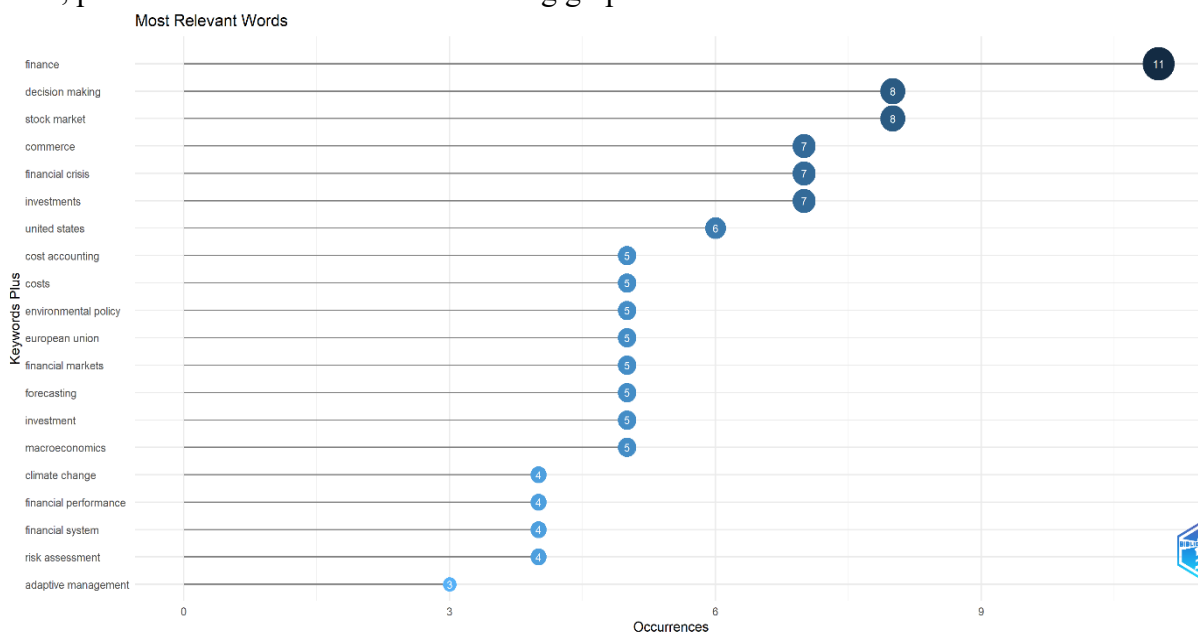


Chart 6. The most relevant keywords used by authors

Source: own processing based on Biblioshiny

The top publications in the field of financial and accounting information according to the number of citations analyzed over time is illustrated in the table below:

Table 2. The most cited publications in the field of financial and accounting information

Nr. crt.	Autori	Titlul publicației	Număr de citări
1	ECCLES RG, 2014, MANAGE SCI	The Impact of Corporate Sustainability on Organizational Processes and Performance	1284
2	ARMSTRONG CS, 2010, J ACCOUNT ECON	The role of information and financial reporting in corporate governance and debt contracting	699
3	FAEMS D, 2010, J PROD INNOVATION MANAGE	Technology Alliance Portfolios and Financial Performance: Value-Enhancing and Cost-Increasing Effects of Open Innovation†	348
4	HORTON J, 2013, CONTEMP ACCOUNT RES	Does Mandatory IFRS Adoption Improve the Information Environment?*	327
5	MINNIS M, 2011, J ACCOUNT RES	The Value of Financial Statement Verification in Debt Financing: Evidence from Private U.S. Firms	308
6	HASAN I, 2014, J FINANC ECON	Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans	303
7	MELLONI G, 2017, J ACCOUNT PUBLIC POLICY	Saying more with less? Disclosure conciseness, completeness and balance in Integrated Reports	221
8	BHATTACHARYA A, 2014, PROD PLANN CONTROL	Measurement using fuzzy ANP-based balanced scorecard: a colla	216
9	SAMAH K, 2012, ADV ACCOUNT	The extent of corporate governance disclosure and its determinants in a developing market: The case of Egypt	206
10	GEPP A, 2018, J ACCOUNT LIT	Big data techniques in auditing research and practice: Current trends and future opportunities	185

Source: own processing based on Biblioshiny

Therefore, the previous table presents the 10 most cited publications in academic literature that include financial-accounting information, the issue being debated being the role of financial-accounting information presented through annual financial statements, within the company's decision-making processes, in carrying out the company's financial audit and within the framework of fiscal control with the role of combating tax evasion.

The keywords that reflect the universe of research related to financial and accounting information are represented by the following graph:



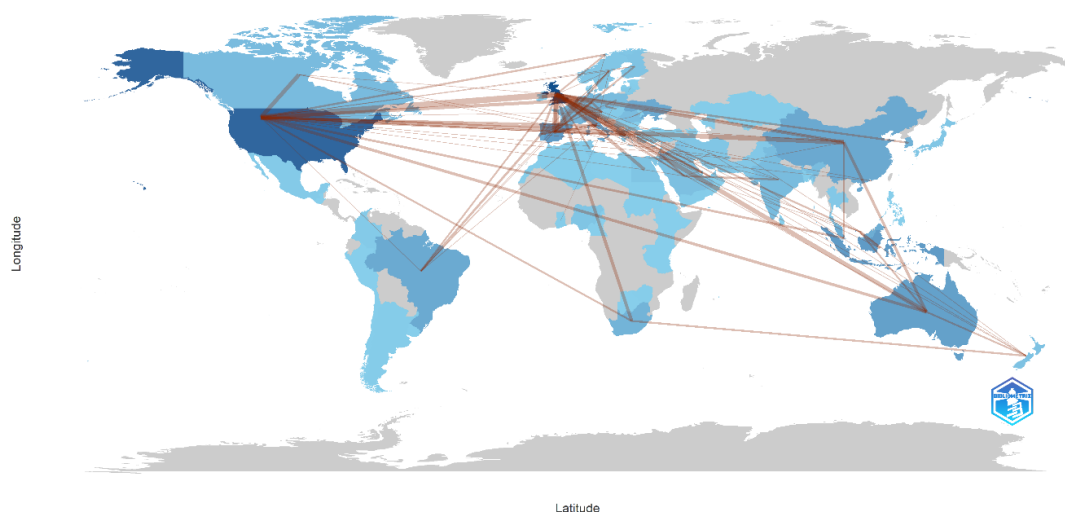
Terms	Frequency
Finance	11
decision making	8
stock market	8
COMMERCE	7
financial crisis	7
Investments	7
united states	6
cost accounting	5
Costs	5
Environment policy	5

Chart 7. The main keywords in the field of financial and accounting information

Source: own processing based on Biblioshiny

Scientific collaboration at the level of the regions of the globe highlights the merging of research interests in order to solidify the studied issues and to substantiate knowledge in the area of analysis from multiple cultural, social and economic perspectives (Botar, 2024) . In the graph below, we have shown the collaborative relationship between different countries on the topic of financial-accounting information.

Country Collaboration Map



from	In	Frequency	from	In	Frequency
AUSTRALIA	BELGIUM	1	CROATIA	ESTONIA	1
AUSTRALIA	CANADA	1	CROATIA	SLOVAKIA	1
AUSTRALIA	CHINA	5	CZECH REPUBLIC	POLAND	2
AUSTRALIA	GERMANY	1	CZECH REPUBLIC	SLOVAKIA	3
AUSTRALIA	ITALY	2	EGYPT	BELGIUM	1
AUSTRALIA	JAPAN	1	EGYPT	QATAR	1
AUSTRALIA	MALAYSIA	3	FINLAND	DENMARK	1
AUSTRALIA	MAURITIUS	1	French	NETHERLANDS	4
AUSTRALIA	NEW ZEALAND	3	French	NORWAY	1
BANGLADESH	OMAN	1	French	SWITZERLAND	2
BRAZIL	ITALY	2	French	TUNISIA	1
BRAZIL	PORTUGAL	4	GERMANY	AUSTRIA	4
BRAZIL	SAUDI ARABIA	1	ROMANIA	Mexico City	1
BRAZIL	SWEDEN	2	ROMANIA	Moldavia	2
CANADA	ARGENTINE	1	ROMANIA	POLAND	1

Chart 8. Regional collaboration on financial and accounting information

Source: own processing based on Biblioshiny

Figure 1 presents the historiographic analysis of the contributions collected based on the direct citation network, and the circles represent the nodes of the network, and the arrows indicate the citation directions. The links can be traced according to the chronological temporal parameter based on direct citations (Botar, 2024) .

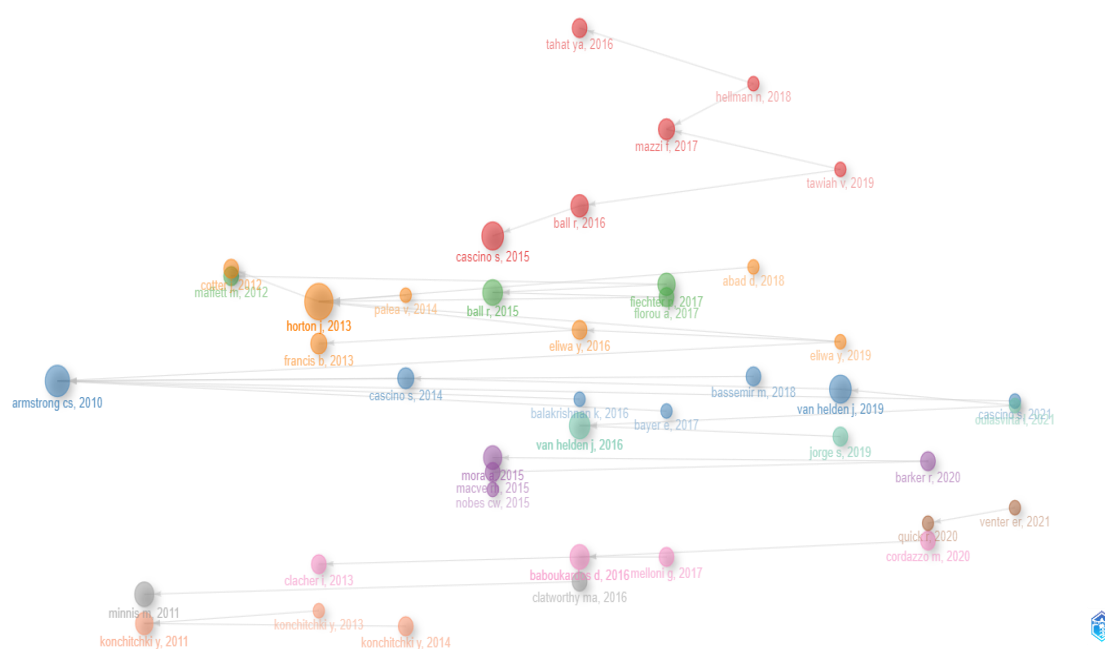


Figure 1. The historiographic network of direct citation

Source: own processing based on Biblioshiny

The three-field diagram (author, affiliation, and country) is shown in Figure 2. The authors are positioned in the center of the figure with nodes limited to 20, the affiliation part is located on the left (20-node limit), and the regions are placed on the right (20-node limit) (Botar, 2024) . Through this diagram, the authors are illustrated by regions from the point of view of interest for research on financial-accounting information. The thickness of the lines, also called arrows or flows, indicates the size or frequency of their appearance, so the greater the amplitude, the greater the flow. The Sankey diagram provides clues regarding the most prolific authors in the research field, the most eloquent affiliations, and the most representative regions for the area of interest related to financial-accounting information research.

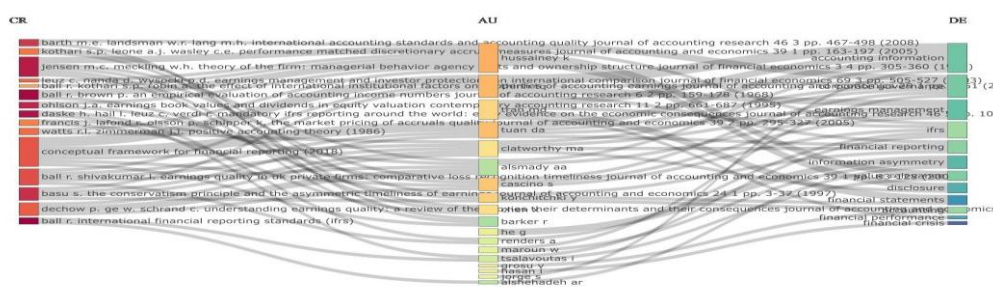


Figure 2. Sankey triple diagram (author-affiliation-country)

Source: own processing based on Biblioshiny

Figure 3 and Table 3 show the central keywords for the specialized literature on financial-accounting information. The proximity between the terms and the thickness of the lines provide clues about the intensity of the connection between them, the size of a node being determined by the frequency of occurrence of the keyword in the analyzed publications.

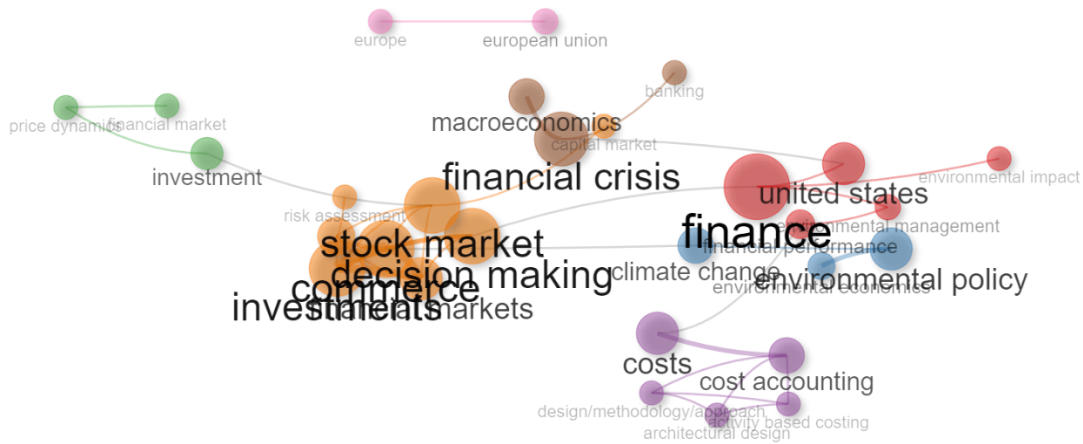


Figure 3. Keyword network map

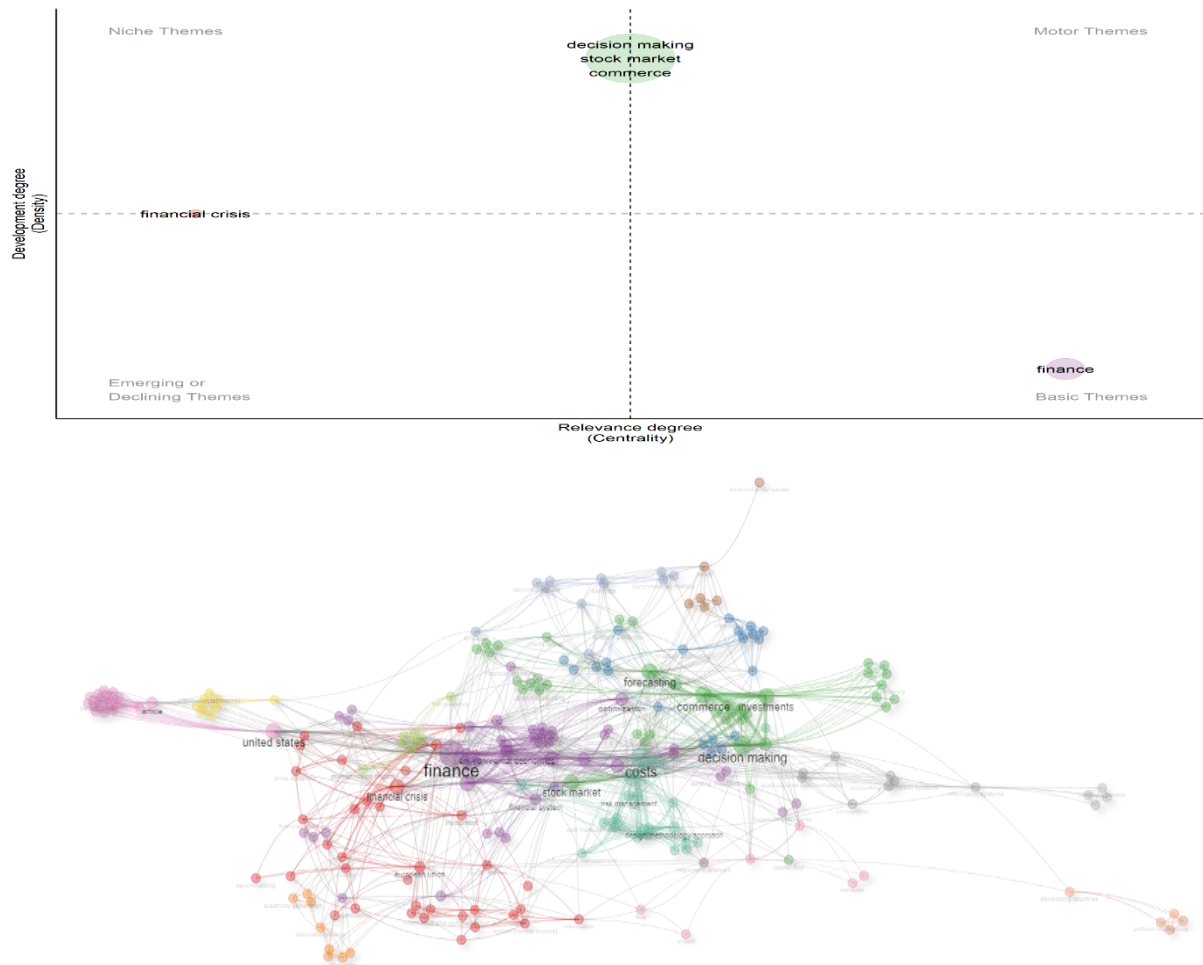
Source: own processing based on Biblioshiny

Table 3. General characteristics of the keyword network

Node	Cluster/ Group	Between groups	Near	The rank of the oagin
finance	1	207	0.012048193	0.049185379
united states	1	69	0.009803922	0.02876875
financial performance	1	105	0.009009009	0.027124774
environmental impact	1	0	0.009259259	0.015624307
environmental management	1	120	0.010416667	0.027152336
Environment policy	2	25	0.007751938	0.034359322
climate change	2	48	0.009433962	0.023283742
Environment economics	2	0	0.006493506	0.022695668
investment	3	48	0.008403361	0.026618545
financial market	3	0	0.005988024	0.019066402
price dynamics	3	25	0.007042254	0.032691737
cost accounting	4	69	0.006802721	0.049146718
costs	4	88	0.0078125	0.030625346
design/ methodology / approach	4	0	0.005882353	0.033359268
activity based costing	4	0	0.005882353	0.033359268
architectural design	4	0	0.005882353	0.033359268
decision making	5	169	0.012195122	0.040975545
stock market	5	91	0.010204082	0.053309243
COMMERCE	5	108.5131579	0.011764706	0.0718553
investments	5	35.09210526	0.011363636	0.058889982
financial markets	5	23.39473684	0.011363636	0.052062784
forecasting	5	25	0.00990099	0.04529377
risk assessment	5	0	0.007936508	0.01217236
capital market	5	0	0.008130081	0.012724557
financial crisis	6	49	0.008130081	0.054124178
macroeconomics	6	0	0.006756757	0.024889078
banking	6	0	0.006756757	0.018316857
European Union	7	0	1	0.034482759
Europe	7	0	1	0.034482759

Source: own processing based on Biblioshiny

Mapping the conceptual structure of the research universe contributes to exploring the relationships between representative keywords or to identifying subdomains of knowledge related to the studied issue (Mora-Valentín et al., 2018) . The conceptual structure is outlined based on the performance of factor analysis, in this case, the multiple correspondence analysis of the keyword/paper matrix (Le Roux & Rouanet, 2010) . Factor analysis helps to visualize by mapping large-scale data into a specific reduced space. In addition, groups are identified based on hierarchical classification (McCain, 1990) (McCain, 1990). The proximity of terms within groups shows their reunion in publications. Words present in the same groups could outline the same concept. The figure related to the multiple correspondence analysis is shown below.



Appearances	wORDS	Cluster	Cluster_Label
6	financial crisis	1	financial crisis
8	decision making	2	decision making
8	stock market	2	decision making
7	COMMERCE	2	decision making
7	Investments	2	decision making
10	Finance	3	Finance

Figure 4. Conceptual structure mapping. Multiple correspondence analysis

Source: own processing based on Biblioshiny

As can be seen, all keywords are written in English, as we previously presented all selected articles are written in English.

Groups of keywords that are related to each other (occur simultaneously in the same paper) are graphically represented with the same color. The figure shows the relevance of each keyword using nodes whose size highlights the degree of importance: the larger the node, the more important the term it defines is within the sample.

The links between two nodes, represented graphically by curves, describe the frequency of occurrence of the two terms they connect: the thicker the curved connecting line, the more frequent the simultaneous occurrence of the two keywords joined by that line is (Mateș & Pordea, 2021) . Also, the shorter the connecting curve, the stronger the relationship between the two terms it joins.

We obtained three groups of keywords, the red one contains the financial crisis (financial crisis) the green one is represented by decision making (decision making), and the purple one is represented by finances.

The so-called Lotka's Law (Lotka, 1926) , one of the basic laws of bibliometrics, involves modeling the distribution of authors according to their scientific productivity: specifically, the number of authors who have published n papers on a topic is inversely proportional to the square of n . In a simplistic way, the law assumes that the most numerous papers in a research area are usually a cumulation of a relatively small number of authors (Botar, 2024) . Figure 6 shows the Lotka distribution for publications related to the analyzed field. As can be seen, the moderate evolution matches the prediction proposed by Lotka's Law. This aspect may contrast with the initial evolution on the main research topic.

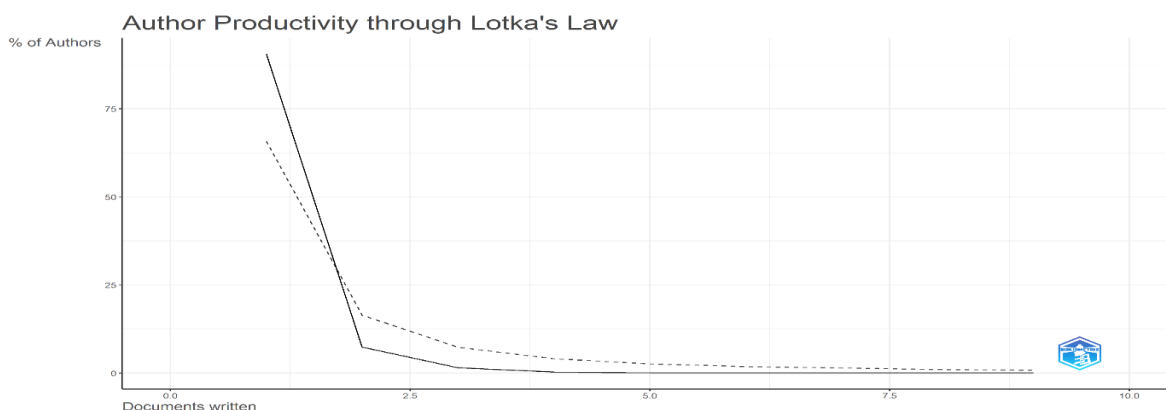


Chart 9. Distribution of publications according to Lotka's Law

Source: own processing based on Biblioshiny

3. Conclusions, results and discussions

Through the bibliometric analysis carried out with reference to the concept of financial-accounting information, it contributes to the substantiation and consolidation of the specialized literature, an aspect justified as follows:

- provides clues regarding bibliometric analysis through a specific software application;
- presents the most significant aspects of the information content related to the research universe of the concept of financial-accounting information (the most relevant sources, the most productive authors, the most influential publication sources, institutions, countries, etc.);
- cartographic visualization of evolutionary trends regarding the concept of financial-accounting information, an aspect that maps future research directions among scientific communities and provides a comprehensive understanding of research topics that have received significant attention from information researchers globally in the last decade.

Also, the bibliometric analysis of the concept of financial-accounting information represents a reference point for potential researchers in order to identify the most relevant sources for disseminating results and selecting representative articles in the field.

Through the bibliometric analysis we were able to highlight some interesting information:

- the most cited country by number of citations is the USA, followed by the United Kingdom, and Spain;
- the graph showing regional collaboration on the topic of financial and accounting information highlights that Romania has collaborated on articles on the topic of financial and accounting information with countries such as Poland and Moldova;
- keyword analysis reveals strong links between the concept of finance, financial crisis and decision-making;

Bibliometric studies on financial-accounting information is limited in the academic literature, thus highlighting that the bibliometric analysis carried out can contribute to accounting research by providing premises for possible further research and having a starting point regarding relevant bibliographic references on this topic.

As a future research direction, bibliometric analysis can be performed, also based on data extracted from the WEB OF SCIENCE database, and data analysis can be performed using the VOSVIEWER software.

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ACCOUNTING FRAUD: CASE STUDY

DOI: <https://doi.org/10.53486/dri2025.47>

UDC: 657.632

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Abstract: *This paper aims to be a qualitative research, respectively a case study. I will analyze two famous cases of accounting fraud: Enron and Lehman Brothers. The analysis considers the techniques used to manipulate the result, the accounting fraud, the causes, the effects, the people involved and the sanctions applied. Although they occurred at different points in time, both have gone down in history as accounting manipulations with a significant economic impact and showed the failure of supervisors. Enron took advantage of accounting policies that allowed the creation of special purpose entities to hide off-balance sheet debts and losses. Lehman Brothers profited from the use of Repo 105, which involved a repurchase agreement that abusively allowed loan transactions to be recorded as sales. Both cases ended up being, due to the accounting manipulations used and the economic impact of those manipulations, resounding bankruptcies.*

Key words: *accounting fraud, Enron, Lehman Brothers, bankruptcy*

JEL: M41

1. Introduction

Accounting fraud is and will be a threat to financial data, affecting both management decisions and investor confidence. It can even lead to economic destabilization of companies and bankruptcy.

Accounting fraud can be increasingly prevalent where internal control mechanisms are completely lacking, or in an increasingly competitive and complex economic environment where certain manipulated financial statements can be used to advantage. In order to avoid such situations, internal control needs to analyze the causes leading to fraudulent financial accounting data, find solutions and establish procedures to avoid such situations. The forms that accounting fraud can take range from manipulating income to concealing debts. For example, some balance sheets, even if they appear perfect, can hide inconvenient truths. The past shows that many companies have used accounting tricks to hide losses and attract investors, as well as to avoid paying taxes.

Accounting fraud, in all its forms, affects the image of companies as well as the confidence of financial markets. Companies frequently become involved in financial scandals, often caused by accounting fraud of various sizes. Whatever the size of the company, the deliberate manipulation of accounting data can lead to significant losses and, in some cases, even insolvency or bankruptcy.

Accounting fraud can take many forms: overstatement of income or assets; omission of significant financial obligations; understatement of expenses or liabilities; recording of fictitious transactions, etc. In the context of a globalized and digitalized economy, where financial information circulates rapidly and influences major decisions, the importance of transparency and accuracy of accounting reporting becomes essential and mandatory.

The consequences of accounting fraud are significant: investors pull out; huge financial losses; management investigations; loss of confidence of business partners and customers.

Only a pro-active approach, together with effective internal control and prevention mechanisms, can significantly reduce the risks associated with accounting fraud and ensure the long-term sustainability of an organization.

In the article I will present the research methodology and then the two selected case studies and finally some conclusions.

2. Research methodology

The research is qualitative, based on the multiple case study method with the aim of analyzing famous case studies on accounting fraud. In order to choose the most famous cases I did an initial Google search on "biggest accounting fraud" and formed a list of 128 famous scandals and then for each of them I searched on the Web of Science as follows: Title/Abstract scandal/company name, English language, document type Article, Web of Science Categories: Business or Business Finance or Ethics. The search returned the most articles for the following cases: Enron and Lehman Brothers. For each of these I will analyze the manipulation techniques, the fraud, the causes and effects of the fraud as well as the people involved and the sanctions that were imposed. I have chosen the cases with the most writings because it means that they are the most relevant to the academic community and resounding scandals at the same time. Among the limitations of the research is that I have chosen to use only Web of Science articles in this research and exclude other types of writings and other data sources that might also be relevant to the topic.

3. Results and discussions

Enron

The Enron case is one of the biggest bankruptcies in the US at the time (2001). Enron was a company that sold energy in America that later started to sell various types of derivatives such as forward contracts and options. Enron took advantage of accounting rules that allowed the creation of special purpose entities (SPEs) to hide liabilities and losses off the balance sheet. These entities were not consolidated by the parent company, i.e. Enron, given a US GAAP provision that allowed the assets and liabilities of an SPE to not appear on the balance sheet of the company that established it if two conditions were met (Deakin & Konzelmann, 2004). The fictitious transactions using SPEs were discovered in the fall of 2001 and an inevitable collapse of the company followed. The auditor, Arthur Andersen at the time called for the consolidation of these special purpose entities even though it initially agreed that they should not be consolidated because this contravened accounting principles. Consolidation years earlier increased earnings by several hundred million dollars and reduced the value of the company by several billion dollars. These restatements and revaluations did not, in themselves, bankrupt the company, but the loss of confidence in the credit and capital markets did. Enron had cash flow problems and in order to save itself it made efforts to access a line of credit and planned to merge with its rival Dynegy but this merger did not materialize due to the size of its debts and so the company went bankrupt on December 2, 2001. Within the company the independence of non-executive members of the Enron board was affected by the fact that they received consultancy payments and other gifts in addition to their compensation. The independence of the auditors was also impaired by the fact that they were paid not only for their audit services but also for their consulting services. At a time when the stock price was falling and the company's future was uncertain Enron management took advantage of tens and even hundreds of millions of dollars in stock option proceeds. All of this drove the company into bankruptcy.

In short the fraud was the use of special purpose entities to report large fictitious profits and hide debts, thus manipulating the financial statements and stock price presented to investors. The effect of the fraud was the company's bankruptcy in 2001, the biggest scandal to date, with the company going bankrupt and its auditor Arthur Andersen disappearing from the market. Employees not only lost their jobs but some of them lost their savings. Shareholders lost over 85 billion dollars as a result of this bankruptcy (Henderson et al., 2009). The Enron scandal led to the introduction of the Sarbanes-Oxley Act (2002), which provides for greater independence of directors and auditors, with the aim of better aligning management actions with shareholder interests.

Among the parties involved in this bankruptcy were managers who in many cases made decisions that destroyed the company, they went along with the decision of senior management and the board to focus on increasing earnings per share (Stewart, 2006).

Lehman Brothers

The Lehman Brothers case represents the 2008 bankruptcy of the fourth largest US investment bank following the use of Repo 105, permitted in the 2000s by SFAS 140 which involved a repurchase agreement that improperly allowed loan transactions to be recorded as sales. Lehman developed a policy to take advantage of this standard, the cash received was not recorded as a loan, and the repurchase obligation was not recorded as a debt. This policy also allowed him to eliminate securities received as collateral from the balance sheet by decreasing assets. It was intended to show apparent economic stability by reducing the net leverage ratio.

In 2007, before bankruptcy, the company had to reduce their leverage ratio due to an unfavorable situation in the financial market and falling real estate prices that did not allow them to sell assets without taking a loss and used Repo 105. They applied this policy on about 50 billion dollar transactions every quarter before bankruptcy to make the balance sheet look better.

In 2008, Lehman made several presentations to credit rating agencies but in none of them did they present the Repo 105 practice or its effect on the leverage ratio.

Lehman's choice of accounting method hid its problems to the point that at one point bankruptcy was the only option (Hines et. all, 2011).

The external auditor Ernst & Young apparently was informed about Repo 105, had a copy of this policy but did not inform the board of directors or the investing public. The auditor did not feel obligated to look at the volume and timing of Lehman's so-called Repo 105 repurchase agreements. The external auditor also did not consider himself responsible to look at the composition of the liquidity fund and how liquid it was believing that this was the responsibility of the regulators and so even though the bank announced a liquidity fund of about \$41 billion on September 12, 2008 the bank had a liquidity fund of less than \$2 billion and virtually did not have enough cash to open.

The failure of Lehman Brothers also points to weak regulation by the SEC and the Federal Reserve Bank of New York (FRBNY), which acted more as a lender to Lehman, had 2 employees within Lehman to monitor its ability to repay the loans, but had no authority over the disclosures it made.

The use of repurchase agreements led to the bankruptcy of Lehman Brothers in 2008, which is considered a turning point in the global crisis at the time, showed a lack of oversight and regulation of financial institutions and ethical problems in the financial system. The collapse meant losses for investors and customers and increased distrust in auditors and institutions with a regulatory and supervisory role in the sector.

The external auditor Ernst & Young has been sued several times in the case, in two major lawsuits, having failed to fulfill its duties as auditor, it agreed to pay \$99 million in 2013 and \$10 million in 2015. Lehman's management was not criminally convicted because there was not enough evidence to show that the fraud was willful. (Kirsiene & Miseviciute, 2017)

4. Conclusions

Accounting fraud is a threat to the integrity of financial information impacting investors, financial institutions and other stakeholders. It distorts reality and even leads to bankruptcy, as was the case of the two bankruptcies presented, which have gone down in history because of their scale.

These scandals showed the failure of the supervisory institutions and the poor corporate governance of the companies involved. In the aftermath of these scandals, steps were taken to ensure that such situations would not be repeated. In the wake of the Enron bankruptcy, the famous Sarbanes-Oxley Act (2002) was introduced to increase the independence of directors and auditors.

This article has been limited to analyzing only two famous cases of accounting fraud but I am planning to extend it by analyzing more cases in the order established according to the research methodology.

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IFRS 15 AND ARTIFICIAL INTELLIGENCE: TRANSFORMING DECISION-MAKING IN THE SOFTWARE INDUSTRY

DOI: <https://doi.org/10.53486/dri2025.48>
UDC: [657:006.32]:004.89

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Abstract: *This study investigates how the implementation of IFRS 15 affects revenue recognition practices within the software industry, with a particular emphasis on the role of Artificial Intelligence (AI) in enhancing financial reporting and supporting decision-making. The research integrates a critical review of recent academic literature with an in-depth case study analysis. The theoretical section outlines key developments and emerging concerns related to the adoption of IFRS 15, the evolving role of AI in accounting and audit functions, and the broader implications of digital transformation for financial practices. The empirical part of the study examines a multifaceted software contract that includes a licensing agreement, customization services, ongoing maintenance, and variable consideration tied to user activity. The five-step IFRS 15 model is applied rigorously to address crucial aspects such as the identification of separate performance obligations, allocation of transaction price, revenue recognition timing, and the treatment of usage-based royalties. Findings emphasize the critical role of professional judgment in navigating complex contractual terms and demonstrate the potential of AI to streamline contract interpretation, automate allocation procedures, and improve the precision of revenue reporting. By linking IFRS 15 implementation with practical AI applications, this research offers actionable insights for accounting professionals operating in an increasingly digital and rapidly evolving economic context.*

Keywords: *IFRS 15, software industry, revenue recognition, complex contracts, Artificial Intelligence, financial reporting.*

JEL: M41, M48, O33

1. Introduction

In an increasingly digitized economic context, characterized by complex business models and a growing volume of intangible transactions, the international standard IFRS 15 "Revenue from Contracts with Customers" is becoming an essential benchmark for revenue recognition in service and technology-based industries such as the software sector. The correct application of this standard requires a deep understanding of contracts, performance obligations and transaction price allocation mechanisms, resulting in a heavy reliance on professional judgment.

In parallel, the integration of Artificial Intelligence (AI) in the accounting and auditing domain is becoming increasingly visible, with literature highlighting its potential to automate repetitive tasks, support predictive analytics and support financial decision making. This trend becomes particularly relevant in the context of the application of IFRS 15, where AI can significantly contribute to the analysis of complex contracts, the identification of distinct obligations and the estimation of variable elements such as royalties or contingent prices.

To substantiate the research direction, a visual thematic analysis of 100 scientific articles published

in the year 2025, collected through the Publish or Perish application based on Google Scholar query, using the keywords "IFRS 15", "Artificial Intelligence" and "IT", was performed. The abstract texts were processed and the results were synthesized into a thematic map highlighting the most frequent research directions. Thus, four dominant clusters emerged: the automation of reporting and auditing through AI; the use of machine learning in the analysis of accounting data; the contribution of AI to financial sustainability; and debates on the legitimacy of algorithms in accounting decision-making. This paper combines a literature review with an applied case study, targeting a software industry specific contract that includes: a custom license, customization services, maintenance and variable royalties. The five-step model prescribed by IFRS 15 is systematically applied and AI is explored as a tool to support the analysis and automation of key revenue recognition steps.

Through this dual approach: theoretical and practical, the research makes an original contribution to understanding the convergence between financial reporting standards and digital transformation, providing useful insights for accounting professionals operating in dynamic and technology-intensive economic environments. This reality is reflected in the way in which accounting standards and emerging technologies are interacting ever more closely, generating a number of conceptual and operational transformations in financial accounting practice.

The application of International Financial Reporting Standards (IFRS) in increasingly digitized economic contexts creates new challenges and opportunities for accounting professionals. In particular, IFRS 15, "Revenue from Contracts with Customers", has fundamentally reshaped the principles of revenue recognition, requiring an approach based on delivery obligations and careful analysis of contractual transactions. In parallel, the integration of advanced technologies such as Artificial Intelligence (AI) is redefining accounting processes, supporting complex data interpretation and financial decision making at an accelerated pace.

The literature highlights intensifying research on the interplay between digitization, leadership style (Tagscherer and Carbon, 2023) (Porfirio et al., 2021) (Porfirio et al., 2021) and AI integration in accounting (Abu Afifa et al., 2024), as well as the fundamental role of interdisciplinary education for developing the skills needed in new financial ecosystems. Other recent studies emphasize the impact of AI in supporting the application of modern accounting standards (Le Guyader, 2020), in addressing traditional reporting challenges (Yi et al., 2023), and in adapting the accounting profession to the demands of a digitized market (Kleinhans, 2025), (Stoica & Ionescu-Feleagă, 2024).

At the same time, the specialized literature reports notable difficulties in the practical application of IFRS 15, both in terms of full compliance with the information presentation requirements (Boujelben & Kobbi-Fakhfakh, 2020), and in terms of adaptability in an economic context marked by financial instability (Napier & Stadler). The entry into force of this standard generated major changes in revenue recognition and in the associated accounting policies, which required the adoption of appropriate assessment mechanisms, especially in economies in transition or exposed to systemic risks (Grosu et al., 2022). In the context of the process of harmonization of international standards, the success of the application of IFRS 15 has proven to be due to the ability of the entities to respond to the complexities of the new conceptual framework regarding revenues and to the contribution to increasing the transparency and relevance of financial reporting (Usurelu et al., 2021). In parallel, the introduction of artificial intelligence into accounting processes brings to the forefront ethical, legal and social challenges, requiring a profound rethinking of the role, skills and responsibilities of accounting professionals.

Scientific issue addressed. Although IFRS 15 provides a clear framework for revenue recognition, the complexity of contracts in the software industry poses major difficulties of interpretation and practical application, especially in the presence of variable elements (e.g. royalties, bundled licenses). At the same time, despite technological advances, the role that AI can play in supporting accounting decisions is not fully understood and validated, especially in the IFRS regulatory context.

The aim of this paper is to explore in an integrated way how Artificial Intelligence can optimize the application of IFRS 15 in the software industry, both from a theoretical (through literature review)

and practical (through case study) perspective, in order to support the accounting decision making process and to increase the quality of financial reporting.

To this end, the research aims to fulfill the following **objectives**:

- identify the dominant research directions on the interaction between IFRS 15 and AI in recent scientific literature.
- critically analyzing how AI is used in accounting and auditing with a focus on IFRS reporting.
- application of the IFRS 15 five-step model to a real contract in the software industry involving variable revenue.
- explore the potential of AI to automate the identification of performance obligations, transaction price allocation and revenue recognition.
- formulating conclusions and recommendations on the integration of AI into accountants' professional practice in the context of international standards.

This approach allows both the theoretical validation of emerging trends and the exploration of the practical applicability of a conceptual framework adapted to the digital realities of the modern economy.

2. Research Methodology

The present research aimed to identify the main directions of scientific investigation on the interaction between IFRS 15 and Artificial Intelligence (AI) in the software industry, through a visual thematic analysis of recent literature. The dataset consisted of 100 scientific articles published in the year 2025, collected through the Publish or Perish application, which queried the Google Scholar search engine based on the keyword combination "IFRS 15", "Artificial Intelligence" and "IT". Relevant metadata were extracted for each article: title, authors, abstract, year of publication, number of citations and source. The abstracts were processed using text mining techniques to identify the five most representative latent themes. In addition, a semantic keyword co-occurrence network, limited to the 30 strongest connections, was constructed to highlight the relationships between terms. The final visualization was realized in the form of a thematic concept map structured by quadrants, with the use of an AI graph generator, each theme being illustrated by a distinct color. This methodological approach allows clear and synthetic mapping of emerging research at the intersection of accounting, technology and financial standardization. Thus, 5 main themes have been identified, each outlined by a distinct set of terms. Table 1 summarizes the main themes identified in the IFRS 15 and IA literature, together with the set of dominant keywords associated with each thematic area.

Table 1. Dominant themes and associated keywords in the IFRS 15 and artificial intelligence literature

Topic	Dominant Keywords
T1: The Impact of AI in Accounting	<i>artificial, intelligence, study, impact, technology</i>
T2: IFRS 15 and Revenue Recognition	<i>IFRS 15, revenue, contracts, compliance</i>
T3: Machine Learning and Big Data	<i>machine, learning, data, analytics, computing</i>
T4: Digital Financial Reporting	<i>financial, reporting, statements, integration</i>
T5: Professional Challenges in Accounting	<i>accounting, education, challenges, research</i>

Source: authors' elaboration based on processed articles

Table 1 outlines the dominant themes and associated keywords emerging from the content analysis of the selected articles. For a visual understanding of the conceptual structure identified, Figure 1 provides a schematic representation of these themes, grouped into five major research strands and connected through the central node of financial reporting. The image shows a concept map structured on the basis of the five thematic directions extracted by automatically analyzing abstracts of scientific articles. Each colored quadrant represents a distinct semantic cluster, shaped by the topic modeling process, and reflects the focus of the research around a coherent set of terms. The blue quadrant

highlights Artificial Intelligence, with a focus on impact, potential, technology and the role of AI in accounting. The green quadrant summarizes the Machine Learning and Big Data dimension, with terms associated with advanced analytical methods and data processing. The orange segment groups topics related to IFRS 15 and revenue recognition, with a focus on contracts, compliance and standard-specific terms. The red quadrant covers digitalization of financial reporting, highlighting data integration, automation and international standards. Finally, the purple area captures professional challenges in accounting, such as education, skills and adapting to new technological requirements.

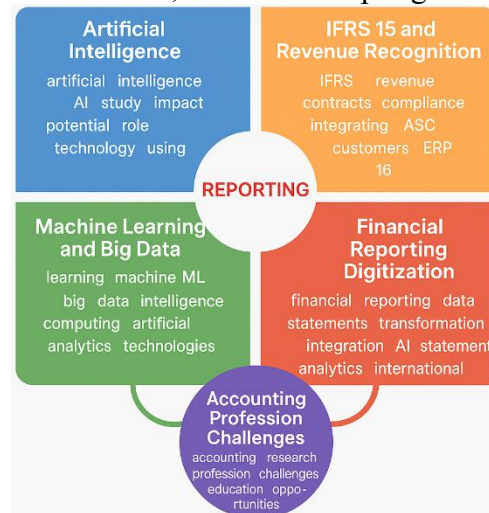


Figure 1. Semantic map of key concepts in the field

Source: authors' elaboration

At the heart of the representation is the notion of "Reporting", symbolizing the unifying role of the financial reporting process in the context of the convergence between accounting rules and emerging technologies. Thus, the figure captures in a synthetic but expressive way how contemporary literature reflects the transformation of the accounting paradigm in the digital age.

3. Literature review

In the literature review, the 10 most relevant scientific papers published in 2025, drawn from an initial sample of 100 articles, addressing the interaction between artificial intelligence, financial reporting and IFRS 15 were selected. Table 2 provides a structured summary of these papers, considering the level of citations, the scientific problem addressed, the methodology applied and the main conclusions drawn by the authors. This presentation helps to delimit the dominant themes and to highlight the relevant contributions in the researched area, providing a solid basis for further exploration of the topic.

Table 2. Summary of most relevant scientific papers on artificial intelligence and IFRS 15 in financial reporting (2025)

Nr.crt.	Article name, citation level, source number	Scientific issue	Methodology	Results
1.	Financial statement manipulation: Ethical and regulatory perspectives. (25) [1]	How accounting manipulations can be detected and prevented using AI and big data	Integrating big data, machine learning and predictive models	Proposes an ethical and technological framework for detecting accounting anomalies
2.	Artificial Intelligence-Enabled Supply Chain Management: Unlocking New Opportunities and Challenges. (12) [5]	Inefficient decision-making in supply chains AI-assisted	Analytical modeling and case studies AI	AI improves responsiveness and predictability of supply chains

Nr.crt.	Article name, citation level, source number	Scientific issue	Methodology	Results
3.	Automated Financial Reporting and Enhancement of Efficiency of Accounts. (9) [16]	Limitations of financial transparency in traditional reporting	Automation with AI and blockchain technologies	Demonstrates increased transparency through automated systems
4.	From social media to artificial intelligence: improving research on digital harms in youth. (6) [11]	Transforming audit in a digital and social context	Comparative analysis between traditional and AI-driven auditing	Identifies trends of migration towards automated and AI-driven auditing
5.	Impact of artificial intelligence on the performance and quality of accounting information systems and accuracy of financial data reporting. (4) [7]	To what extent AI influences the quality of managerial decisions	Interviews and content analysis	Confirms that AI increases decision-making accuracy, but raises ethical issues
6.	Transformative impact of AI and digital technologies on the FinTech industry: a comprehensive review. (4) [15]	How electronic data can be leveraged in audit	ML applications on financial datasets	Increases efficiency in identifying accounting errors and fraud
7.	A machine learning approach to leveraging electronic health records for enhanced omics analysis. (3) [12]	Difficult to measure accounting environmental impacts	Hybrid model IA + environmental accounting	Improves relevance and accuracy of environmental indicators
8.	Boosting the efficacy of green accounting for better firm performance: artificial intelligence and accounting quality as moderators. (3) [8]	Stakeholder perceptions on the use of AI in reporting	Qualitative analysis of standard comment letters	Highlights polarization of opinions and the need for regulation
9.	Navigating legitimacy: diverse stakeholder perspectives on the IFRS Foundation's establishment of the ISSB. (3) [3]	The need for automated IFRS compliance verification	IA techniques applied on IFRS 15 and financial documents	IA reduces the risk of non-compliance and accelerates reporting
10.	Artificial intelligence and digital technologies in finance: a comprehensive review. (3) [14]	How technology affects the implementation of IFRS 15	Case study and semantic analysis	Suggests full digitization of the revenue recognition process

Source: authors' elaboration based on processed articles

The ten papers reviewed highlight a growing scientific interest in the application of artificial intelligence to financial reporting and IFRS 15 compliance. The research brings together a variety of methodologies, from case studies and predictive modeling to qualitative analysis, and provides complementary perspectives on efficiency, transparency and ethics in accounting. Overall, the literature reveals the significant potential of AI in transforming financial decision-making, but also the need for clear regulation and practical validation of these solutions.

A valuable contribution to the understanding and application of IFRS 15 in emerging industries is the PhD thesis by Jieri Nicolai (2024), which proposes an integrated model for applying the standard in sectors such as IT, manufacturing and services. The relevance of this work for the present research lies in the analysis of the difficulties encountered by entities in applying the five-step model, especially in complex contracts with multiple elements and variable revenues. The author emphasizes the importance of rigorous assessment of performance obligations and the correct allocation of the transaction price, which are also key issues in the applied study in this paper.

4. Basic content

Following on from the theoretical aspect analyzed above, this section is dedicated to the practical application of IFRS 15 requirements in the context of a specific contract in the software industry. The

case study aims to illustrate how to apply the standard in complex contractual situations by identifying the main accounting difficulties encountered in practice: distinguishing between services that can be treated separately or form an integrated obligation, allocating the contractual value between the components of the transaction, determining the timing of revenue recognition for each obligation, and the treatment of variable royalties based on usage. The analysis also highlights the critical role of the accountant in the exercise of professional judgment and explores the ways in which artificial intelligence can support accounting decision making, in particular in terms of classifying obligations and automating the revenue recognition process.

Practical study: Applying IFRS 15 in a complex software contract with variable elements.

This case study analyzes the application of IFRS 15, "Revenue from Contracts with Customers" in the context of a contract between a software entity and a corporate customer with a contractual term of two years. The contract consists of several elements, namely a software license, customization services, annual maintenance, and variable fees based on actual use of the software. Due to its structure, this contract requires careful application of the five-step model set out in IFRS 15 as it involves distinct performance obligations, inseparable elements and variable revenue components.

The contract has a determinable initial total value, with no uncertainties as to the performance of the obligations or the collection of the agreed amounts. At the stage of the analysis of the performance obligations, it is noted that the software license amounting to EUR 700,000 is provided for the entire duration of the contract, but cannot be separated from the customization services amounting to EUR 200,000, which are to be delivered in the first six months. In accordance with IFRS 15, these two components are treated together as a single performance obligation, because the customer cannot receive the license separately from the customization services delivered by the entity.

In addition to this unified obligation, the contract also provides for an annual maintenance service, valued at €50,000 per year (total €100,000 for the two years of the contract). This service is provided periodically and uniformly, and under IFRS 15 is recognized as a separate performance obligation. In addition, the contract includes a variable component: a fee of EUR 5 for each additional user above the threshold of 1,000 users. In accordance with IFRS 15, these fees are treated as variable revenue and are recognized in the period in which actual usage occurs, without being initially allocated to the transaction price.

The transaction price is allocated as follows: EUR 900,000 corresponds to the combined performance obligation (comprising the license and customization), while EUR 100,000 is assigned to maintenance services, which are recognized on a straight-line basis in equal monthly amounts of EUR 4,166.67 over a 24-month period. Regarding the combined obligation, the customization component - estimated at EUR 200,000 - is recognized over the first six months, aligned with the delivery phase, using an input-based approach. The remaining EUR 700,000, related to the software license, is recognized evenly over the contract term, reflecting the ongoing economic benefits derived from continued software usage. Usage-based royalties are recognized separately, based on quarterly data reported by the customer. Calculating the additional users (over 1,000) and applying the EUR 5 fee yields the variable revenue per quarter. The total estimated value of this variable revenue is EUR 57,500, which will be recognized on the basis of actual consumption.

This application demonstrates the complexity of contracts specific to the software industry and how IFRS 15 requires careful analysis of the characteristics of each contractual element. The correct application of the principles of the standard, in particular the delineation of performance obligations, the treatment of variable components and the determination of when revenue is recognized, ensures transparent and relevant financial reporting. At the same time, the use of digital solutions, including artificial intelligence, can support the accountant in automating decision making, estimating revenue based on utilization and efficiently classifying contract components.

Applied analysis of the five steps of IFRS 15

For a thorough understanding of how IFRS 15 applies to the contract under review, a systematic approach to the five steps of the standard is required. Each step is examined from the perspective of the central accounting issue, the potential support provided by artificial intelligence (AI), the intervention required from the professional accountant and the impact on revenue recognition and presentation. This integrated approach enables not only a rigorous application of the standard, but also the assessment of opportunities for digitization and automation of the accounting decision-making process.

Step 1 - Identify the contract with the customer

The initial stage in applying IFRS 15 involves assessing whether a legitimate contract exists between the parties, one that gives rise to enforceable rights and obligations. From an accounting perspective, this step ensures that the transaction amount can be reliably measured and that the contract does not contain provisions that might hinder its proper execution. In this context, artificial intelligence can support the due diligence process by automatically scanning contract documents and identifying any ambiguous or risky terms. The intervention of the accountant is essential to validate this information and to apply professional judgment in interpreting specific terms, especially in the case of atypical clauses or credit risks associated with the customer. From an accounting point of view, the purpose of this stage is to establish the eligibility of the contract and to create the necessary premises for the subsequent recognition of revenue.

In this case, the contract was signed for a period of 24 months, with a total estimated value of EUR 1,000,000, plus a variable component, i.e. royalties based on the use of the software. The contracting parties have formally approved the agreement, the rights and obligations are clearly stipulated and the terms of payment are explicitly stated. There are no elements that raise doubts about the likelihood of collection, which allows the contractual relationship to be recognized. In conclusion, the contract meets the requirements of IFRS 15 to be recognized and further analyzed under the five-step model.

Step 2 - Allocate the transaction price

After identifying the distinct performance obligations, the subsequent step is to distribute the overall transaction price among them. According to IFRS 15, this allocation should reflect the relative standalone selling prices of each obligation, based on observable data or reasonable estimation where direct prices are not available. In practice, this step involves significant accounting challenges, especially when contracts include combined components, customized services and variable elements. In such cases, determining the benchmark for each service becomes a complex process, particularly if there are no similar transactions in the entity's portfolio.

Artificial intelligence can significantly support this process by using machine learning algorithms to estimate individual selling prices based on historical data or predictive models. This is particularly useful for recurring or standardized contracts, where variations can be learned from internal datasets. However, the intervention of the accountant remains essential in validating allocation proportions, especially in cases with unique customizations or where history is not sufficiently representative. Professional judgment is used to justify assumptions and estimates used in the absence of observable market prices.

In the example considered, the contract comprises two performance obligations: the first, consisting of license and customization services, treated together as a single inseparable element, has a contractual value of EUR 900,000; the second, annual maintenance service, has a fixed value of EUR 100,000. As the license and customization are delivered as part of the same obligation, no internal allocation between them is required under the aggregation principles of IFRS 15. The total transaction price is thus allocated directly: EUR 900,000 for the combined obligation and EUR 100,000 for the maintenance service, to be recognized ratably over the term of the contract. The variable component, which is the royalties related to the actual use of the software, is not included in this initial allocation

but will be recognized separately, based on the achievement of the conditions of use, in accordance with IFRS 15.

This stage has a significant impact on the revenue recognition schedule and financial reporting structures. A correct and justified allocation contributes to the faithful presentation of economic performance and to avoiding distortions in the reflection of revenue according to the actual contractual deliveries.

Step 3 – Determining the transaction price

Assessing the transaction price is a pivotal step under the IFRS 15 revenue recognition framework, as it directly influences the value of revenue to be reported. At this point, the entity is required to estimate the total consideration expected in exchange for the transfer of promised goods or services. This includes not only fixed amounts stipulated in the contract, but also any variable elements, such as performance-based discounts, rebates, or royalties tied to usage patterns.

In the case under review, the contract has a total value of EUR 1,000,000, broken down into EUR 700,000 for the software license, EUR 200,000 for the customization component, and EUR 100,000 allocated to maintenance services provided over a two-year period. These components are contractually defined and present low estimation uncertainty. In contrast, a portion of the revenue is contingent upon future user activity, with royalties set at EUR 5 per user exceeding 1,000 active accounts per quarter.

Under IFRS 15, such variable consideration is only included in the transaction price when it is highly unlikely that subsequent adjustments will materially affect the recognized revenue. Due to significant fluctuations in the client's user base, the royalties are excluded from the initial estimate and recognized progressively as the usage occurs, aligning with the principle of caution.

Artificial Intelligence (AI) can enhance this process by simulating various usage scenarios, leveraging predictive analytics, and automating data integration from customer systems. Nonetheless, human oversight remains critical: the accountant must validate model assumptions, exercise professional judgment regarding uncertainty thresholds, and determine when variable revenue qualifies for inclusion. From a financial reporting perspective, this step substantially affects revenue volumes, shapes key performance indicators, and influences how contractual obligations and risks are reflected in the financial statements.

Step 4 – Allocation of the transaction price

Distributing the transaction price is a crucial phase in the IFRS 15 application process, as it determines how and when revenue is recognized across the duration of the agreement. According to the standard, the total amount expected from the customer must be allocated proportionally to the individual performance obligations specified in the contract, using the best available estimates of their standalone values where observable prices are not available.

In the case of the contract analyzed, the entity has identified two distinct performance obligations: the first, consisting of the software license (EUR 700,000) and the customization services (EUR 200,000), is considered a unitary performance obligation; the second, the maintenance services, worth EUR 100,000, is distinct and is carried out uniformly over the 24 months. The total determinable value of the transaction is therefore EUR 1,000,000, excluding variable royalties, which are not included in this step.

Given that the license and customization are not provided independently and cannot be separated from the point of view of the benefit to the customer, the entire amount of EUR 900,000 related to them is allocated as such to the combined obligation. The remaining EUR 100,000 is allocated to maintenance, based on the explicit value stipulated in the contract. The variable component, which involves the payment of EUR 5 for each user exceeding the threshold of 1,000 users per quarter, is not allocated at this stage, but will be treated separately, according to the conditional recognition provided for in IFRS 15.

In practice, this allocation can also be made through IT systems, with the support of artificial intelligence algorithms, which automatically calculate the proportions based on the value share and the history of similar contracts. However, the accountant's intervention remains essential in confirming the method used and in adjusting the proportions in particular cases, such as the lack of reference prices or the existence of global contractual discounts.

The accounting impact of this stage is significant, as it determines the value of each obligation to be recognized as income. A correct allocation contributes to the faithful presentation of the entity's performance, while an erroneous distribution may affect the timing of recognition and, implicitly, the economic and financial indicators reported.

Step 5 – Revenue Recognition (Revised)

The final phase of the IFRS 15 framework involves identifying the correct moment and method for recognizing revenue associated with each performance obligation. This decision depends on how control of the goods or services is transferred to the customer—either at a specific point in time or progressively over the duration of the contract. The choice between these approaches must be grounded in a detailed analysis of delivery milestones, the degree of completion, and the available supporting evidence.

In the analyzed contract, the integrated performance obligation—comprising both the software license and the customization work—is considered to involve a continuous transfer of control. This is because the customization process adds essential functionality, and the customer derives incremental benefits as the work progresses, making the license unusable in isolation from the adaptation services. Thus, the revenues related to the amount of EUR 900,000 are gradually recognized: approximately EUR 200,000 are recognized in the first six months, corresponding to the degree of completion of the customization, and the remaining amount (EUR 700,000) is recognized proportionally until the conclusion of the contract, reflecting the continuous use of the license. This approach is consistent with the input-based method, recommended by IFRS 15 for performance obligations achieved over time. The maintenance services, worth EUR 100,000, are provided uniformly over the 24 contractual months and do not depend on the actual use of the software. Consequently, the revenue related to this performance obligation is recognized on a straight-line basis, in equal monthly installments of EUR 4,166.67, reflecting the constant provision of the service.

The contract includes a variable revenue component, structured as royalties that apply when the number of users surpasses the 1,000-user threshold. In line with IFRS 15 requirements, such amounts are excluded from the initial transaction price, as they do not meet the criterion of being highly predictable. Instead, revenue related to these royalties is recorded progressively, based on actual user activity within each reporting period.

At the close of every quarter, the entity calculates and recognizes the income attributable to the additional users, relying on client-provided usage data. Over the full term of the contract, projections estimate a cumulative royalty income of EUR 57,500, allocated across eight quarters—reflecting a consistent increase in user engagement with the software solution.

Artificial intelligence can significantly support this stage by automating monthly registrations and dynamically calculating royalties, using actual usage data collected directly from the customer's systems. However, the accountant has the responsibility to verify the accuracy of the data entered, to validate the revenue recognition logic and to ensure compliance with auditability and documentation requirements. The accounting impact is significant, as the timing and amount of revenue recognition directly influences the entity's performance indicators, the true and fair view of the financial statements and, implicitly, the decisions made by their users.

5. Conclusions

The present research highlights the increasing complexity of the revenue recognition process in the context of IFRS 15, especially in dynamic industries such as software, where contracts include

multiple components and variable elements. The bibliometric analysis demonstrated that the interaction between artificial intelligence and financial reporting represents an emerging and relevant research direction, with high potential to transform accounting practices. The applied case study illustrated the applicability of the five-step model of IFRS 15 in a realistic scenario, providing a clear framework for understanding the accounting and decision-making implications of each stage, from contract identification to the actual recognition of revenue, including those based on usage.

The integration of advanced technologies, especially artificial intelligence, into the accounting process not only offers opportunities for automation and efficiency, but also imposes new challenges regarding the quality of professional reasoning, the validation of estimates and the control of the decision-making process. The results obtained underline the fact that AI can become a valuable ally in the analysis of complex contracts, in the estimation of variable revenues and in the management of the large volume of information, without replacing the responsibility and judgment of the professional accountant. In conclusion, the coherent application of IFRS 15, supported by intelligent tools, can significantly contribute to increasing the transparency, accuracy and relevance of financial reporting, provided that a solid governance and an ethical framework adapted to the new digital reality are maintained.

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THEORETICAL FOUNDATION OF FINANCIAL LIABILITIES AUDIT QUALITY VIA A MATHEMATICAL MODEL APPLIED TO RISK ASSESSMENT AND SPECIFIC AUDIT PROCEDURES

DOI: <https://doi.org/10.53486/dri2025.49>

UDC: 519.876.2:657.6

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Abstract: *The assessment of risks related to financial liabilities in the audit of financial statements is still facing more often with problems related to subjectivity, lack of quantitative benchmarks and pressure on auditors. Without a unified methodological framework, professional decisions become difficult to document and compare, which affects the transparency and quality of the audit process. In this context, the present research aims to develop and validate a mathematical model that transforms key concepts such as the level of risk, the intensity of the procedures applied and the quality of the auditor's decisions into measurable and quantifiable variables.*

The study was carried out in three stages: theoretical analysis of risks and ethical dilemmas, construction of a well-structured mathematical model, and development of a scaled form for risk and procedure assessment. The proposed model provides a logical, coherent and reproducible framework for substantiating auditor's decisions, contributing to the standardization of professional reasoning and strengthening ethics in financial debt auditing. The empirical validation of the model through application in practical cases will be the subject of future research, aimed at testing the consistency of the functional relationships and calibrating the scores in real audit contexts.

Keywords: *financial debt audit, risk assessment, mathematical model, audit quality, professional decision, financial transparency*

JEL: M42

1. Introduction

In the current context of financial statement auditing, the assessment of the risks associated with financial liabilities faces multiple challenges that affect the consistency and quality of the auditors' decision-making process. The increasing complexity of credit and loan contracts, the pressures in the client-auditor relationship and the lack of well-defined quantitative benchmarks on the severity of risks contribute to a climate of uncertainty and subjectivity in the audit assessment of these liabilities. Moreover, the absence of a uniform methodological framework for quantifying risks and the effectiveness of the procedures applied by the auditor leads to divergent interpretations, ethical tensions and difficulties in the traceability of professional decisions. In this reality, the theoretical identification of risks is no longer sufficient - it is necessary to develop applicable, quantifiable and reproducible tools that support auditors in objectively substantiating their opinions and increase the transparency of the decision-making process.

With these premises in mind, the choice of the topic is motivated by the need to transform a conceptual approach into an applied tool that responds to the current needs of the accounting profession and users of financial information. The development of a mathematical model thus becomes not only a natural continuation of earlier theoretical research on optimizing decision making and managing ethical dilemmas, but also a practical response to the problems encountered in financial

debt auditing.

The overall aim of the research is to develop and validate a mathematical model applicable in financial debt auditing, capable of transforming conceptual elements such as risk severity, intensity of procedures applied and quality of professional decisions into measurable variables. The proposed model will enable logical analysis, support the auditor's conclusions and increase transparency in financial auditing.

In order to achieve this goal, the research aims to achieve the following **objectives**:

- ✓ theoretical and normative analysis of the risks associated with financial liabilities and the ethical dilemmas influencing auditor's decisions;
- ✓ identification and classification of the relevant variables for the model (risks, procedures, outcomes);
- ✓ formulation of the functional relationships between variables in the form of a mathematical model;
- ✓ development of an assessment tool applicable in audit engagements (scaled grid form).

The research was structured in three stages:

Stage I: Theoretical and documentary foundation by reviewing the literature, auditing standards and accounting regulations on financial liabilities;

Stage II: Construction of the mathematical model by defining the variables, formulating the functional relationships and developing the model;

Stage III: Development of the applied tool by realizing the assessment grids, scaling the scores and constructing the working form.

2. Basic content

There are numerous works in the literature devoted to external auditing as a whole, but they deal with risk and professional decision issues in a general way, without paying detailed attention to financial debt auditing as a distinct segment.

Therefore, Tanasă and Nuță (2020) demonstrate that audit risk estimation can be deepened by using probabilistic models based on confidence functions, which allow the auditor to quantify professional judgment in a formalized and reproducible way. This approach provides an alternative analytical framework to that provided by traditional standards, with the potential to improve the quality of documentation and the relevance of audit conclusions.

Some studies (Kyriakou, 2024) approach audit quality from the perspective of external pressures, such as non-audit service provision or financial crises, demonstrating that it can be negatively affected under conditions of high systemic risk. The present research proposes an alternative, internal and formalized, internal approach to the influence of specific risks and applied procedures on audit quality.

Other research (Botez, 2015), confirms that the conceptual transformation of risks into measurable variables allows the auditor not only to identify them, but also to logically relate them to the procedures applied, thus enhancing the substantiation of the professional decision. In this way, the developed mathematical model becomes an essential tool in optimizing audit planning and enhancing audit quality.

In the view of some Romanian researchers, risk assessment in financial auditing requires a rigorous and objective approach, and the integration of statistical methods and technology-assisted tools is a viable solution for reducing subjectivity and increasing the reliability of auditor's decisions. The proposed model provides an applicable mathematical framework that supports the professional substantiation of the audit opinion, while preserving the essential role of human reasoning in the interpretation of results (Zaiceanu et al., 2015).

In the context of economic uncertainties and the growing need for credible financial information, research (Robu et al., 2012) demonstrates that statistical analysis applied to relevant economic and financial indicators can significantly contribute to the assessment of going concern and the

classification of entities according to the risk of bankruptcy. The proposed mathematical model, based on rigorous multivariate analysis methods, provides a practical tool for anticipating financial vulnerabilities in the corporate environment.

Șoimu (2024) proposes an advanced integrative-type model for the optimization and continuous supervision of the quality management system in financial auditing, built in accordance with the requirements of international quality control standards. Although the model is not limited to a singular thematic segment, its architecture allows for methodological adaptation to the specific risks of financial debt auditing, providing a logical and operational framework for identifying, quantifying and addressing quality deficiencies in the auditor's decision making.

A qualitative study conducted in France reveals that decision-making in the face of ethical dilemmas is not a solitary process, but based on strategic professional consultations between audit partners. The choice of consultees reflects the subjective perception of ethical risk, which highlights the importance of collective reasoning in managing moral uncertainty (Hazgui and Brivot, 2020).

Recent research on decision modeling in auditing has highlighted the need to develop applicable analytical frameworks and tools to support professional reasoning under uncertainty. Among the major directions being addressed are logistic regression models (Johnstone, 2000), used in estimating the likelihood of events such as client acceptance or issuance of a modified opinion.

In this context, the model proposed in the present research is positioned as an applied contribution, aimed at formalizing the relationships between identified risks, the procedures actually applied and audit quality. In contrast to advanced statistical or algorithmic models, the chosen approach combines the simplicity of a deterministic function with the practical applicability of a scaled worksheet, which directly reflects the professional judgment and traceability of the financial auditor's decisions.

Therefore, the previous phase of the research [?] aimed at optimizing auditors' decision making in the context of financial debt risks, highlighting the tensions between the technical requirements of auditing and the ethical dilemmas that auditors face in practice.

This research continues in this direction by developing an applied mathematical model to formalize the decision-making process in a coherent, quantifiable and reproducible framework. In order to build this model, a number of risks specific to the audit of financial liabilities have been identified, correlated with the usual procedures applied by the auditor in practice. These elements were translated into observable variables, which serve as pillars of the mathematical model.

Thus, risks have been coded as variables X, procedures as variables Z, and expected outcomes are represented by output variables Y. This structure ($X \rightarrow Z \rightarrow Y$) allows tracing the logical flow from cause (risk) to action (procedure) to effect (audit quality). Therefore, X (risks) \rightarrow causes the application of Z (procedures), and the procedures affect the final outcome - Y (quality, transparency). In the structure of the developed mathematical model, the variables used are classified according to the functional role they fulfill in the causal and decision influencing relationships. Thus, they have been coded as follows:

Table 1. Significance of variables

Symbol	Meaning	Variable type
X	Risks identified in the audit process	Independent variables (input)
Z	Audit procedures applied	Intermediate variables (decision mechanisms)
Y	Results of the audit process	Dependent variables (output)

Source: Author

The table below, presents the risks specific to the audit of financial liabilities, correlated with the usual procedures applied by the auditor in practice.

Table 2. Risk assessment and audit procedures

Cod	Risks identified	Code	Procedures applied	Code	Variable
X ₁	Lack of supporting documents	Z ₁	Review of contracts	Z ₇	Application of audit procedures
X ₂	Denaturarea dobânzilor	Z ₂	Verification of accounting policies	Z ₈	Audit reporting
X ₃	Confirmation of balances	Z ₃	Audit quality maintained	Y ₁	Maintained audit quality
X ₄	Understatement of liabilities	Z ₄	Verifying compliance	Y ₂	Transparency of financial statements
		Z ₅	Assessing risks and controls	Y ₃	Improving financial transparency
		Z ₆	Audit planning		

Source: Author

Classification allows a systemic approach to auditor decision making and facilitates mathematical modeling of causal relationships, while providing a basis for logical and comparable assessment of audit performance in varied contexts. Hence:

- ✓ X variables represent the external determinants or observable situations that generate the need for auditor intervention. They are treated as inputs to the decision-making system, as they trigger the application of specific procedures.
- ✓ Z variables correspond to professional response mechanisms (e.g. checks, confirmations, assessments) and are considered as process or intermediate variables, as they mediate the relationship between risk factors and the final outcome. They are controllable by the auditor and reflect conscious actions to reduce risks.
- ✓ Y-variables reflect the final effects of decisions and actions taken and are dependent on both the nature of the risks (X) and the intensity and appropriateness of the procedures applied (Z). They serve as indicators of audit quality and the level of financial transparency achieved as a result of the engagement.

The functional relationships between these variables reflect the influence of the risks on the auditor's decisions and, therefore, on audit quality. The table below summarizes the logical relationship between the risks identified, the procedures applied and the variables included in the model, forming the formal basis of the analytical structure used in the validation phase.

Table 3. Correlation between identified risks, audit procedures applied and variables in the mathematical model

Code and risk	Applied procedures	Chain of variables	Functional explanation
X ₁ – Lack of supporting documents	Z ₁ - Review of contracts Z ₅ - Risk assessment Z ₇ - Application of procedures	$X_1 \rightarrow (Z_1, Z_5) \rightarrow Z_7 \rightarrow Y_1 \rightarrow Y_2 \rightarrow Y_3$	Lack of supporting documentation leads to the need for contract review and risk assessment. They contribute to a rigorous application of audit procedures (Z ₇), which positively influences audit quality (Y ₁) and, by extension, financial transparency (Y ₂ , Y ₃).
X ₂ – Misrepresentation of interest rates	Z ₇ – Application of procedures	$X_2 \rightarrow Z_7 \rightarrow Y_1 \rightarrow Y_2 \rightarrow Y_3$	The risk of incorrect interest rates leads directly to the application of specific procedures (Z ₇). This has a direct impact on audit quality and indirectly on reporting transparency.
X ₃ – Misreporting of	Z ₂ - Verification of accounting policies	$X_3 \rightarrow Z_2, Z_4, Z_3 \rightarrow Z_8 \rightarrow Y_2 \rightarrow Y_3$	Reporting errors can arise from incorrect accounting policies (Z ₂) or

debts	Z ₄ - Compliance verification Z ₃ - Confirmation of balances Z ₈ - Audit reporting		unaudited balances (Z ₃), which requires compliance checks (Z ₄) and influences the content of the audit report (Z ₈). This directly affects the level of financial transparency (Y ₂) and the perception of financial transparency (Y ₃).
X ₄ – Undervaluation of debts	Z ₃ - Confirmation of Balances Z ₄ - Compliance Check Z ₈ - Audit Reporting	$X_4 \rightarrow Z_3, Z_4 \rightarrow Z_8 \rightarrow Y_2 \rightarrow Y_3$	The understatement of liabilities can be identified through external confirmations (Z ₃) and compliance checks (Z ₄), which determine the content of the final report. This has consequences for transparency and the confidence of users of financial information.

Source: Author

It should be noted that audit planning (Z₆), although essential to the mission, is not included in the correlation table because it is not a procedure directly applicable to an individual risk, but a general framework that underpins the selection and application of the other procedures.

Having established the conceptual relationships between the risks identified (X), the procedures applied (Z) and the results of the audit process (Y), it is necessary to formalize these interactions in the form of a coherent mathematical model. The proposed model is intended to quantify the influences between the variables and to allow a systemic analysis of how the risks and the auditor's professional reactions contribute to determining audit quality and the transparency of financial information.

Having established the functional relationships between the identified risks, the procedures applied and the results of the audit process, the next step is to formalize these links in a coherent analytical framework. The proposed model is based on a simplified functional type formula:

$$Y=f(X,Z) \quad (1)$$

where:

X represents the risks related to financial liabilities;

Z comprises the procedures applied by the auditor during the engagement;

Y reflects the final outcome of the audit, expressed in terms of the quality of the assessment and the level of financial transparency achieved.

This simplified formulation provides the necessary basis for expressing the functional relationships between the key audit variables and will be the starting point for applying the model in the subsequent stages of the research.

As part of the research, a scaled worksheet was developed for application in financial debt audit assignments as a tool to support the documentation of professional judgment. This worksheet reflects the logical structure of the proposed model and allows quantification of the relationships between the risks identified, the audit procedures applied and the results of the decision-making process. The worksheet is structured in three sections:

1. Risk assessment, comprising items corresponding to each identified risk, rated on a scale from 0 to 1 (e.g. 0 - no risk, 1 - maximum risk observed);
2. Procedures applied: allows to mark the procedures actually used and to scale the intensity of application (e.g. 0 - not applied, 1 - fully applied);
3. The estimation of the audit quality is performed through a synthetic assessment, where several components (procedures applied, documentation, traceability) are integrated into a single final score, expressed on a scale from 0 to 1.

In order to facilitate the practical application of the proposed model and to ensure consistency in the assessment of the auditor's decisions, a standardized worksheet has been developed, as presented in

Table 4.

Table 4. Financial Debt Audit Quality Assessment Form

Code	Risks identified	Situation observed in the audit mission	Score assigned (0-1)
Section 1: Risk assessment (X-variables)			
X ₁	Lack of supporting documentation		
X ₂	Misrepresentation of interest rate gains		
X ₃	Misreporting of debts		
X ₄	Understatement of debts		
Section 2: Assessment of the application of audit procedures (Z-variables)			
Z ₁	Review of contracts		
Z ₂	Review of accounting policies		
Z ₃	Confirmation of balances		
Z ₄	Compliance review		
Z ₅	Risk assessment and controls		
Z ₆	Audit planning		
Section 2: Estimating audit quality			
Z ₇	Application of audit procedures	The application of audit procedures (Z ₇) is assessed by the arithmetic average of four key factors: lack of supporting documentation (X ₁), interest rate misrepresentation (X ₂), contract review (Z ₁) and risk assessment and internal controls (Z ₅). These factors reflect key stages in the audit process, from identifying documentation and financial manipulation, to contract verification and control systems review. Thus, the Z ₇ indicator provides an integrative overview of how audit procedures are applied in practice in a professional and compliant manner.	
Z ₈	Audit reporting	Audit reporting is analyzed through the arithmetic average of two key elements: compliance with the regulatory framework (Z ₄) and the auditor's vigilance in detecting debt understatements (X ₄). Combining these dimensions provides an integrated picture of the effectiveness and quality of the audit report.	
Y ₁	Audit quality maintained	The dependent variable "Audit quality maintained" (Y ₁) is determined as the simple arithmetic mean of the three sub-indicators Z ₅ , Z ₆ and Z ₇ , each reflecting a specific dimension of the quality of the audit process	
Y ₂	Transparency of financial statements	Y ₂ reflects the degree to which the entity's financial statements are presented in a clear, verifiable and reliable manner. This indicator combines the simple arithmetic average of the quality of the audit performed with the transparency and compliance of the audit report, thus providing an overview of the entity's level of openness.	

Code	Risks identified	Situation observed in the audit mission	Score assigned (0-1)
Y ₃	Improving financial transparency	In the proposed model, the variable Y ₃ ,“Improved financial transparency” is equated with Y ₂ , being interpreted as the measurable outcome of the application of the audit and reporting indicators. This assumption reflects a logical identity relationship in which transparency is also perceived as the ultimate indicator of progress in the conduct of financial liability audits.	

Source: Author

This worksheet enables not only the coherent organization of audit evidence, but also the practical application of the mathematical model developed in the research. It can be used in real assignments as well as in simulations or training, contributing to standardization of reasoning and traceability of the audit decision.

The values assigned to each component are expressed on a scale from 0 to 1 and reflect the professional judgment applied in the audit engagement. Although the estimates are not completely objective, they are based on direct observations, supporting documentation and a standardized assessment framework, which allows the auditor's decisions based on these estimates to be reproduced and justified. This type of scaling allows for the transformation of audit findings into measurable variables that can be easily introduced into the functional relationships defined above. In this way, each risk-procedure-result chain can be evaluated and interpreted in a standardized way, according to the scores assigned in the worksheet. These functional relationships, exemplified in Table 3 and Table 4, summarize the logic of the proposed model and delimit the completion of the conceptual and methodological construction stage of the research.

3. Conclusion

The research started from the premise that auditors' decision-making in the context of financial debt risks requires a more rigorous and reproducible approach, both to reduce professional uncertainty and to support transparency in financial reporting. In this respect, the work has contributed to the development of a clear theoretical-methodological framework that integrates risks, audit procedures and expected results in a logical, mathematically formalized structure.

The main results of the research are: the definition and categorization of the relevant variables (X - risks, Z - procedures, Y - results), the construction of a functional model of type $Y = f(X, Z)$, which expresses the influences between the components, and the development of an application tool in the form of a scaled assessment form. The proposed model facilitates the understanding of the relationships between risks and the quality of professional decisions and provides a potential support for professionalizing reasoning in financial auditing.

The limitations of the research include the lack of a real database for testing the model under field conditions, the difficulty in objectifying some ethical or qualitative components of the auditor's decision, and the limited applicability to the audit of financial liabilities with no immediate extension to other components of financial statements.

Future research directions. In view of the complexity of the empirical validation of the proposed model and the need to integrate real data from professional practice, the stage of testing and statistical calibration of the functional relationships will be the subject of a future study. This line of research will aim at applying the evaluation form in concrete audit assignments, analyzing the results using quantitative methods, and drawing conclusions on the reliability, applicability and limitations of the model in different organizational contexts. This may strengthen the practical applicability of the model and help to inform professional decisions in an objective, traceable and ethical manner.

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BIBLIOMETRIC EVIDENCE ON WHAT SHAPES CSR: A KNOWLEDGE STRUCTURE ANALYSIS

DOI: <https://doi.org/10.53486/dri2025.50>

UDC: 005.35:001.891

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Abstract: *The concept of Corporate Social Responsibility (CSR), although introduced several decades ago, continues to evolve actively and is now more relevant than ever. Researchers are expanding their studies by exploring CSR from various perspectives and across different fields, identifying valuable correlations for both the academic and business communities. Observing the growing interest in this area, the aim of this research is to investigate the main trends of the past five years and the approaches through which CSR has been analyzed. To achieve this objective, a bibliometric analysis was conducted using the Scopus database, with results processed and interpreted through Biblioshiny. The findings reveal emerging themes such as digital transformation and ESG performance, both considered influential factors that may shape CSR practices. Moreover, an annual publication growth rate of 8.51% was identified, highlighting the rapid expansion and increasing importance of CSR in contemporary research.*

Key words: *Corporate Social Responsibility (CSR), bibliometric analysis, knowledge structure, research trends, scientific mapping.*

JEL: M14.

1. Introduction

Over the past few years, there has been a growing number of studies addressing the concept of corporate social responsibility (CSR). This increase is explained by the increasingly demanding expectations of stakeholders for companies to conduct their operations in line with the principles of sustainable development. Corporate social responsibility (CSR) is a concept that can be applied by companies across various industries, regardless of their size or location (Russo and Tencati, 2009). However, the extent to which CSR approaches are integrated into organizational culture may vary depending on several factors. Understanding and promoting corporate social responsibility are becoming increasingly relevant in today's society, pushing contemporary management to move beyond the traditional view of meeting only the minimum requirements and to adopt a strategic approach focused on social impact and sustainability (Rosak-Szyrocka et al., 2022).

The *purpose of this research* is to highlight the areas of interest that have been developed and analyzed by researchers over the past five years, specifically during the period 2020–2024. The *importance* of analyzing recent trends is emphasized by the need for companies to adapt in line with the current demands of stakeholders. The *research methodology* consisted of the exploration and qualitative structuring of scientific articles through bibliometric analysis. As a first step, relevant literature was identified using the Scopus database, one of the most highly regarded and valuable

sources for scientific studies. The search targeted all scientific articles published between 2020 and 2024 that included the terms "Corporate Social Responsibility" in their title, abstract, or keywords, with the aim of capturing the most recent and relevant contributions in the field. By applying the specified filters, a total of 12,272 publications related to CSR were identified. The data obtained was processed and analyzed using Biblioshiny, an extension of the Bibliometrix package in R software, designed for advanced exploration of bibliographic data. This analysis provides a detailed overview of the current state of recent research and its implications for the theoretical and practical development of the CSR concept, while also offering a solid foundation for the formulation of new research directions.

2. Basic content

The concept of Corporate Social Responsibility (CSR) emerged in the second half of the 20th century, gaining recognition as early as the 1950s when initial ideas began to take shape regarding the growing importance of companies' social responsibilities (Fixen, 2018). By the late 1970s, the business environment began shifting its focus toward the relationship between corporations and society, recognizing the broader implications of corporate actions on social well-being (Tripathi and Bains, 2013). During this period, Friedman (1970) emphasized that while profit maximization remains a company's primary goal, it must be pursued through fair competition, without deception or fraud, and in full compliance with the laws and societal norms of the communities in which businesses operate. Over time, as society grew more aware of the economic, social, and environmental impacts of corporate behavior, the understanding of social responsibility evolved far beyond simple profit generation or occasional philanthropy. In today's business landscape, CSR is widely regarded as a strategic imperative embedded within the core operations of organizations. Companies are increasingly expected to play an active role in generating long-term, sustainable value not only for shareholders but for all stakeholders, including customers, employees, communities, and the environment—meeting the growing demands for transparency, ethical governance, and social impact (Wahyuni et al., 2024). Considering the ongoing evolution of the CSR concept, it becomes essential to identify the latest advancements that have emerged over the past five years and to outline the key research directions that have captured the attention of the academic community during this period.



Figure 1. Main information
Source: Bibliometrix, Biblioshiny

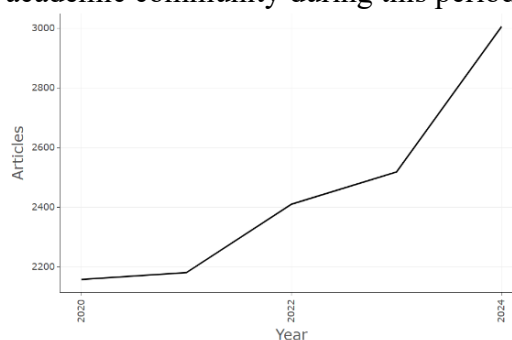


Figure 2. Annual Scientific Production
Source: Bibliometrix, Biblioshiny

Based on the dynamics illustrated in Figures 1 and 2, a steady and active growth in CSR-related publications can be observed, with an annual growth rate of 8.63% over the period 2020–2024. A total of 12,272 scientific articles were authored by 23,352 researchers, with an international collaboration rate of 32.79%. These contributions were published across 2,506 different sources, reflecting a wide range of journals and academic platforms interested in advancing CSR-related topics. In terms of content, the dataset includes over 22,221 author-provided keywords, highlighting both the thematic diversity and the complexity of the research carried out in this field.

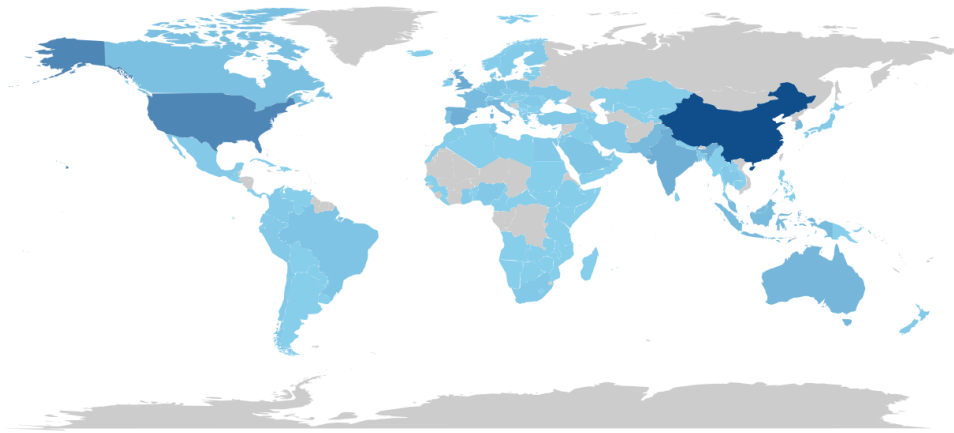


Figure 3. Countries' Scientific Production related to CSR research

Source: Bibliometrix, Biblioshiny

From the perspective of research productivity by country, China stands out with an impressive volume of studies, reaching a total of 5,520 publications on CSR to date. The significant number of studies can be explained by the pressing need to promote CSR practices in China, a country home to countless factories producing a wide range of products. In this context, an international perception has emerged that Chinese companies tend to focus on low-cost manufacturing while showing limited commitment to ESG and CSR practice (Su and Zhong, 2022). At the same time, researchers in the United States stand out for their advanced academic productivity, having published no fewer than 2,998 scientific articles in the past five years. This intense scientific activity reflects the growing interest in the development and deepening of the CSR concept, demonstrating that, although its practical application is often focused on governance and profitability, academic debates contribute to expanding the understanding and promotion of social responsibility within the American business environment (Capaldi and Nedzel, 2021).

Out of the 12,272 articles analyzed, ten studies stood out for having attracted the highest number of citations worldwide, reflecting their significant influence on the academic discourse surrounding CSR in the past five years. These works have made a notable impact by addressing diverse and highly relevant topics. Table 1 presents an overview of the studied phenomena, the objectives pursued, and the key findings of these influential contributions.

Table 1. Synthesis of the main scientific research in the field of CSR

Authors, year	Total citations	Studied phenomenon	Purpose	Results/effects
Gillan, Koch and Starks (2021)	1253	CSR and ESG practices in corporate finance	To review and synthesize empirical research on how ESG/CSR activities relate to corporate governance, risk, ownership, performance, and value	Findings are mixed but generally indicate growing interest and positive links between ESG/CSR and firm performance, although conflicting evidence highlights unresolved questions requiring further research.
He and Harris, (2020)	923	The impact of the COVID-19 pandemic on CSR, consumer ethics, and marketing philosophy	To explore how the pandemic reshaped CSR practices, influenced ethical consumer behavior, and redefined marketing strategies and concepts	COVID-19 accelerated authentic CSR engagement, raised consumer expectations for responsible behavior, shifted consumption patterns, and forced companies to adopt more agile, ethical, and digital-focused marketing strategies
Berg, Kölbel and Rigobon, (2022)	830	The inconsistency of ESG ratings	To analyze why ESG ratings diverge by decomposing the sources of disagreement into	Findings show that measurement differences account for 56% of divergence, scope for 38%, and

Authors, year	Total citations	Studied phenomenon	Purpose	Results/effects
		across major providers	scope, measurement, and weighting differences	weighting only 6%, highlighting the challenge of relying on ESG ratings for investment, regulation, and corporate evaluation
Pedersen, Fitzgibbons and Pomorski, (2021)	742	The financial trade-offs in responsible investing based on ESG preferences	To model and empirically test how ESG considerations impact portfolio choice, expected returns, and investor behavior through the concept of an ESG-efficient frontier	The study demonstrates that ESG-aware portfolios can achieve competitive Sharpe ratios but face trade-offs between risk, return, and ESG alignment, revealing that both costs and benefits depend on investor preferences and market pricing dynamics
Kraus, Rehman and Garcia, (2020)	737	The relationship between CSR and environmental performance in manufacturing firms	To investigate whether environmental strategy and green innovation mediate the link between CSR and environmental performance	CSR does not directly improve environmental performance but has a strong indirect impact through environmental strategy and green innovation, providing practical insights for managers aiming to enhance environmental outcomes
Ding, Levine, Lin and Xie, (2021)	669	Corporate resilience to the COVID-19 pandemic across global firms	To examine how pre-pandemic corporate characteristics influenced stock market performance during the COVID-19 crisis	Firms with strong finances, low supply chain exposure, higher CSR engagement, better governance, and certain ownership structures experienced milder stock price declines. The findings highlight the importance of liquidity, stakeholder relations, and governance in enhancing corporate resilience during global crises
Tang and Zhang, (2020)	586	The impact of corporate green bond issuance on shareholder value and market perception	To assess whether issuing green bonds benefits shareholders by analyzing stock price reactions, institutional ownership, and stock liquidity across firms in 28 countries from 2007 to 2017	Green bond announcements generate positive stock market reactions, increase institutional ownership, and improve stock liquidity, suggesting that green bond issuance enhances firm visibility and benefits shareholders despite minimal impact on debt costs
Christensen, Hail and Leuz, (2021)	523	Mandatory CSR and Sustainability Reporting	To evaluate the potential economic effects of requiring firms to disclose CSR and ESG information, based on theoretical and empirical literature in accounting, finance, and management	Mandatory CSR reporting can improve transparency, comparability, and accountability, but may also introduce costs and risks of boilerplate disclosures. Its impact varies depending on the reporting scope, enforcement mechanisms, and stakeholder engagement
Rehman, Kraus, Shah, Khanin and Mahto, (2021)	515	The role of GIC, GHRM and GI in improving environmental performance in manufacturing firms	To explore how GI mediates the relationship between GIC, GHRM, and environmental performance, and how environmental strategy moderates this effect	GIC and GHRM do not directly influence environmental performance but have an indirect impact through GI. Proactive environmental strategies strengthen the positive effect of GI on environmental outcomes

Chen, Dong and Lin, (2020)	480	The role of institutional shareholders in shaping CSR policies	To investigate whether increased institutional ownership and focused shareholder attention influence firms' CSR activities and improve social outcomes	The study finds that higher institutional ownership and concentrated attention significantly improve CSR performance, particularly in material and risk-reducing areas, demonstrating that institutional investors can generate real social impact through active monitoring and engagement
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Source: Prepared by the author

In the past five years, the study of CSR practices has generated unprecedented academic interest, not only in terms of the number of published works but also in the remarkable consistency of the results obtained, with research having a significant impact on shaping future research directions concerning CSR-related aspects. For example, Chen et al. (2019) identified the influence of institutional investors on the integration of ESG criteria into corporate behavior, prompting companies to implement actions aligned with sustainable development objectives. On the other hand, Kraus et al. (2020) determined that the impact of CSR on environmental performance is mediated by environmental strategies and green innovations, concluding that “our results show that CSR has no direct significant influence on environmental performance, but is positively correlated to environmental strategy and green innovation.” In this regard, Rehman et al. (2021) propose an integrative model in which green intellectual capital, green human resource management, and green innovation mediate the relationship between environmental strategy and environmental performance.

However, certain aspects of CSR remain uncertain, causing hesitation among companies in adopting CSR practices. Researchers Christensen et al. (2021) highlight the growing need for regulations and guidelines in the field of CSR to ensure that the information disclosed by companies is comparable and verifiable, noting that most current reports are vague due to their voluntary nature. Supporting this view, Berg et al. (2022) emphasize the issue of divergence among ESG ratings provided by different agencies, identifying methodological and evaluation differences that account for 94% of the discrepancies between ratings. Building on these challenges, it becomes essential to explore which CSR-related topics have gained the most academic attention in recent years, as illustrated in below.

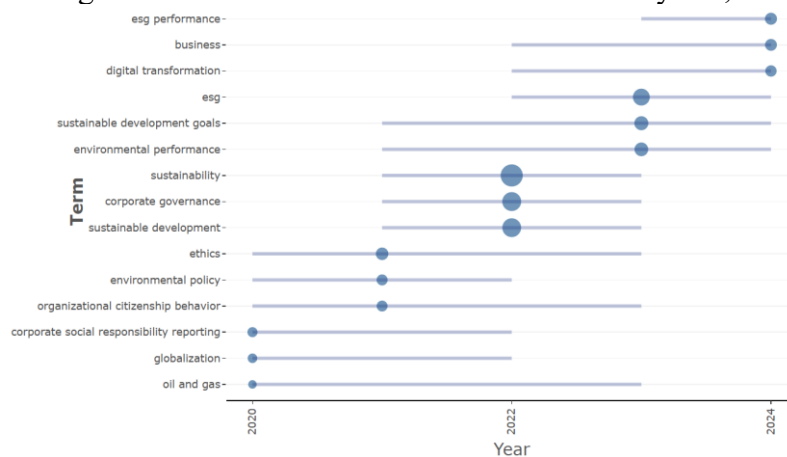


Figure 4. CSR-related trend topics

Source: Bibliometrix, Biblioshiny

Figure 4 presents the trends of research topics related to CSR, represented by the keywords most frequently used by authors in the field. It can be observed that in recent years, corporate social responsibility has been increasingly explored in relation to ESG performance, digital transformation, and business aspects. Researchers Zheng and Zhang (2023) identified in their investigation that improving the level of corporate social responsibility can enhance green technology innovation

capability through digital transformation. Similarly, Ionașcu et al. (2022) argue that “companies’ digitalization may have a beneficial impact by adopting ‘smart’ technologies that enable the efficient use of natural resources and the reduction of pollution, facilitating the transformation of business models into sustainable ones within a circular and digitized economy”.

In addition to digital transformation, ESG practices and their performance tend to gain increasing importance in the context of corporate social responsibility, with authors linking CSR reporting to ESG objectives (Gillan, Koch, and Starks, 2021). In the same vein, Li and Wu (2020) found that the voluntary adoption of corporate social responsibility actions encourages the reduction of negative ESG incidents, particularly among companies in the private sector.

At the beginning of 2020, discussions on CSR focused mainly on CSR reporting, globalization, and environmental policies. However, between 2021 and 2023, corporate social responsibility began to be explored from the perspective of sustainable development goals, environmental performance, and business ethics. It can be concluded that CSR has undergone a transition from a general concept to more complex analyses seeking intersections with topics such as sustainability, the global business environment, ESG performance, and others. The expansion of the research scope represents a positive trend, providing grounds to assume that future CSR research will adopt a much more integrated approach than it does today.

3. Conclusions

Under the conditions of globalization, organizations are called to go beyond mere economic interests and legal compliance by embracing broader political and social responsibilities, thus playing an active role in advancing global governance (Scherer & Palazzo, 2011). This article offers a thorough exploration of the recent progress and emerging directions in CSR research over the past five years. By conducting a bibliometric analysis of 12,272 academic publications, the study highlights the increasing significance of CSR in both scholarly and practical contexts, particularly at the intersection with ESG performance, digital innovation, and sustainable business practices.

The analysis indicates a notable shift in CSR discourse—from traditional frameworks centered on compliance and reporting toward more strategic and integrated approaches that create lasting value for organizations and their stakeholders. Recent studies underline the importance of environmental strategies, green innovation, and the active role of institutional investors in advancing corporate performance and strengthening stakeholder relationships. Nevertheless, issues such as the lack of clarity in voluntary disclosures and inconsistencies across ESG rating systems continue to pose challenges, emphasizing the need for improved regulatory standards and evaluation methods.

Future studies should aim to better understand how companies can move beyond simple reporting to actually measure the real outcomes of their CSR and ESG activities. It is also important to explore how regulations and reporting standards could improve the quality and reliability of CSR information. In addition, researchers are encouraged to investigate the role of digital technologies in helping businesses become more transparent and sustainable.

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THE ROLE OF THE INTERNAL CONTROL SYSTEM IN ENHANCING THE EFFICIENCY OF FINANCIAL RESOURCE MANAGEMENT IN A NON PROFIT ORGANIZATION

DOI: <https://doi.org/10.53486/dri2025.51>

UDC: 657.62:334.012.46

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Abstract: *One of the most important tools contributing to the successful attraction of financial resources is the internal control system. In commercial institutions, this tool is aimed at optimizing financial flows, minimizing risks and increasing transparency, which in turn helps attract investment and improve reputation. For non-profit organizations, internal control performs similar functions, but the emphasis is on compliance with legislation, effective use of funds, and accountability to donors and the public. In this article, we will analyze how internal control affects the processes of attracting financial resources in non-profit organizations, highlight its key aspects and offer recommendations for improving the control system in the context of the specifics of the activities of these organizations.*

Key words: *internal control system, internal audit, donors, assessment, efficiency, financial resource.*

JEL: M41.

1. Introduction

In today's world, attracting financial resources effectively is a crucial aspect for the growth of both commercial and non-profit organizations (hereafter referred to as NPOs). Commercial organizations aim to generate profits and maximize shareholder value, while NPOs focus on implementing social, cultural, or environmental projects aligned with their goals and objectives. NPOs are organizations that do not aim to generate profits, which are then distributed to the founders. In contrast to the commercial sector, NPOs' work is not centred on enriching its founders, and investors, as a rule, do not expect immediate and proportional returns, but rather believe that NPOs will effectively utilize the funds provided and report on their expenditure in a timely manner. Thus, NPOs need to demonstrate the effectiveness and efficiency of using funds raised more clearly than commercial organizations in order to meet the expectations of those who rely on their financial stability. One of the most significant tools for attracting financial resources successfully is the internal control system. In commercial organizations, this system aims to optimize financial flows, minimize risks, and increase transparency, which helps attract investment and enhance reputation. For nonprofit organizations, internal control serves similar purposes, but with a focus on compliance with regulations, efficient use of funds, and transparency and accountability to donors and the public. International Standards on Internal Auditing define internal control as actions taken by management, the board of directors, and other parties to manage risks and increase the chances of achieving goals and objectives. According to the International Standards on Auditing (ISA) 315, a system of internal control is a process developed, implemented, and maintained by those responsible for corporate governance and management to provide reasonable assurance regarding the achievement of organizational goals in the preparation of financial statements, the effectiveness and efficiency of operations, and compliance with laws and regulations.

Therefore, internal control aims to achieve the following objectives:

- efficient and effective operation of operational activities;
- preparation of accurate and reliable financial statements;
- compliance with applicable laws and regulations.

These objectives are essential for the success and sustainability of any organization, as they ensure that the company is operating in a safe and compliant manner and achieving its goals.

The existence of an internal control system helps protect the goals and interests of all stakeholders involved in the organization, including donors who provide resources and recipients who benefit from them. This is confirmed by the recent report of the European Court of Auditors on non-transparent funding of NPOs, particularly by USAID. This report led to the suspension of funding for NPOs in Moldova. According to the report, meeting transparency requirements means knowing not only who, why, and for what purpose funds were provided by the EU, but also how they were spent, the amounts involved, and whether the recipients respected EU values.

This article will analyze how internal controls affect the process of attracting financial resources for non-profit organizations. It will highlight key aspects of internal control and offer recommendations to improve the control system based on the specific needs of these organizations.

2. Basic content.

Despite the fact that the internal control system is one of the essential concepts in international practice, this term remains poorly understood in the Republic of Moldova. Thus, the Law on Accounting and Financial Reporting in Article 18, paragraph 2 (e) defines the responsibility of managers and administrators of accounting entities to organize an internal control system. At the end of 2018, the Official Monitor published the order of the Ministry of Finance on the approval of National Standards of Internal Audit in accordance with the provisions of art.29 of the Law on State Internal Financial Control, thus marking a new milestone of internal audit in the public sector of the Republic of Moldova. According to Birca and Babuci, "internal audit has become a vital tool that reflects not only evaluation mechanisms, but also values, principles and best practices that emphasize the importance of integrity, efficiency and accountability".

As for the non-profit sector, the Law on Non-Profit Organizations, establishing the powers of the supervisory authority in paragraph 1 of Article 20, notes that in order to control the management of a non-profit organization and the activities of the administrator, the supreme governing body may appoint one or more auditors or decide on an annual audit of the organization's activities by an external auditor. At the same time, the supervisory authorities are responsible for compiling an annual report on the financial activities of the organization and submitting it to the governing bodies, notifying them of cases they have identified that contradict the law or the NPO's charter and that have caused or may cause significant damage to it.

The wording "may appoint or make a decision" rather gives a certain choice, but does not oblige an NPO to introduce an internal control system by conducting annual audits and compiling reports to the governing body. Thus, the system of internal control in NPOs, despite its increasing international importance, is more proactive than mandatory.

The Sarbanes–Oxley Act of 2002 (hereinafter referred to as SOX), in particular section 404, is gaining popularity in international practice. This section requires that each financial statement of a commercial organization contain a vulnerability report on the Internal control System (ICW). At the same time, the management of the organization is responsible for creating and maintaining an adequate internal control structure and financial reporting procedures. Such a report should also contain an assessment of the effectiveness of the organization's internal control structure and procedures as of the end of the reporting period.

The main objectives of SOX are:

1. restoring public trust;
2. protecting the interests of investors by increasing the accuracy and reliability of disclosed information;
3. increased corporate responsibility through stricter financial reporting requirements;
4. prevention of corporate fraud;
5. strengthening internal control.

Despite the fact that NPOs are not covered by SOX, many of them in the Western world voluntarily accept the provisions of SOX, and the reasons for this, according to research published in Research handbooks on Accounting by Tinkelman D., Parsons L. are:

1. state nonprofit regulations designed to emulate aspects of SOX;
2. to prevent scandals;
3. because some provisions of SOX, including whistleblower regulations, apply to nonprofits regardless.

The extent of voluntary acceptance of SOX provisions by NPOs remains relatively unknown, but a survey-based study by Vermeer, Raghunandan, and Forgione (2006) sheds light on this issue. The authors found that 36% of NPOs have audit committees, although not all of them are independent. A study by Nezhina and Brudney (2012) also uses survey data to study the use of SOX in the non-profit sector and shows that approximately half of the respondents have implemented some SOX provisions. At the same time, about 25% of respondents noted an improvement in internal control as a result of the adoption of SOX.

Given the global need to attract SOX compliance specialists, according to LinkedIn, as well as the international nature of non-profit relations, it can be assumed that the state of the internal control system and disclosure of information in financial statements is of significant importance to international donors.

According to research, disclosure of information about internal control weaknesses negatively affects NPOs, and donors, as a rule, react negatively to such information. In particular, a study conducted by Petrovits, Shakespeare, and Shih (2011) found a link between the mention of internal control weaknesses in financial statements and a decrease in donations. The results of their research show that donors and government agencies, important sources of capital for NPOs, respond either directly or indirectly to information about internal controls. Another study by Berglund and Sterin (2021) revealed an indirect link between information about weaknesses in internal control and indicators of NPO resource surpluses and charity spending, suggesting that financially successful NPOs have a more reliable internal control system. The findings of their research are relevant to all stakeholders of NPOs, demonstrating that the control environment has a comprehensive impact on the ability of NPOs to effectively carry out their socially useful activities.

Thus, in the context of the lack of funding from international donors, which has been observed recently due to the termination of funding for NPOs by the USAID organization, the establishment of an effective internal control system and the reflection of relevant information in financial statements is becoming especially important in the Republic of Moldova.

When creating an internal control system, an organization's supervisory authority must analyze and identify the risks that lead to misstatement of financial statements.

A suitable basis for building an effective internal control system is the concept proposed and developed by the COSO Committee (The Committee of Sponsoring Organizations of the Treadway Commission) "Integrated Internal Control Framework" designed to help enterprises and other organizations assess and improve their internal controls in order to avoid collapse and heavy losses during financial crises. This concept has been widely recognized and disseminated throughout the world and is currently considered the best basis for the development, implementation and implementation of internal control.

The COSO structure consists of five interrelated components focused on the aforementioned internal control objectives: control environment, risk assessment, control procedures, information and communication, and monitoring.

In addition to the components, the concept is based on 17 principles, representing the fundamental concepts associated with each component. The table below shows the relationship between the components and principles and their application in NPOs, compliance with which will ensure a reliable and effective internal control system.

Table 1. Effective internal control system in NPOs according to the COSO structure

The internal control component	
Principles and their content	Application in NPOs
<p><i>The control environment</i> is the general attitude and culture of the organization in relation to internal control. It includes ethical values, leadership values, organizational structure, and responsibility allocation. An effective control environment helps to create the foundations for other components of internal control.</p>	
<p>Principle 1. The organization demonstrates commitment to the principle of decency and ethical values. It is expected that all structures of the organization will demonstrate commitment to the principle of decency and ethical values through their behavior and directives.</p>	<p>Since the NPO's mission and goals are directly related to the implementation of projects of public importance and dependent on external financing, the honesty and integrity of managers towards sponsors and donors are key success factors. Ethical standards and commitment to high standards of conduct should form the basis for all actions and decisions of the organization in order to ensure trust and support from stakeholders..</p>
<p>Principle 2. The Board of Directors demonstrates independence from management and oversees the development and implementation of internal control. The Management Board is responsible for ensuring that it includes a sufficient number of members who are independent of management and objective in their assessments and decision-making.</p>	<ul style="list-style-type: none"> • The Executive Committee of an NPO should consist of members who are not directly related to the operational activities of the organization. This will help ensure objectivity and independence in the decision-making process. • Defining clear responsibilities of the executive committee, including regular oversight of financial statements, compliance with internal control procedures, and the overall health of the organization. • Regular meetings of the executive committee discussing internal control issues, the current status of projects, financing and compliance with legislative requirements. • Creation of specialized committees, such as oversight committees, audit committees, etc., that monitor various aspects of internal control and report on their activities to the Executive Committee. • The administrative body of an NPO should regularly report to the Executive Committee on key financial performance indicators, budget execution, the state of the organization's net assets, as well as on achieved goals and risks.
<p>Principle 3. Management, under the supervision of the board of directors, determines the structure of the organization, the lines of subordination, as well as the corresponding powers, duties and responsibilities in the process of achieving goals. The Board of Directors approves the company-wide goals and is responsible for overseeing the development and maintenance of lines of command, as well as assigning appropriate powers and responsibilities to achieve the goals.</p>	<ul style="list-style-type: none"> • Development of the NPO's organizational structure and line of command. • Defining roles and responsibilities – approving job descriptions that would specify specific responsibilities, powers, and areas of responsibility. • Holding regular strategic meetings with the executive and administrative committees to discuss strategy, achieve goals and current objectives, clarify responsibilities, and identify the need for changes in structure or processes. • Implementation of systems to ensure transparency and tracking of responsibilities and tasks within the framework of ongoing projects and financial accounting.
<p>Principle 4. The organization demonstrates the desire to attract, develop and retain competent employees in accordance with the set goal. The organization attracts, develops and retains competent employees in accordance with the company's goals.</p>	<ul style="list-style-type: none"> • Develop and use clear recruitment criteria based on the values and mission of NPOs that are willing to contribute to the mission. • Creation and implementation of systematic training and professional development programs for employees to improve their skills and qualifications necessary for the implementation of projects in many areas. • Conducting regular assessments of employee competencies to identify weaknesses and identify which skills are needed to achieve the organization's strategic goals. • Creating a positive and supportive work environment that promotes increased engagement and job satisfaction.

<p>Principle 5. The organization establishes the responsibility of employees for fulfilling their responsibilities in the field of internal control in the process of achieving goals.</p> <p>Holds employees accountable for fulfilling their responsibilities in the field of internal control in the process of achieving goals. This responsibility includes transferring designated responsibilities, implementing performance evaluation systems, and implementing HR processes designed to hold people accountable for their actions.</p>	<ul style="list-style-type: none"> • Setting clear goals for each employee. Each task should have defined criteria for success and evaluation, which will allow you to track the results of the work. • Implementation of a regular reporting system, where employees must present the results of their work and achieved goals to management and colleagues, which promotes responsibility for fulfilling their duties. • Conducting regular assessments of the work of employees in the field of internal control to ensure timely identification of problems, shortcomings or violations, and the opportunity to correct them. • Documentation of processes related to the performance of duties, including records of inspections carried out, problems encountered, suggestions for improvement, etc. This will allow you to monitor the fulfillment of responsibilities at the level of internal control procedures. • Appointment of responsible employees for internal control responsible for various aspects of internal control, which creates clear lines of responsibility and allows for more effective management of control processes.
<p><i>Risk assessment.</i> This component includes the analysis and assessment of risks that may affect the achievement of the organization's goals. The assessment helps identify potential threats and vulnerabilities, as well as determine what measures should be taken to manage them.</p>	
<p>Principle 6. The organization defines clear goals in order to be able to identify and assess the risks that hinder their achievement.</p> <p>Setting goals and regularly identifying and documenting potential risks that may make it difficult to achieve goals.</p>	<ul style="list-style-type: none"> • NPOs should clearly define their strategic goals related to the organization's mission and objectives. Goals should be measurable, achievable, and time-bound to facilitate the risk assessment process. • Operational plans and action programmes must be developed to achieve strategic objectives. Clear planning will help identify key initiatives and actions that need to be taken to achieve the goals. • Conducting regular risk assessments related to achieving the set goals. This may include discussing possible threats and opportunities both within the organization and in the external environment, as well as analysing past experiences and failures. • Identify key performance indicators for goals and risks, which will allow NPOs to continuously monitor progress and assess how effective risk management is.
<p>Principle 7. The organization identifies risks that hinder the achievement of the full range of its objectives and performs risk analysis to determine approaches to their management.</p> <p>Assessment of the probability of occurrence and potential impact of identified risks.</p>	<ul style="list-style-type: none"> • Creation of a risk committee and/or a chief risk manager to coordinate certain activities for other risk management functions. • Establishing responsibility for specific risks and response measures. • Holding regular risk discussion sessions with project managers, volunteers, and donors to identify potential threats that may affect the achievement of goals. • The use of qualitative and quantitative methods for risk analysis. A qualitative analysis may include expert opinions and ratings, while a quantitative analysis may include an assessment of the likelihood of an event and its consequences for NPOs.. • Establishing a regular reporting mechanism to inform the Board of Directors and other stakeholders about the status of risks and effective risk management measure.
<p>Principle 8. When assessing risks that hinder the achievement of goals, the organization takes into account the possibility of fraud.</p> <p>Implements processes for detecting, suppressing and detecting fraud.</p>	<ul style="list-style-type: none"> • Identification of potential fraud risks. Conducting risk assessments for potential fraud threats. Having open sources of information and analyzing the previous experience of NPOs and other organizations can help identify vulnerabilities. • Implementation of an internal control system, which includes mechanisms for tracking financial flows, asset inventory, regular audits, and requesting reconciliation reports with counterparties. This will allow you to identify anomalies and inaccuracies that indicate possible fraud. • Create secure and anonymous channels for employees, volunteers, and external stakeholders to report suspected fraud without fear of consequences. • Organization of independent internal and external audits to assess fraud risks and verify compliance with established control procedures. It will also help to identify and correct weaknesses in the control system.

	<ul style="list-style-type: none"> Assessing the likelihood and impact of fraud. When assessing an organization's risks, it is important to consider possible fraud scenarios and their potential impact on the achievement of the NPO's objectives. This will help determine what measures need to be taken to prevent them. Regularly informing management and the board of directors about the state of fraud risk management, as well as the results of internal and external audits.
Principle 9. The Organization identifies and evaluates changes that may have a significant impact on the internal control system. Since changes can be caused by a wide range of internal and external sources, those responsible must be prepared for new problems that may have a significant impact on the internal control system.	<ul style="list-style-type: none"> Regular monitoring of changes in the internal and external environment of NPOs, such as changes in legislation, the economic situation, social trends and technological innovations. This allows you to identify potential impacts on the internal control system in advance. Conducting assessments of how changes (for example, changes in funding priorities or in the needs of the target audience) may affect the achievement of the organization's goals and, consequently, the required internal control measures. Updating and adapting internal control policies and procedures in response to identified changes. This may include a review of reporting procedures, financial flow management, and audit and control systems. Conducting regular audits and internal audits to evaluate the effectiveness of the updated internal control systems after the changes. This will allow you to identify weaknesses and take corrective measures. Involving stakeholders (volunteers, partners, donors) in the process of evaluating changes and developing strategies for managing internal controls, which can lead to a more comprehensive and effective control system.
<i>Control procedures</i> are policies and procedures designed to minimize risks and ensure that organizational goals are achieved. Control procedures may include automated systems, inspections, separation of responsibilities, and approval mechanisms.	
Principle 10. The Organization selects and develops control procedures that reduce to an acceptable level the risks that hinder the achievement of goals. Maintaining effective internal control and daily implementation of risk management procedures. Operational management identifies, evaluates, controls, and mitigates risks by directing its activities to meet the company's goals and objectives.	Creation of specific internal control procedures: <ul style="list-style-type: none"> control over budget approval and execution; cost control in accordance with the budget plan; procedures for the management of donor funds, targeted use of funds; procedures for reflecting economic events on accounting accounts (availability of accounting policies); procedures for accounting and inventory of assets; rules for handling confidential information; Development of standards and protocols to be followed by staff and volunteers within the framework of internal controls. Implementation of measures to restrict the physical access of unauthorized persons to the assets of the organization, to the document preparation system and accounting records. Providing training for staff and volunteers on the developed control procedures and their significance. This is important to ensure that new requirements are understood and followed. Establish a system for regular monitoring and evaluation of control procedures to ensure that they work effectively and meet changing conditions. Creation of transparent and accessible documents for managing internal controls, which can be easily updated in case of changes in conditions or new risks.
Principle 11. The organization selects and develops common procedures for technology control to achieve its goals. Develops and implements technology-related control measures. This includes developing and disseminating technology-related policies and procedures and ensuring adequate IT controls to help achieve the goals set.	<ul style="list-style-type: none"> Identify the technological needs of an NPO based on its goals and objectives, including data security, license accounting, software management, and access to information. Selection and implementation of technologies that meet the goals of the NPO. This may include project management systems, CRM systems for managing interactions with donors, accounting and reporting software. Establish procedures for controlling access to technological systems, including defining access rights for various employees and ensuring confidentiality and data protection.

	<ul style="list-style-type: none"> • Organization of training programs on the use of technology and compliance with security policies. The training should cover both new systems and general principles of safe technology use. • Creation and implementation of data backup and recovery procedures to ensure the continuity of the organization's work in the event of failures or loss of information.
Principle 12. The organization implements control procedures through policies that define the expected outcomes through which policies are implemented. Periodic review and testing of control procedures to confirm their effectiveness and identify opportunities for improvement.	<ul style="list-style-type: none"> • Create and document policies and procedures that set performance standards and expected results for key NPO processes such as financial accounting, project management, and donor engagement. • A description of the specific, measurable results to be achieved through each policy. This may include KPIs (key performance indicators) that will help assess success in policy implementation. • Establish control methods that allow you to monitor the implementation of policies and procedures at all levels of the organization. This may include regular reports, inspections, and audits. • Establish a process for periodic review and updating of policies to ensure that they remain relevant and consistent with changes in legislation, the internal environment, and NPO targets. • Identify those responsible for the implementation of each policy and control procedures. This helps to create clear lines of responsibility and ensures that everyone understands who is responsible for policy compliance.
<i>Information and communication</i> are processes that enable the effective transmission of important information both within and outside an organization. This includes reporting systems, communication channels, and feedback mechanisms that help ensure that the necessary information is understood and received in a timely manner.	
Principle 13. The organization receives or generates and uses meaningful and high-quality information to maintain the functioning of internal control. All employees should have access to the necessary information to perform their duties and understand the internal control system.	<ul style="list-style-type: none"> • Determine what information is needed for effective management and administration of NPOs. This may include financial reports, donor data, activities and results, as well as other information that is important for making managerial decisions. • Establish a policy for documenting and storing information so that data is available at the right time and in the right place. This may include the creation of centralized data warehouses and the organization of archives.
Principle 14. The organization carries out an internal exchange of information, including information on the objectives of internal control and responsibilities in the field of internal control, which is necessary for its functioning. Encouraging constructive information exchange between different levels of the organization to identify problems and respond promptly to them.	<ul style="list-style-type: none"> • Development of a clear structure and communication channels that ensure regular and effective information exchange between all levels and departments of NPOs. • Clearly articulating and documenting internal control objectives so that employees understand how internal control procedures relate to the overall goals and mission of the organization. • Establish a system of regular reports on the state of internal control, which provide information on the achievement of goals and any identified problems. These reports should be discussed at management meetings and distributed to all departments.
Principle 15. The Organization exchanges information with external parties on issues affecting the functioning of internal control. Having processes in place to provide meaningful information to external parties in a timely manner, including shareholders, partners, owners, regulators, customers, financial analysts, and other external parties.	<ul style="list-style-type: none"> • Feedback from donors. Regular interaction with donors to receive their opinions and suggestions on internal control and project management issues. This can be done through surveys, meetings, or project implementation reports. • Publication of financial and accounting data on the NPO's activities on its website and in reports for third parties. This helps to build trust and strengthen the reputation of NPOs.
<i>Monitoring.</i> This component includes regular assessment and monitoring of the effectiveness of internal control systems. It allows you to identify deficiencies and make necessary adjustments, as well as ensure that control processes continue to operate effectively and up-to-date.	

<p>Principle 16. The Organization selects, evaluates, and conducts continuous and/or periodic evaluations of internal control components to ensure that they are available and operational.</p> <p>Conducting regular audits and inspections to assess the compliance and effectiveness of the internal control system.</p>	<ul style="list-style-type: none"> • Conducting regular internal audits, the purpose of which is to verify compliance with internal control processes and identify areas for improvement. The results of the auditors can help to make adjustments to the procedures. • Evaluating the components of internal control in the context of changing conditions, such as changes in legislation, new information, or changes in the NPO's operating environment. Adaptation of processes in response to such changes. • Preparation of regular reports on the state of internal control and assessments, which will be provided to the Board of Directors or the management of the NPO for analysis and discussion.
<p>Principle 17. The Organization evaluates deficiencies in internal control and promptly informs the parties responsible for implementing corrective actions, including senior executive management and the board of directors.</p> <p>Setting processes for continuous improvement of the internal control system based on monitoring results and changes in the external environment or internal structure of the organization.</p>	<ul style="list-style-type: none"> • Conducting systematic assessments of the internal control system to identify deficiencies through regular internal audits, as well as monitoring key indicators. • The establishment of a reporting mechanism, which implies that all identified deficiencies should be documented and issued in the form of reports, which will be transmitted to responsible persons on time. • Elimination of identified deficiencies in internal control through a system for monitoring the implementation of internal audit recommendations and conclusions.

4. Conclusions.

The internal control system plays a critical role in ensuring the success and financial stability not only of commercial organizations, but also to an even greater extent of non-profit structures. This system applies not only to accounting and reporting, but also to the organization's communication processes, internal and external influences. Effective internal control mechanisms not only help to minimize risks and prevent fraud, but also increase the level of trust among donors, partners and other stakeholders. However, it is important to understand that the creation and maintenance of such a system requires significant financial investments. These investments should be aimed at improving the quality of information disclosed in financial statements on internal control. Otherwise, the lack of changes in control practices, despite increased costs, may lead to a deterioration in operational efficiency, data distortion, and a decrease in management's ability to make informed decisions. Thus, in order to achieve the desired results, it is necessary that every aspect of the internal control system be carefully thought out and implemented, which ultimately will ensure financial stability, sustainable growth and development of NPOs.

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IMPLEMENTATION OF RESPONSIBILITY CENTERS IN MANAGERIAL BUDGETING: IMPACT ON THE PERFORMANCE OF MANUFACTURING ENTERPRISES IN THE REPUBLIC OF MOLDOVA

DOI: <https://doi.org/10.53486/dri2025.52>

UDC: 336.1:001.891(478)

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Abstract: *The present study aims to map the thematic evolution and existing gaps in scientific research on budgeting, with a focus on sector-focused papers published internationally between 1975-2025. The research was carried out through a bibliometric analysis using the Web of Science Core Collection database, processed with the Biblioshiny tool. A total of 907 documents published in 604 scientific sources were analyzed, including a total of 33,846 bibliographic references. The selection of papers was based on the co-occurrence of the terms "budgeting" and "production", ensuring a clear focus on the connection between budgeting and productive activity.*

In order to outline a comparative perspective, a complementary analysis at national level was carried out using the National Bibliometric Tool (NBI) of the Republic of Moldova. This identified 241 papers, mostly in the economic field, with a strong focus on traditional topics such as budget spending and budget deficit. Emerging concepts such as participatory budgeting, sustainability and digitization are poorly represented.

The results highlight an increase in international interest in interdisciplinary and sustainable approaches to budgeting, especially after 2010. In contrast, national research remains normative oriented, with little thematic diversification. The results highlight a clear gap between international dynamics and national research, emphasizing the need for scientific alignment with new economic and social challenges.

Keywords: *budgeting, production, bibliometric analysis, sustainability, participatory budgeting, Republic of Moldova.*

JEL: H61, M41, Q56

1. Introduction

Budgeting, once considered a simple financial planning tool, has significantly expanded its role in recent decades, becoming a strategic link in the decision-making process and in the managerial architecture of entities. Economic, social and environmental transformations on a global scale have increased the complexity of budgetary tasks, which today go beyond accounting and include essential components such as performance, sustainability, participation in decision-making and digitization of processes.

In this new context, scientific research is becoming an essential pillar for reconfiguring budgeting paradigms and defining models adapted to contemporary economic realities (Nguyen et al., 2018). This article aims to provide a rigorous and original exploration of how the topic of budgeting has been addressed in the international scientific literature over five decades, between 1975 and 2025. The bibliometric analysis was carried out through the Web of Science platform, using the Biblioshiny

tool, and specifically targeted works that simultaneously contain the terms “budgeting” and “production”, in an effort to map the conceptual evolution of budgeting in the production sphere.

The results of the selection include 907 papers published in 604 scientific sources, supported by 33,846 references, reflecting the contribution of over 3,000 authors. With an average of 3.51 authors per paper and an increasing trend of co-authorship, the results indicate a growing interdisciplinary collaboration. This collaborative density, together with the increasing dynamics of publication, suggests a consolidation of budgeting as a scientific topic of strategic interest, with increasingly evident practical ramifications.

The study correlates the frequency of scientific terms with the dynamics of emerging themes, providing a detailed thematic mapping of the conceptual evolution of budgeting in relation to current performance and sustainability requirements. The thematic polarization revealed, between established concepts such as capital budgeting or efficiency and emerging directions such as participatory budgeting or life cycle assessment, reflects a reconfiguration of the theoretical field, adapted to contemporary challenges.

The originality of the approach lies in the rigorous combination of quantitative data with relevant qualitative interpretations, highlighting both the thematic consistency and the deep discontinuities in the field. The analysis also reveals a significant imbalance in the geographical distribution of research, marking a conspicuous absence of applied studies in the Eastern European area. This opens real prospects for the development of conceptual models and empirical investigations relevant to transition economies.

In addition, the dynamics of national publications, analyzed on the basis of data available in the National Bibliometric Instrument (NBI), indicate a peak in the years 2015-2020, correlated with the reporting of funding projects, followed by a visible decrease in the post-pandemic period. Although the Republic of Moldova clearly dominates the map of the region in terms of volume published (241 papers compared to 21 in Romania, 6 in Ukraine or 3 in Russia), emerging themes such as participatory budgeting, budget sustainability or mainstreaming digital tools remain almost absent.

This asymmetry between international and national trends justifies the need for a reconceptualization of budget research in Eastern Europe, in parallel with the adaptation of international frameworks to the institutional and economic realities in the region.

2. Research methodology

In order to investigate the evolution of the topic of budgeting in the specialized literature, an exploratory and descriptive bibliometric analysis was applied. The study was carried out in two complementary stages, covering both international and national scientific production.

In order to outline a systematized perspective on the evolution of research on production budgeting, a bibliometric analysis was carried out using the Web of Science platform, through the Biblioshiny tool. The selection criteria focused on the simultaneous presence of the terms “budgeting” and “production” in the subject field of papers published between 1975-2025, regardless of the disciplinary area. All graphical visualizations included in the bibliometric analysis were generated using the Biblioshiny platform, a component of the Bibliometrix package in R. This tool allowed exploratory analysis and interactive visualization of the extracted bibliometric data, facilitating the interpretation of thematic evolution, international collaborations, conceptual structure and emerging directions in the literature. This approach allowed the extraction of a corpus of 907 documents, published in 604 scholarly sources (academic journals, conference volumes, monographs), comprising a total of 33,846 bibliographical references.

The selection of keywords included terms such as budgeting, capital budgeting, performance budgeting, participatory budgeting, along with concepts associated with production - to capture the relationship between the budgeting process and the production function. After cleaning the dataset, only those publications that simultaneously fulfilled the conditions of topic and relevance were kept for analysis.

For the bibliometric analysis, the Bibliometrix software package Bibliometrix was used, through its interactive graphical interface Biblioshiny. The techniques applied included: keyword frequency and co-occurrence analysis, co-citation network analysis, thematic map, trend topics and temporal evolution analysis of publications. In addition, the geographical distribution of scientific contributions and international collaborations was assessed in order to highlight regional imbalances and centers of academic influence. This methodological approach made it possible to identify dominant research directions and emerging themes, providing a structured picture of how budgeting is conceptualized and applied in the scientific literature dedicated to output.

In addition to this stage, a comparative analysis at national level was carried out using the National Bibliometric Tool (NBI) of the Republic of Moldova. The query of the NBI database targeted papers containing the terms "budget", "budgeting", "budget expenditure", "budget deficit", "performance", 'sustainability' and "digitization" in the thematic fields. The resulting national set comprised 274 papers, with a majority concentration in the economic field, providing a relevant basis for analyzing differences in direction, thematic depth and level of conceptual integration between national and international research. This dual approach allowed not only to assess the overall dynamics of budgeting research, but also to identify regional gaps and underdeveloped themes in the Eastern European context, thus contributing to inform future directions for applied research.

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1975:2025
Sources (Journals, Books, etc)	604
Documents	907
Average years from publication	12.4
Average citations per documents	19.09
Average citations per year per doc	1.68
References	33846
DOCUMENT TYPES	
article	712
article; book chapter	6

Analyze search results 274 publications

Search criteria

keyword, title, abstract: *bugetare* | period: 1975-2025

2. Literature study

The issue of budgeting has been intensively debated in the literature, amid criticism of traditional methods as rigid and resource-consuming. In contrast, recent research points to a move towards modernizing these systems by integrating more flexible and performance-oriented procedures.

In this line, Popesko et al. (2017) analyze the relationship between the main dimensions of budgeting and organizational performance, synthesizing theoretical developments, examining current practices and assessing statistical correlates of the use of budgeting as a managerial tool and its impact on the adaptability of firms. Continuing the critical analysis, Rishen and Schalk (2024) highlight how the limitations of traditional budgeting lead to weakened budgeting processes, emphasizing the role of attitudes, subjective norms, and perceived control over managerial intentions, and proposing a more agile and performance-oriented approach.

In a convergent perspective, Ross (2020) argues that budgeting should be a genuine roadmap for achieving strategic goals, and not simply an exercise in estimating revenues and expenditures, with the choice of budget model depending on the organization's goals and management involvement in the decision-making process. In parallel, Sharma and Frost (2020) approach budgeting from a social capital perspective, demonstrating, based on qualitative interviews with 38 managers, the importance of collaboration and participation in shaping budgeting processes and highlighting the influence of social components on budgeting effectiveness in organizations across diverse industries.

Kenno (2018) proposes a systematic review of 249 articles in the field, revealing the conceptual fragmentation of budgeting research and suggesting the need for an integrative theoretical framework capable of harmonizing the varied perspectives and existing methodological approaches.

In terms of modern models, Manta (2020) analyzes the concept of Performance-Based Budgeting, highlighting the benefits, implementation difficulties and conditions necessary for effective implementation, and offers recommendations adapted to the Romanian context for strengthening sustainable economic development.

Also, Wagner et al. (2021) investigate, through PLS-SEM structural equation modeling, the effects of operational managers' participation, appraisal and reward on the relationship between budget use and its perceived usefulness, concluding that their active involvement has a positive impact on satisfaction with budget processes, although the results should be interpreted with reservations due to sample limitations.

At national level, budgeting research is characterized by a strong focus on integrating budgeting into international projects (Țugulschi, 2015), optimizing the performance of non-commercial organizations (Cauș, 2024) and supporting the implementation of organizational strategies (Mihaila et al., 2015). At the same time, there is a consolidated interest in the continuous improvement of budgeting processes through the Kaizen method (Mihaila et al., 2019) and in the development of budget management through the organization of responsibility centers (Mihaila and Bădicu, 2017).

3. Basic content

In order to scientifically substantiate the research approach, this section presents the methodology applied in the bibliometric analysis, as well as the main results obtained from the literature review of the topic. The analysis is based on data extracted from the Web of Science and IBN, covering the period 1975-2025, in order to identify the evolution, thematic trends, areas of interest and collaborative networks relevant to the topic under investigation.

In order to assess the dynamics of research in the analyzed area, an analysis of the annual scientific output was carried out.

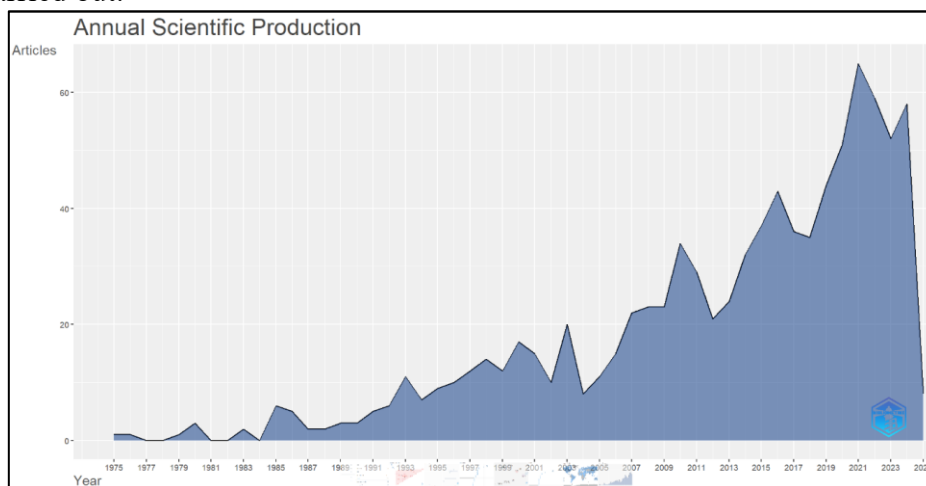


Figure 1. Annual evolution of scientific output in the analyzed field (1975-2025)

Source: developed by authors in Biblioshiny

The data reflect an accelerated increase in the number of articles since the 2000s (51), peaking between 2021-2022 (65 and 59, respectively). This development suggests a significant intensification of academic interest in the topic of budgeting and sustainability over the last two decades.

The analysis of the authors' structure is an essential starting point in understanding the dynamics of scientific production in the investigated field. In total, at international level, 3,180 authors have been identified, of which only 114 have published papers individually, the rest (3,066) being involved in collective works. The total number of author publications in papers is 3,584, reflecting a sustained publication activity. Collaboration between researchers is evidenced by an average number of 3.95 co-authors per paper, while the collaboration index has a value of 3.89, signaling a strong trend towards team research. The average of 3.51 authors per paper also underlines the fact that research in this field is predominantly collective, with individual papers representing only a marginal proportion (118 papers).

These data suggest an interconnected scientific community, open to interdisciplinary and international collaboration.

AUTHORS	
Authors	3180
Author Appearances	3584
Authors of single-authored documents	114
Authors of multi-authored documents	3066
AUTHORS COLLABORATION	
Single-authored documents	118
Documents per Author	0.285
Authors per Document	3.51
Co-Authors per Documents	3.95
Collaboration Index	3.89

For a better understanding of the geographical distribution of scholarly contributions, a global map of scholarly output has been generated, based on the number of papers published per country. The analysis of the geographical distribution of publications, therefore, constitutes an important element in characterizing the investigated field. It reflects the level of interest and involvement of different countries in the research on the topic.

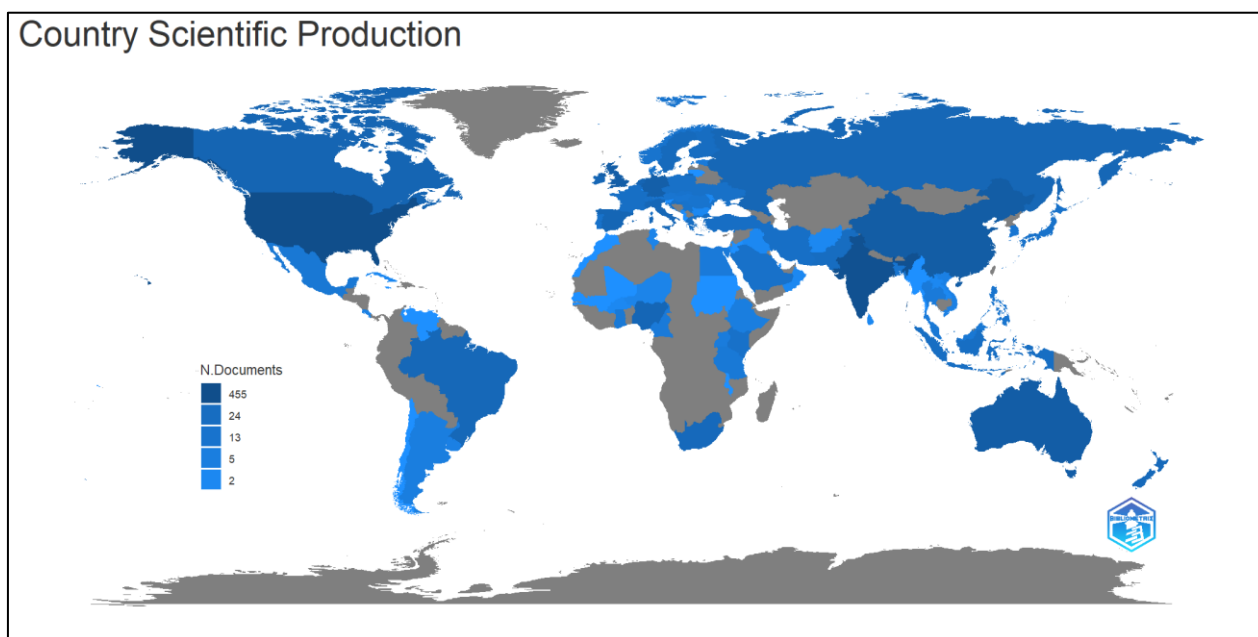


Figure 2. Scientific output by country
Source: authors in Biblioshiny

The data show that the United States dominates the ranking with a total of 455 publications, followed by India (324) and China (108). This concentration of output in countries with strong academic systems and significant resources indicates not only research capacity but also the prioritization of the topic at national level. Australia (104), the United Kingdom (96) and Germany (87) complete the top positions, signaling active participation from developed countries. At the same time, the presence of countries such as Nigeria (44) or Italy (41) suggests a progressive extension of interest to emerging economies, which may also reflect a regional application dimension of the research. This distribution confirms the global nature of research in the field, but also highlights a possible imbalance between world regions in terms of scientific contribution.

region	Freq
USA	455
INDIA	324
CHINA	108
AUSTRALIA	104
UK	96
GERMANY	87
CANADA	51
NETHERLANDS	49
IRELAND	45
SPAIN	45
NIGERIA	44
RUSSIA	43
ITALY	41

The general data on the volume, sources and age of the documents included in the bibliometric analysis are presented below. Thus, the bibliometric analysis was performed on a corpus of 907 documents, published between 1975 and 2025, selected from 604 scientific sources (journals, books, chapters, etc.). This selection yielded a total of 33,846 references, reflecting a significant coverage of the literature. The average of 12.4 years since publication indicates a balance between recent and established papers, and the average number of citations per paper (19.09) confirms a notable scientific interest in the topics covered. Reported on an annual basis, each paper has on average 1.68 citations per year, suggesting moderate scientific visibility and reasonable sustainability over time. In terms of document typology, scientific articles predominate (712 articles), while publications in the form of book chapters are marginal (only 6 documents in this combination). This confirms that publication on the analyzed topic is mostly in academic journals with impact factor.

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1975:2025
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Average citations per year per doc	1.68
References	33846
DOCUMENT TYPES	
article	712
article; book chapter	6

After outlining the general characteristics of the corpus and the distribution of authors, it is essential to explore the thematic content of the publications, reflected by the frequency and relevance of the keywords used by the authors.

In order to identify the major research directions, an analysis of the most frequent keywords used by the authors was carried out. The results indicate that the term “budgeting” is the most present term in the literature with 41 occurrences, followed by “capital budgeting” (38) and “economics” (37). Also, terms such as “partial budgeting” (32) and “profitability” (25) reflect the interest in specific approaches to budget analysis and its link to economic performance, Figure 1. The presence of terms such as “sustainability”, “energy use efficiency” or “life cycle assessment” highlights the integration of environmental and sustainability components in recent research. Thus, the literature is built around a multidimensional theme, combining economic-financial, energy and environmental aspects.

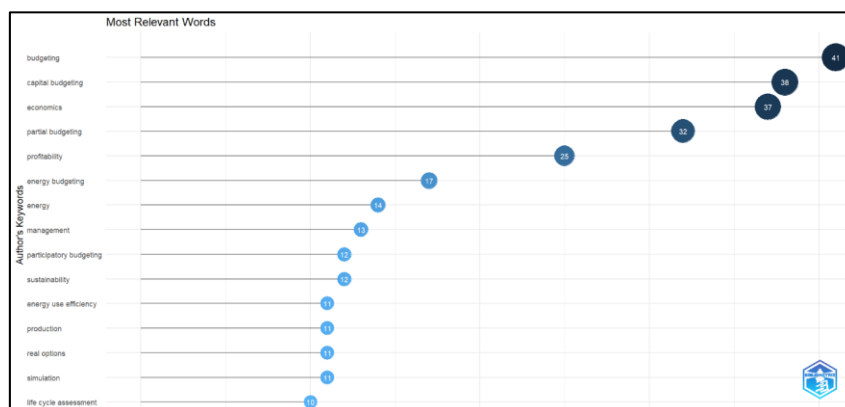


Figure 3. Frequency of the most relevant keywords in bibliographic articles

Source: developed by authors in Bibliometrix

In order to identify the conceptual structure of the analyzed field and the interrelations between the frequently addressed sub-themes, a thematic map was generated based on the keywords associated with the scientific documents. This map (Figure 4) classifies the themes into four quadrants, according to two essential dimensions: centrality (relevance of the theme in the research network) and density (degree of internal development and cohesion).

In the “Motor Themes” quadrant (top right) are located the key themes with a high level of centrality and density, considered essential for the field. Here we find terms such as profitability, efficiency, biomass, as well as the cluster of budgeting, management and production, indicating that these topics are both mature and deeply embedded in the literature.

The “Basic Themes” box (bottom right) includes fundamental concepts, widely used but with lower internal cohesion. Among these are capital budgeting, partial budgeting, energy budgeting and life cycle assessment, which outline the theoretical frame of reference for research in the field.

In the “Niche Themes” area (top left), well-developed but poorly connected themes such as renewable energy, economic analysis and simulation, reflecting specialized research directions, often addressed in particular contexts.

Finally, the “Emerging or Declining Themes” quadrant (bottom left) contains terms such as participatory budgeting or governance, which may represent emerging directions that are insufficiently explored or, on the contrary, themes that are declining in interest.

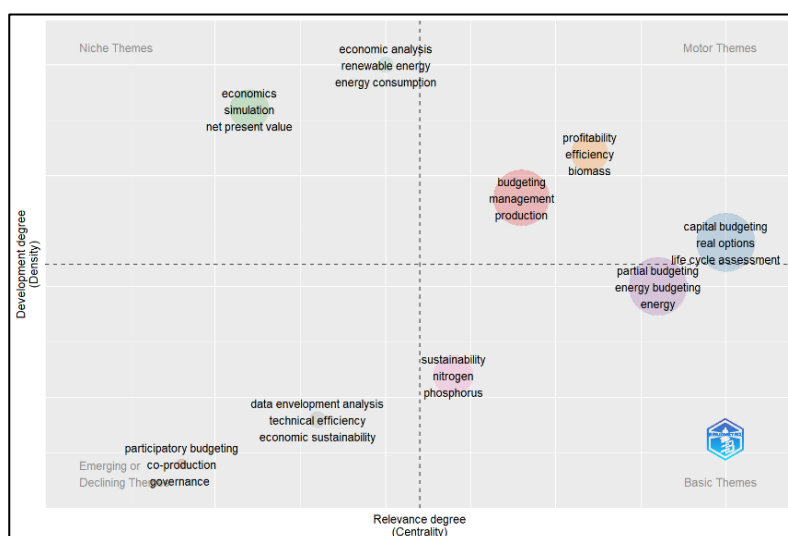


Figure 4. Thematic keyword map: degree of relevance and development of research topics

Source: developed by authors in Biblioshiny

This categorization provides an overview of how themes interrelate in the field, facilitating the identification of dominant areas, but also of gaps or opportunities for future research.

Summarizing, the bibliometric analysis highlights an ever-expanding field, marked by thematic diversity, international collaboration and a progressive orientation towards sustainability and efficiency. Although the field of budgeting and production is well-developed at the international level, the results also reveal the existence of emerging directions such as participatory budgeting, co-production and governance, which, although poorly developed in the current literature, offer valuable perspectives for future research, especially in the context of integrating participatory principles and governance into budgeting processes.

In order to track the dynamics of research themes over time, the frequency and duration of use of the most important key terms in the literature was analyzed. The analysis of trending topics provides a temporal perspective on how certain topics have evolved in the literature, reflecting their level of interest and topicality within the scientific community. This graph correlates the key terms used by the authors with the period in which they were frequently used, as well as the intensity of their use, expressed by frequency (size of dots).

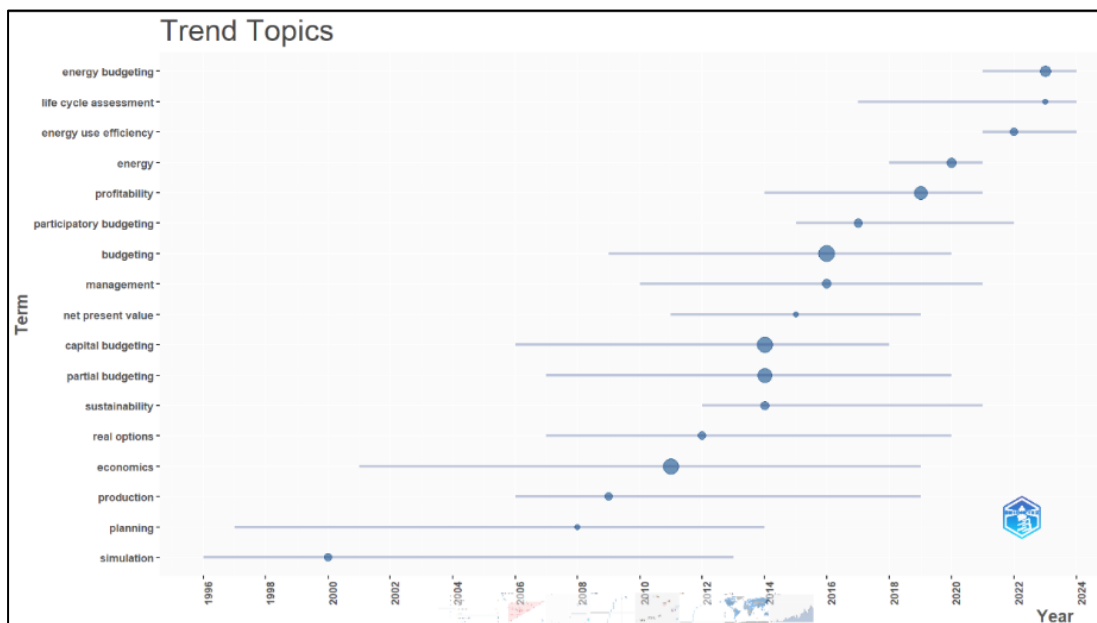


Figure 5. Evolution over time of the main research topics

Source: developed by authors in Bibliometrix

Trending topics analysis provides a temporal perspective on how certain topics have evolved in the literature, reflecting their level of interest and topicality within the scientific community. This graph correlates the key terms used by authors with the period in which they have been frequently used and the intensity of their use, expressed by frequency (size of dots).

The results highlight a number of topics with a long-established tradition in research, such as budgeting, capital budgeting and partial budgeting, which remain constant over several years and have high frequencies. These can be considered as central pillars of the field, underpinning the conceptual development of the papers analyzed. On the other hand, the recent emergence and rise of topics such as energy budgeting, life cycle assessment and energy use efficiency, which mark a progressive orientation of research towards sustainability, energy efficiency and life cycle impact assessment dimensions, can be observed. These terms, concentrated in recent years, signal emerging directions with potential for future consolidation.

At the same time, there are a number of concepts which have had a punctual presence in the literature, such as simulation or planning, but which have not expanded over time, which could indicate either

their niche character or a gradual decline in interest. This longitudinal perspective allows not only the identification of dominant themes, but also a clear delineation of the development phases of the different research areas, supporting the orientation of future scientific investigations according to the detected trends.

If the analysis of the trending topics revealed the temporal dynamics of the topics of interest, the next step aims at exploring the conceptual relationships between them, by identifying semantic clusters generated by the co-occurrence of terms in the literature.

In this context, an analysis of the conceptual structure has been carried out using the Multiple Correspondence Analysis (MCA) method. This map positions keywords in the factor space according to the frequency with which they co-occur in the articles, thus facilitating the identification of cohesive thematic clusters.



Figure 5. Map of the conceptual structure of the analyzed literature (MCA method)

Source: developed by the authors in Biblioshiny

The results indicate that there is a strong core of terms such as budgeting, management, production, production, profit and climate change, which define the dominant research directions. A clear cluster of applications in sustainable agriculture (conservation agriculture, water productivity, irrigation) emerges to the right, while a group of terms associated with energy efficiency and environmental impact (carbon budgeting, biomass, phosphorus) is visible at the bottom. The isolated group of terms control, costs, planning signals the existence of traditional themes, possibly separated from modern research axes.

Thus, the map confirms the complexity of the field and suggests the existence of inter- and trans-disciplinary connections around the concepts of efficiency, sustainability and performance.

In addition to the international analysis, an exploration of the themes addressed in the national scientific literature was carried out, using Romanian keywords. The results indicate a predominance of the term budget (15 occurrences), followed by Budget (14) and related concepts such as budget expenditures, budget deficit and budget revenues (each with 13 occurrences). This high frequency suggests a constant concern for analyzing budget balances and public resources. Terms such as taxes, public finance and state budget complete the semantic palette, thus configuring a research agenda focused on fiscal policies and public funds management.

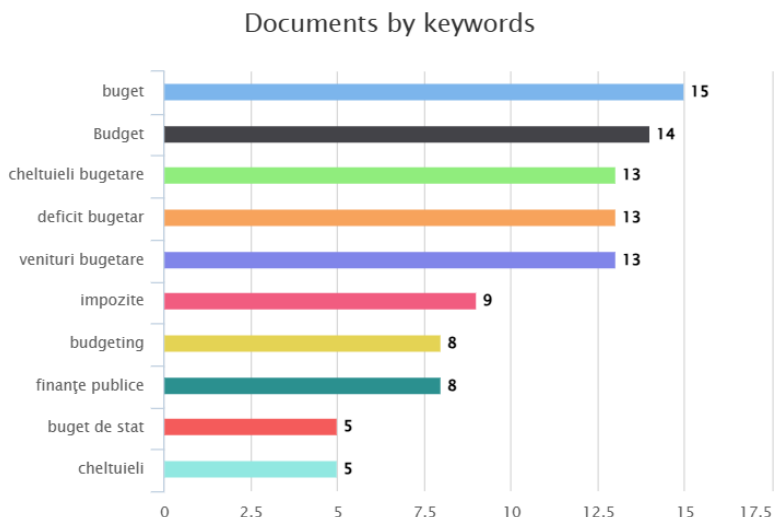


Figure 6. Distribution of documents according to the keywords used in the national literature
Source: authors based on IBN

Although terms referring to budgeting are frequently used in the national literature, detailed keyword analysis does not reveal an explicit orientation towards budgeting in the manufacturing sector. Specific terms such as cost-center budgeting, budget planning in manufacturing or budget variance analysis in factories are absent, suggesting an important and untapped thematic gap in local research. To complete the overview of budgeting research, the geographical distribution of authors by country of institutional affiliation was also analyzed.

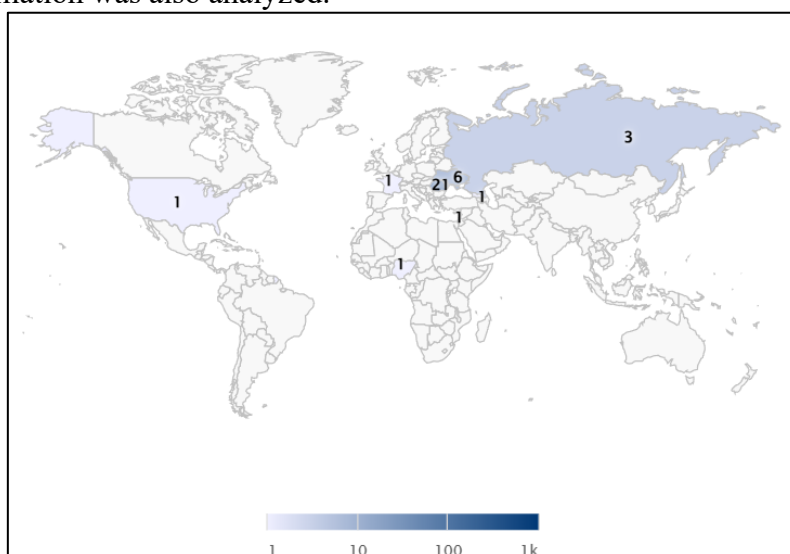


Figure 7. Geographical distribution of authors by country of affiliation
Source: authors based on IBN

The map shows the distribution of documents by country of affiliation of the authors. Romania stands out with the highest contribution (21 documents), followed by Ukraine (6) and the Russian Federation (3). The presence of sporadic contributions from other countries (USA, Nigeria, Morocco, Morocco, France, etc., 1 each) suggests a punctual global interest, but also a regional geographical concentration of research. These data can be interpreted as an opportunity to expand international collaborations and to increase the scientific visibility of the topic.

Conclusion

The bibliometric analysis carried out shows that the topic of budgeting is a field in continuous expansion, with a strong dynamic in the last two decades. At international level, research has focused mainly on aspects such as capital budgeting, partial budgeting, profitability and sustainability, configuring a multidimensional thematic network that combines economic-financial considerations with concerns related to energy efficiency and environmental impact.

The literature reflects a sustained scientific activity characterized by a high degree of international collaboration and a significant thematic diversification, supported by the emergence of emerging directions such as participatory budgeting or carbon budgeting. At the same time, the conceptual maps have revealed complex semantic structures in which budgeting is articulated with themes such as management, production, risk analysis and climate change.

On the other hand, the national analysis reveals a high frequency of general concepts related to budgeting and public finance, but also a significant lack of approaches applied to the manufacturing sector. Essential terms for managerial budgeting in industry, such as cost-center budgeting or budget variance analysis, are absent from the domestic corpus, indicating an important thematic gap and a valuable opportunity for future research.

In conclusion, budgeting remains a relevant and versatile field, but one that requires a closer reconnection with concrete practices in the economy, especially in the context of manufacturing enterprises, where the integration of budgeting tools can substantially contribute to optimize performance and sustainability.

Limitations of the research

This bibliometric analysis is based exclusively on documents indexed in international and national databases, which may generate a limitation in fully capturing the "gray" literature (conference papers, industrial case studies, theses, policy reports, etc.). Also, the use of keywords may be influenced by linguistic variations (e.g. "budget" vs. "budget"), which requires some caution in interpreting the completeness of the results. Another limitation is the relatively narrow geographical concentration of authors, especially in the national literature, which may reduce the universality of the findings.

Future research directions

On the basis of the results obtained, several relevant directions for future investigations emerge:

Extending the research to the production sector, by developing applied models of responsibility-center budgeting in correlation with the economic performance of manufacturing enterprises;

International comparative approach, by linking budgeting practices in different economic systems to highlight good practices transferable to the regional context;

Exploring emerging themes underdeveloped in the national literature, such as participatory budgeting, carbon budgeting or economic governance, which offer significant openings in the context of sustainability and resource efficiency;

The integration of artificial intelligence and digital tools in budget planning and decision analysis processes, a growing direction in the international literature but insufficiently explored in the national space;

Combined quantitative-qualitative analyses, linking bibliometric data with empirical research (case studies, interviews, enterprise surveys), to validate the applicability and real impact of budget tools on organizational performance.

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ASSESSING CONCEPTUAL DYNAMICS AND COLLABORATIVE NETWORKS IN FORENSIC ACCOUNTING THROUGH A BIBLIOMETRIC APPROACH

DOI: <https://doi.org/10.53486/dri2025.53>

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Abstract: *This paper investigates how forensic accounting-particularly judicial and fiscal expertise-has evolved conceptually and collaboratively over the last quarter-century. A customised search of the Web of Science Core Collection retrieved 1 255 records (articles, book chapters and early-access papers, 2009-2025) filtered to the Business, Economics, Management and Finance categories. After preprocessing, the database was analysed with SciMAT to map thematic structure and longitudinal shifts. The science-mapping workflow (standardisation, theme detection, longitudinal overlay and network analysis) revealed two distinct developmental phases. Between 2009-2016 the agenda pivoted toward behavioural determinants of fraud and Digital Forensics, signalling the first response to data-intensive crime. In the most recent window (2017-2025) the high-centrality/high-density Forensics hub absorbs emerging clusters such as Earnings Management, Cybersecurity, Blockchain and stakeholder Perceptions, evidencing a turn towards technology-enabled detection and ethical transparency. Overall, the results demonstrate a maturing, multidisciplinary domain in which digital tools, regulatory harmonisation and ethical accountability are co-evolving drivers. These insights offer scholars a clarified thematic roadmap and provide regulators and practitioners with evidence on where scientific effort-and gaps-are concentrated.*

Key words: *Forensic Accounting, SciMAT, Bibliometric, Digital Forensics, Earnings Management*

JEL: M41, M42

1. Introduction

Currently, we are witnessing rapid changes in the economic environment at both macro and micro levels. These bring a real and significant contribution to the transformation of today's business environment (Li, 2022), which is why a bibliometric analysis of the conceptual and legal approaches in legal practice in relation to accounting and tax expertise is warranted, given the important role it plays in dispute resolution, in the relations between parties and, in general, in ensuring financial compliance (Kantorowicz-Raznichenko et al., 2025). We also consider it particularly relevant to conduct a bibliometric analysis, as it provides us with a systematic and quantitative insight into how a field or concept develops over time, providing information about the intensity of research on that topic, as well as about the collaborative networks and clusters formed between authors, keywords, geographical distribution of papers, etc.

Therefore, the aim of our research is to explore, with the help of a bibliometric analysis of the literature, the structure, dynamics, evolution, and research directions in the field of forensic accounting and tax expertise in forensic accounting, with a focus on the conceptual and legal aspects that significantly influence this field. In order to fulfil the proposed aim, we formulated two main objectives, namely: *Objective 1 - To conduct a literature review on the fundamental concepts in the field of forensic accounting and forensic and tax accounting respectively.* The objective was concretised through a review of the most relevant scientific works, in order to establish both the theoretical foundations and the concepts that define this field; *Objective no. 2 - To identify the main*

thematic clusters and their related sub-themes, as well as their evolution over time; This objective was concretised through a bibliometric analysis, both from the demographic point of view of the works published in the field, and from the thematic point of view of the main clusters that were identified with the help of the sciMAT mapping software (Shen et al, 2023); thus, by fulfilling the first objective we aimed to provide a deeper understanding of the structure of the analysed field, while the 2nd objective provided us with an overview of how key concepts and effectively the field of forensic accounting, respectively forensic and tax accounting has evolved over time in the literature.

2. Literature Review

Nowadays, more and more economic entities are active in global markets as a result of the globalisation phenomenon as well as economic and technological progress (Matyushok et al., 2021). Thus, we observe a major change in the economic reality, where entire sectors are constantly expanding, changing and developing, contributing to increasingly unpredictable phenomena and increasingly fierce competition. Under these circumstances, there is a clear need for control and audit tools, as well as methods to distinguish illicit activities and clarify who and how is responsible for them.

Involvement in illicit activities and acts of corruption, where self-interest is put before public (societal) interest, is not a new problem (Hanousek et al., 2023). However, the problem arises with the technological advancement in recent years, where those involved in such offences have started to develop and utilise increasingly sophisticated methods to commit illegalities. Therefore, the audit function alone is no longer sufficient and other supporting tools are needed to fight these activities such as fraud and corruption. This has also been one of the main motivations for the emergence of the field of forensic accounting, i.e. forensic accountancy.

The concept of forensic accounting first emerged in the 1980s in America and Western European countries. However, the very concept of forensic accounting itself is much older and dates back as far as 3000 B.C. (Arslan, 2020). In scholarly works, it first appeared when it was mentioned as a central idea in Nejat Bozkurt's paper "*A new field in the accounting and audit profession: forensic accounting*". At the same time, over time, global events have made the field highly relevant (Corporate Financial Institute [CFI] 2019).

As far as the current state of play is concerned, forensic accounting is an extremely complex concept in the specialised literature and one can even say that it is constantly evolving. In order to be able to establish a starting line and to define this concept as clearly as possible, we have produced Table 1, where we have made a brief review of the literature on the specific characteristics of forensic accounting, focusing on forensic and tax accounting expertise.

Table 1. Definitions and specific characteristics of forensic accountancy

Nr.	Title	The role of accountancy	Contributions	Differences from other approaches
1	<i>Economic and Legal Nature of Forensic Accounting Expertise in the Market Economy (Stelmah, 2014)</i>	Forensic accountancy is an important tool for gathering evidence in many criminal and civil cases. A qualified forensic accountancy facilitates the establishment of the objective truth and the adoption of a correct judgement.	It contributes to establishing the truth objectively and to making the right decisions in court.	This approach focuses on the legal and economic aspects, emphasising the limits of current perceptions.
2	<i>Information provision of forensic accounting (Stelmakh, 2021)</i>	Forensic accountancy is essential for the identification and prevention of economic crime, for providing objective truth and fair court judgements, and for ensuring the quality of the information provided to experts.	This paper emphasises the importance of accountancy in the process of auditing economic activities.	This approach focuses on prevention and detection, while other definitions place greater emphasis on analysing evidence.
3	<i>Forensic accounting: A new dynamic approach to investigate fraud cases (Yadav, 2013)</i>	Forensic accounting plays a fundamental role in detecting fraud and evaluating internal controls in both civil and criminal litigation.	It defines expertise as a branch of accounting that investigates financial fraud.	Focussed on financial fraud, as opposed to other broader approaches.
4	<i>Accounting Expertise as a Tool for Verification</i>	Forensic accounting is used to verify accounting data and identify economic	Orientate accountancy as a control and audit	This approach focuses on the verification of

	<i>of Accounting Data in Legal Proceedings (Stelmah, 2022)</i>	offences.	tool.	accounting data, as distinct from other more complex approaches.
5	<i>A Comparison Between Forensic Accounting and Judicial Accounting (Xias-bo, 2005)</i>	Forensic accounting, is a combination of law and accounting, in which forensic accountants use accounting skills to investigate and analyse legal issues in civil and criminal trials to provide evidence directed to a court for an expert opinion.	Research geared towards integrating several fields into judicial practice.	This approach is a dual one, emphasising greater legal and accounting integration.
6	<i>Definition and Attribute of Forensic Accounting (Yong, 2003)</i>	Forensic accounting is the litigation activity that involves expert accountancy to assess legal issues.	The extended definition includes litigation and accounting duties.	Emphasis on litigation, as opposed to other definitions that include only the investigation component.

Source: author's own processing

In the table above, we observe a high diversity in the approach to forensic accountancy, ranging from a focus on its economic and legal components, to its preventive and educational role. In other words, these diverse approaches reveal the complexity of the role of forensic accounting in the judicial process as well as its applicability in the educational field.

Another important aspect often found in the literature is the multidisciplinary aspect of forensic accounting, with an emphasis on the need for regulation and standardisation of practice. For example, the study by Abrahams et al, (2024), shows that fragmented regulation of the profession has a negative effect on its effectiveness. Even though accountants are affiliated with professional organisations, there is no generally valid centralisation of regulations, especially in the performance of accountancy valuations. We note in the literature that in the case of Jordan, where the share of tax collection in the state budget is very high (Qwader et al., 2020), we find forensic accounting or forensic accounting as a central pillar in combating tax evasion. Therefore, forensic accounting, when approached correctly, can have a major influence on the revenue collected by the state, and at the same time, can be a vital tool that can make a real contribution to reducing tax evasion, thus providing a comprehensive picture of the real income of taxpayers. Furthermore, on the basis of table 1, we find that forensic accounting can be broadly defined as a whole interdisciplinary field that requires both accounting and legal knowledge and is applied in analysing and resolving financial disputes. This field is also theoretically anchored in the need for integrity of financial data, providing a mechanism for detecting and correcting inadvertencies that may cause economic damage. For this reason, the relevance of forensic accounting is growing amid new economic and technological challenges, justifying the emphasis on investigation and prevention, as well as the importance of developing an educational foundation for future practitioners.

Reflecting also on the role of the expert accountant in fraud detection, these issues are covered in detail in numerous studies such as Kaur et al, (2023). We observe numerous creative accounting techniques that are used to mask financial data, evidently, detecting these requires a distinct set of analytical skills on the part of the experts. Another equally important aspect that we find in the literature is the training and professional education of the experts. Some authors (Goncalves et al., 2022) consider that certificates of completion of specific courses such as "*Certified in Financial Forensics*" (CFF) or "*Certified Fraud Examiner*" (CFE) can guarantee an accepted level of knowledge and investigative skills to be able to deal with various fraud-related cases. Other authors, (Zhang et al., 2020) consider that experts, in order to remain relevant and competitive, also need to have extensive skills in the use of new technologies and in analysing data, which are essential in the digital age. With these aspects in mind, our theoretical framework focuses on the concepts of fraud and tax evasion, exploring the links formed between the fields of accounting, legislation and professional ethics. We also note that forensic accounting expertise in the literature is grounded in theories of the integrity of financial information and the application of analytical methods and tools in the forensic process (Daraojimba et al., 2023). Thus, by applying these various tools, forensic accountancy and forensic accounting seeks to detect inconsistencies and ensure compliance with the economic and tax laws of a particular jurisdiction. In this context, a forensic accountant becomes the

bridge between several fields, analysing transactions and reporting through methods such as regulatory checking, arithmetic, document comparison, cross analysis, etc, all of which are directed towards establishing the veracity of information.

Therefore, we consider the role of the forensic accountant to be a central one, both in fraud identification and fraud prevention, which is widely discussed in the literature (Odeyemi et al., 2024). The literature also points to the need for regulation and standardisation of practice, which would translate into a more consistent application of forensic expertise in this area. In addition, we observe that the evolution of this concept is leading to a need for the integration of a wide range of multidisciplinary knowledge, a trend amplified by technological advances and the digitisation process (Oladejo et al., 2020). Thus, we consider that we have met our first objective by analysing the literature on the evolution of the concept of forensic accounting, namely forensic accounting expertise, and by providing a theoretical framework that offers a deeper understanding of the relevance of forensic accounting expertise in the fight against economic crime.

2. Research Methodology

We have chosen to structure the methodology of this paper in the following elementary steps, through which we will be able to explain and at the same time highlight the main trends and connections in the field of forensic accounting, as can be seen in Figure 1.

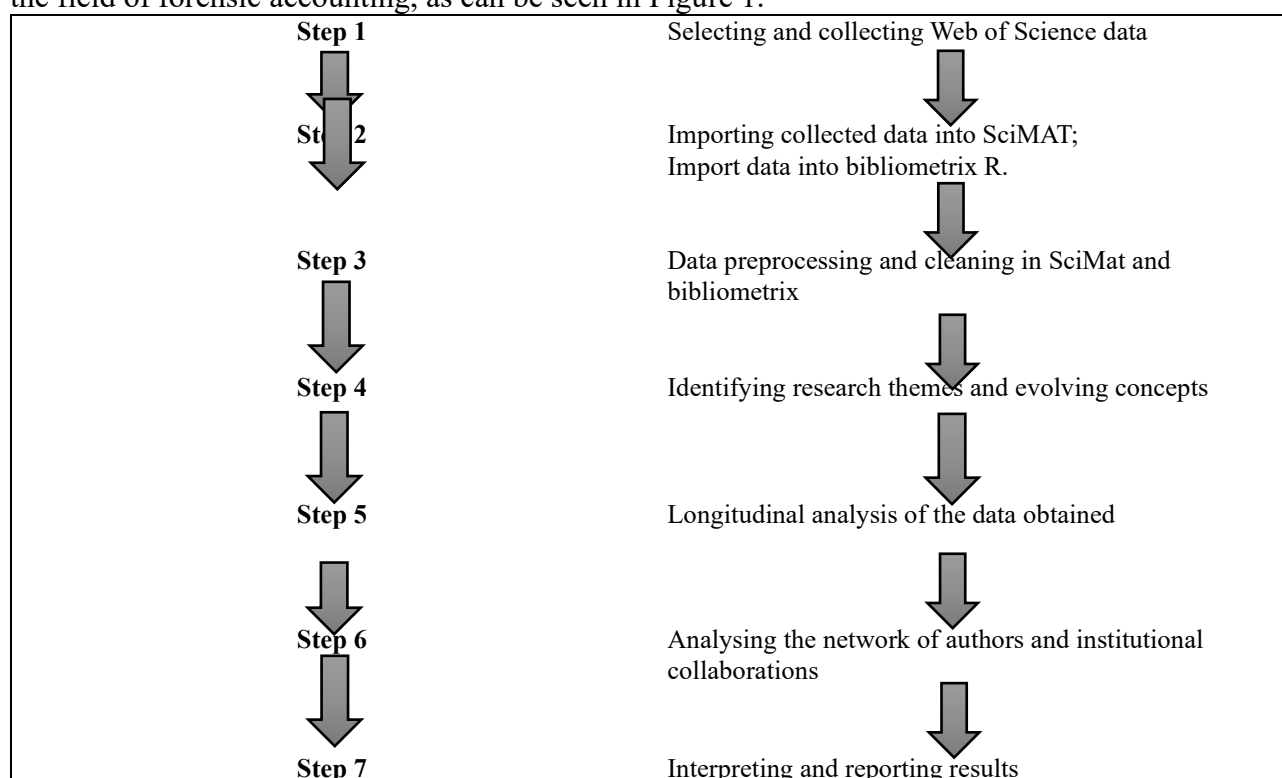


Figure 1. Research methodology

Source: author's own processing

As we can see, the first step is to select and collect data from the Web of Science. We used the Web of Science database because it is one of the main databases in academic research (Zhu et al., 2020), and the quality of the indexing of articles is high. The selection criteria can be seen in Table 2.

Table 2. Criteria for selecting scientific papers from the Web of Science

Keywords used for the search		<i>"Forensic Accounting"</i> <i>"Judicial expertise"</i> <i>"Accounting and Tax Forensics"</i> <i>"Legal Frameworks in Forensic Accounting"</i> <i>"Fiscal Forensics"</i> <i>"Forensic Auditing"</i> <i>"Judicial practice in Forensic Expertise"</i>	
Search date		12.01.2025	
Total results achieved		Forensic Accounting	3620
		Judicial expertise	686
		Accounting and Tax Forensics	30
		Legal Frameworks in Forensic Accounting	47
		Fiscal Forensics	42
		Forensic Auditing	632
		Judicial practice in Forensic Expertise	43
Filter	Categories:	Business, Business Finance, Management, Economics	
	Publication type:	Article, Book chapters, Early Access, Letter	
	Period	2009 - 2025	
Results after filtering		Forensic Accounting	633
		Judicial Expertise	302
		Accounting and Tax Forensics	18
		Legal Frameworks in Forensic Accounting	19
		Fiscal Forensics	8
		Forensic Auditing	265
		Judicial practice in Forensic Expertise	10

Source: Author's own processing

Filtering and collection resulted in 1255 scientific papers that were integrated into a database. Further we used SciMAT as the main programme to structure and clean this database (Gibbin et al., 2023). As structuring and cleaning methods we used the following: standardisation of terms, elimination of redundant keyword variants and identification of unique authors.

SciMAT thus allowed us to identify the main research themes and emerging sub-themes, as well as to observe how they have evolved over time. Using this software we also performed a longitudinal analysis to track the dynamics and changes over time of the concepts analysed. In addition, sciMAT allowed us to calculate the centrality and density of the clusters formed as a result of the bibliometric analysis. The centrality of a theme reflects the degree of its connectivity with other main themes in the bibliometric network (Duan et al., 2020). In our context, the high centrality of a theme indicates its importance in establishing links between accounting expertise, legal issues and tax elements. Density, on the other hand, measures the internal cohesion of a cluster and indicates the degree of internal development of a theme. Thus, a high density value means that the themes within that cluster are well connected to each other, forming a solid research core.

As for the Bibliometrix software, it is an R package specialised in bibliometric analysis (Ab Rashid, 2023) and was used for the demographic analysis of the selected scientific papers in our database. Thus, we investigated numerous aspects such as the geographical distribution of papers, the source of papers, their annual evolution, as well as various aspects related to the demographic side. We also chose to investigate this aspect because it helps us to understand the context and structure of the research as a whole in global forensic accounting and tax expertise.

At the same time, for the analysis carried out, we divided the study periods of the analysed articles into two intervals: 2001 - 2008, 2009 - 2016 and 2017 - 2025. This division primarily makes the longitudinal analysis possible, but it also allows us a more multifaceted, staged perspective on how various concepts and topics of interest in our field of study have evolved. Therefore, in the next part of this paper we will discuss the results obtained and present the dominant themes, emerging sub-

themes, and the evolution of the forensic accounting field as a whole and the relationships between them for each time interval.

4. Discussions and results

In the following we will analyse the thematic clusters formed in the period 2009-2016. sciMAT results can be seen in Figure 1.

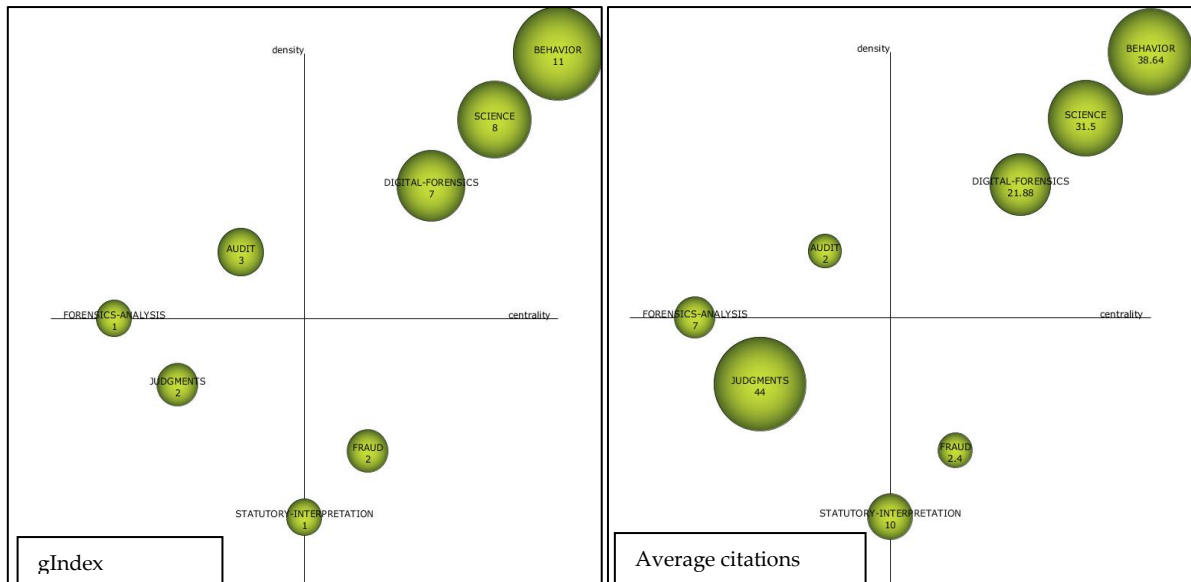


Figure 2. Main research clusters from 2009-2016

Source: SciMAT processing

The following thematic clusters can be observed in Figure 2: 'Behaviour', 'Science', 'Digital-Forensics', 'Fraud', 'Statutory-Interpretation', 'Judgements', 'Forensic-analysis' and 'Audit'. The cluster with the highest values in terms of centrality and density is "Behaviour", which indicates the researchers' interest in this topic. In other words, during this period there has been a high level of researcher interest in understanding human behaviour in the context of fraud and forensic and tax accounting. Thus, research from 2009-2016 focused more on the influence of psychological and behavioural factors on decisions leading to illicit financial activities. Therefore, thanks to this approach we can consider that fraud investigation has increasingly started to adopt perspectives from the behavioural sciences, evolving towards a multidisciplinary approach (Scheaf et al., 2022). As for the thematic cluster "Science", it continues to be of interest for researchers in the period 2009-2016, with a high density and centrality. Therefore, the emphasis in forensic accounting research is on scientific methodologies, which shows that standardisation and the use of evidence-based techniques have continued to be at the forefront of researchers' concerns, with the aim of further strengthening the validity of accounting investigations and enhancing the credibility of results presented in court (Emmanuel et al., 2018). The next for the thematic cluster, namely "Digital forensics" observes that it is in a higher position compared to the previous period. This denotes that this theme, digital forensics, has gained momentum, gaining increasing importance in the context of the growing volume of data and electronic transactions in this period. We believe that this development highlights the attempt of researchers to adapt to the new challenges brought by technology and at the same time, the importance of integrating new digital tools in forensic accounting and tax investigations (Odeyemi et al., 2024). The next thematic cluster labelled 'Fraud' shows moderate centrality and density, therefore, although still a relevant theme in this period, researchers have turned to other sub-themes of fraud investigation, such as forensic and audit analysis. We believe that this may indicate that the interest of researchers has shifted towards methodological details and approaches rather than general

discussions of fraud. Nevertheless, '*Fraud*' remains a central pillar of forensic accounting and tax expertise, around which many other sub-topics gravitate.

The next cluster analysed, i.e. '*Statutory Interpretation*' shows low density and medium centrality, which suggests that statutory and regulatory interpretation continued to be a concern for some authors, but did not remain in the focus during this period, i.e. 2009-2016. The reason for this decline is due to the fact that while forensic accounting expertise continued to be guided by the legal framework, research focused more on more tangible investigative tools and techniques and the behaviour associated with financial fraud, as noted above (Ozili, 2023).

The last cluster analysed '*Judgements*' indicates a reorientation of research from 2009-2016 towards how courts interpret and evaluate the evidence presented by experts. This is relevant in forensic accountancy and tax expertise because the reports produced are usually presented to the courts as evidence, and the way they are understood and utilised by the judiciary certainly has an effect on the outcome of cases. Thus, this cluster, shows the concern of researchers to ensure that the information provided by experts in the field is clear, objective and relevant so that it can be correctly utilised in the judicial decision making process (Denhere, 2022).

Regarding the last period analysed, i.e. 2017-2024, we observe a greater diversification in the field of forensic accounting and tax expertise, as can be seen in Figure 2.

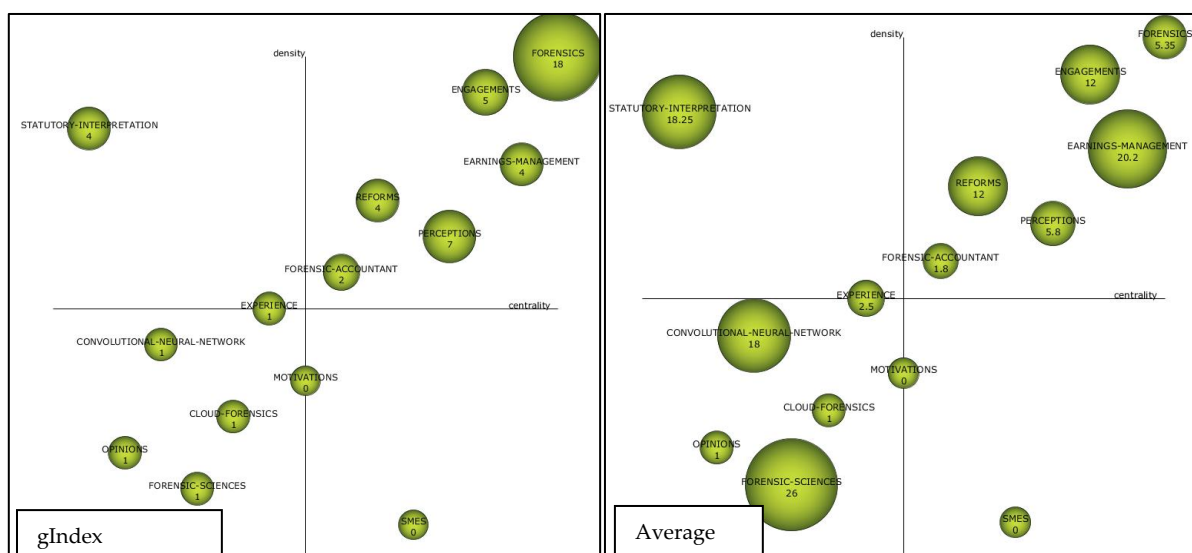


Figure 3. Main research clusters 2017-2025

Source: SciMAT processing

Firstly, we observe that the thematic cluster "*Forensics*" dominates this period as well, with the highest centrality and density. This reflects the increasing complexity in the field and an integrated approach, in which *forensic* expertise is the essential component in the investigation of fraud and illicit economic activities because in the modern context the term *forensics* includes traditional accounting-financial analysis technologies, but also modern ones that rely particularly on new digital technologies. Also, the centrality and high density of this thematic cluster indicates the acceptance and adaptation of the field to cope with new challenges that often come from the digital environment (Mert, 2022). The next thematic cluster with high centrality and density is "*Earnings Management*". It shows the researchers' interest in maintaining financial integrity and transparency, in the context of increasing pressures and demands from management for earnings manipulation and the use of cosmetic accounting practices to cosmeticise reports. Thus, this thematic cluster is concerned with manipulative practices and of course, exploring the tools that experts have at their disposal to identify and correct these practices. Another thematic cluster with a high centrality and density is the one on "*Perceptions*", which indicates that researchers also pay particular attention to the perceptions of the

public and other stakeholders regarding the field of forensic and tax accounting. In this context, this cluster points to the need for a code of ethics and transparent reporting as stakeholder trust in these reports is an extremely important resource for any economic entity, especially in the long run (Bhasin, 2013).

Reflecting on the "*Engagements*" thematic cluster, it considers interactions and engagements in the realisation of expertise. In other words, the quality of expertise is closely linked to collaboration with third parties, and positive collaboration can lead to more positive outcomes. In more sophisticated cases, stakeholder involvement is particularly important. Another thematic cluster of interest is "*Statutory interpretation*", a cluster which has high density and low centrality. We consider this theme relevant because experts need to work within a well-defined legal framework and have a correct understanding of how existing regulations apply. Even if this cluster has a low centrality, the interpretation of legislation is a key element, especially in this period of major changes.

Towards the end of the paper, we made a longitudinal analysis of the evolution of the field, taking into account the three time intervals analysed above. Thus, the results can be seen in Figure 3.

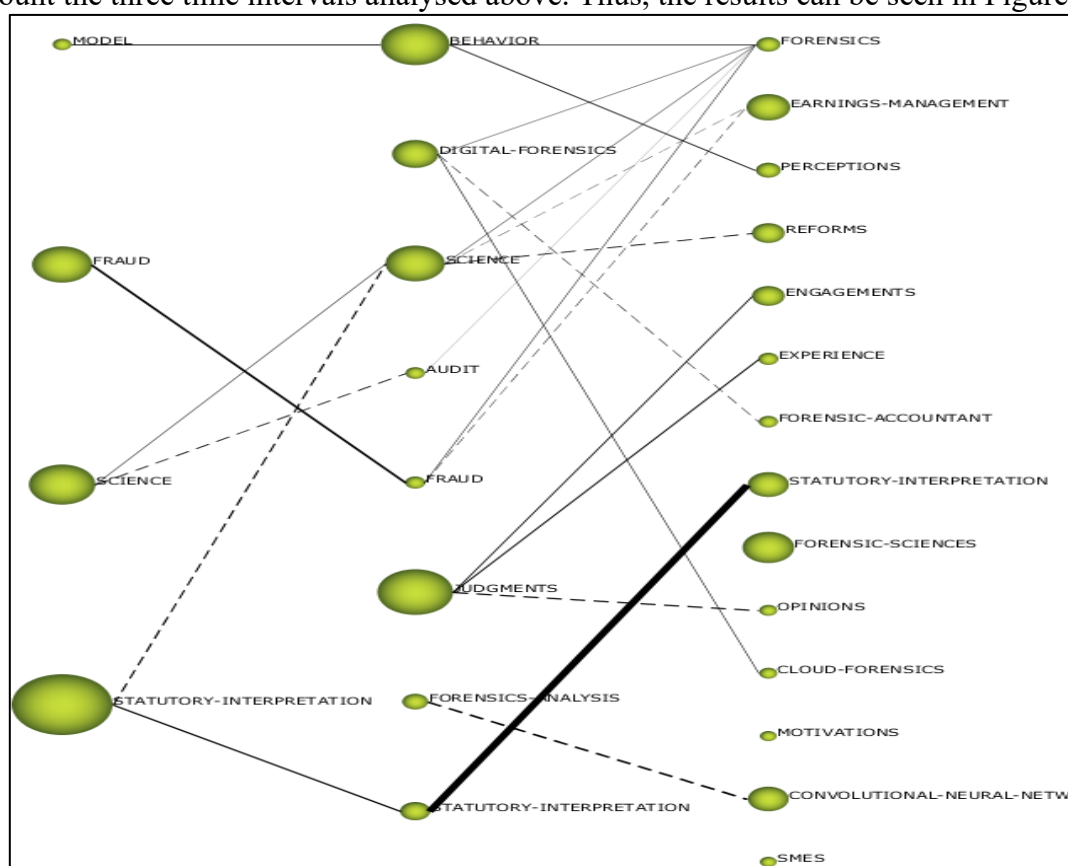


Figure 4. Longitudinal analysis of the evolution of topics in forensic and tax accountancy
 Source: SciMAT processing

In Figure 3, we have also realised a representation of the full evolution of the main forensic accounting themes over three periods, namely 2001 - 2008, 2009 - 2016 and 2017 - 2025. Each line represents a link between themes and shows the continuity and/or transformation of that theme. The solid lines also represent the intensity of those connections.

The first column represents the period between 2001-2008, a few central themes dominate the scientific discourse. Themes such as '*Statutory Interpretation*', '*Fraud*' and '*Science*' indicate the foundation of the field, with researchers focussing on creating a solid foundation to combat the problem of fraud. In this context, research on various methodologies and tools has been highly relevant. Therefore, we can say that this period is dominated by the need to respond to illegitimate activity with a more methodical, rule-based and methodological orientation that reinforces the theoretical framework to support investigations in this area. As we move to the next period analysed,

we also observe a reorientation in the topics addressed by researchers, as well as in their complexity. We are also seeing the emergence of new themes such as '*Digital Forensics*' and '*Behaviour*' in response to new digital challenges and understanding fraudulent behaviour. Furthermore, we are seeing increasing connections between '*Fraud*', '*Science*' and '*Audit*', which is why we can conclude that scientific methods are beginning to be accepted and integrated into the business environment. Finally, this stage marks an opening towards interdisciplinarity in the field analysed. The third period analysed we observe a maturing and even integration of several new technologies in forensic and tax accountancy together with an awareness of the importance of ethics in this field. Also, the relationships between the topics of forensics, accruals and 'earnings management signal a renewed interest in discouraging financial manipulation and in close collaboration between stakeholders such as regulators, auditors and financial organisations.

5. Conclusions

The results obtained in this paper demonstrate the complexity of current issues in the field of forensic and tax accountancy, reflecting the evolution of the field from its early stages to the present day, and reflecting the increasing relevance of the field in the current economic context. The literature review using the sciMAT programme revealed a number of trends and future directions, which underline the adaptation of research and practice to the new challenges posed by technology, globalisation and ever increasing demands. These have been discussed in detail in the previous subchapters. In the period 2001-2008, the focus was on building a theoretical foundation and at the same time defining the methodological frameworks needed to investigate illicit or fraudulent economic issues. The period 2009-2016 has seen a maturation of the field, with researchers' interest broadening towards behavioural and psychological aspects, such as understanding actor behaviour as a key factor in fraud investigation. The current period, 2017-2025, is characterised by a diversification of themes, reflecting issues such as the integration of new digital technologies and methodologies and procedures for their use. In addition, certain themes such as cybersecurity, blockchain and earnings management demonstrate the researchers' interest in adapting forensic and tax accounting expertise to the new requirements of the globalised economy. Therefore, this paper makes important contributions to our understanding of the evolution and structure of forensic and tax accounting expertise. However, there are also some limitations to be mentioned. Firstly, the use of a single database (Web of Science) to collect bibliometric data can be an impediment, as not all papers on this topic are included, providing a restricted view of the field from this point of view. Also, a second limitation of this work concerns the complexity of the terminology used in the field of forensic accounting and tax expertise. Although an attempt has been made to standardise keywords in order to capture the field accurately, there is a risk that some works may not have been included due to differences in terminology and/or limited adaptation to new emerging concepts.

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COST ACCOUNTING: A COMPARATIVE STUDY OF BEST PRACTICES IN HIGHER EDUCATION

DOI: <https://doi.org/10.53486/dri2025.54>
UDC: 657.47:378(478)

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Abstract. *The article investigates university cost accounting in the Republic of Moldova (RM), highlighting the need to adopt internationally recognised practices to strengthen financial sustainability and transparency. The research goal is to compare the cost-accounting system used in Moldovan public higher-education institutions (HEI) with a range of established international models. The study relies on a qualitative analysis of national legislation, benchmark international reports and specialised academic literature, supported by comparative investigation. The findings reveal the current system's limitations: the absence of a unified methodological framework, limited professional competences in cost accounting, and inadequate digital analytic platforms – all of which prevent management based on real, decision-relevant costs. Drawing on comparative analysis and case studies, the authors propose a phased approach for implementing a modern cost-accounting system in Moldovan universities. Cost-accounting reform is presented not merely as a technical adjustment but as an essential condition for greater transparency, budget efficiency and institutional responsiveness in a rapidly changing educational environment. Adopting international best practice is therefore crucial to modernising university management and consolidating financial autonomy in RM.*

Keywords: *cost accounting, university costs, higher education, financial autonomy, budget efficiency, international best practice.*

JEL: I23, I28, M41, L32

Introduction.

Higher education in the RM is undergoing transformation driven by recent reforms in funding and university autonomy. The introduction of a standard-cost per student allocation mechanism and a performance orientation represent important steps towards modernisation (Government of RM, 2020). Despite these advances, cost accounting – an essential tool of financial governance – remains underdeveloped and under-utilised.

Today, the sector lacks a unified methodological framework for costing and allocation, professional competences in management accounting are limited, and digital infrastructure is weak. Consequently, universities struggle to assess resource-use efficiency and to underpin strategic funding decisions (Court of Accounts of RM, 2023). Current practices focus largely on budgetary compliance and financial reporting, without producing information on the real costs of teaching, research or support services. Reliable evaluation of resource use and evidence-based management decisions are therefore difficult, hindering responses to challenges of financing, institutional performance and public accountability.

Across the EU, complex cost-calculation models have been developed and integrated into managerial processes. The UK employs the TRAC model (Transparent Approach to Costing), facilitating efficient resource allocation and funder reporting (UKRI, 2022). Sweden's SUHF model offers clear tracking of direct and indirect costs, supporting transparency and financial planning (SUHF, 2007). The Netherlands, Austria and Croatia apply Activity-Based Costing (ABC) variants with embedded performance indicators (Estermann & Claeys-Kulik, 2013). Spain uses a flexible ABC-based

approach adapted to university specifics (Brusca et al., 2019); Italy has introduced uniform cost-calculation practices (MUR, 2024); and Belgium operates advanced systems focused on research projects and internal reporting (VLUHR, 2020). In the United States, costs are allocated by programme and responsibility centre, providing a sound framework for financial planning, tuition setting and efficiency evaluation (Lang, 2001).

These functional university cost-accounting systems were preceded by extensive basic and applied research, which underpinned the development of advanced accounting tools now used for financial decision-making, tuition-setting and efficiency assessment. A bibliometric analysis of literature (2005-2024) using Web of Science and the keywords "higher education", "cost accounting", "cost of higher education" shows (Figure 1) that most publications originate from the USA (450+ articles), followed by the People's Republic of China (~200). Other significant contributors – Germany, Brazil, the UK, France and Spain—each produced over 80 articles. Eastern-European countries are weakly represented (fewer than 20 articles); the Republic of Moldova does not appear among contributing states.

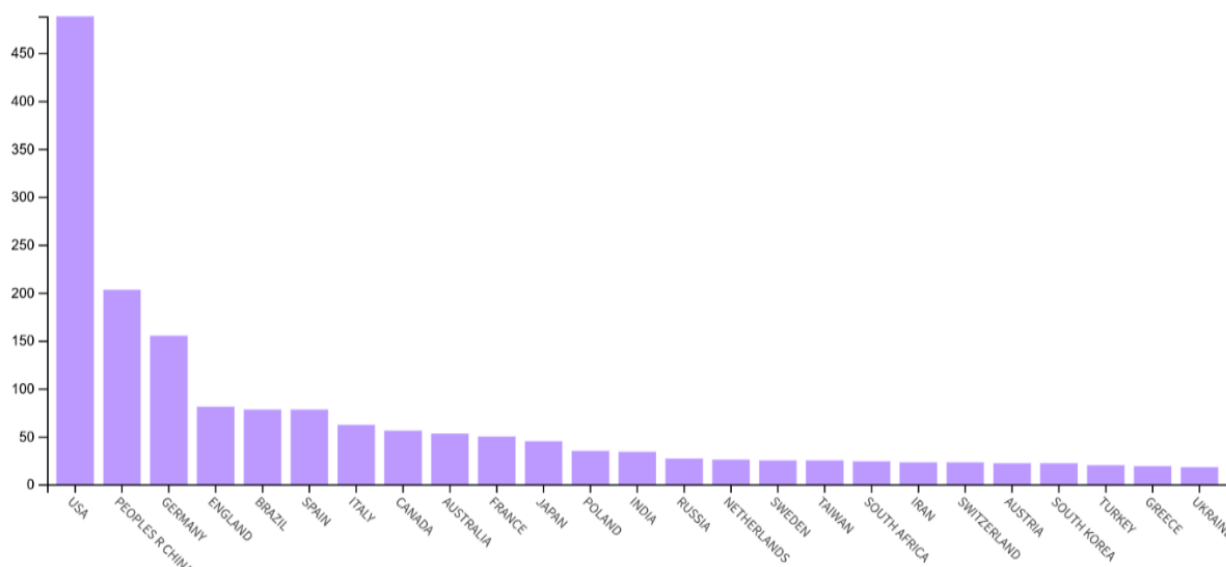


Figure 1. Geographical distribution of research publications on higher-education costs, (2005-2024)

Sursa: Web of Science

The analyzed distribution reveals a clear concentration of research in countries with well-developed educational systems and public policies focused on the cost-efficiency of universities, highlighting the need for more active involvement from transition states such as the RM.

Beyond the geographic spread of studies, the temporal dynamics are also revealing, offering insight into how lively this field has become. As shown in Figure 2, academic interest in university cost accounting has trended upward over the past two decades, with a marked surge beginning in 2015 and peaking between 2019 and 2022. This pattern mirrors global concerns about the financial sustainability of higher-education institutions, spurred by funding reforms, digitalization, and related factors. Against this backdrop, research acts as a catalyst for change and institutional reform. The absence of contributions from the RM points not only to a scientific gap but also to a strategic opportunity for institutional development and integration into international trends.

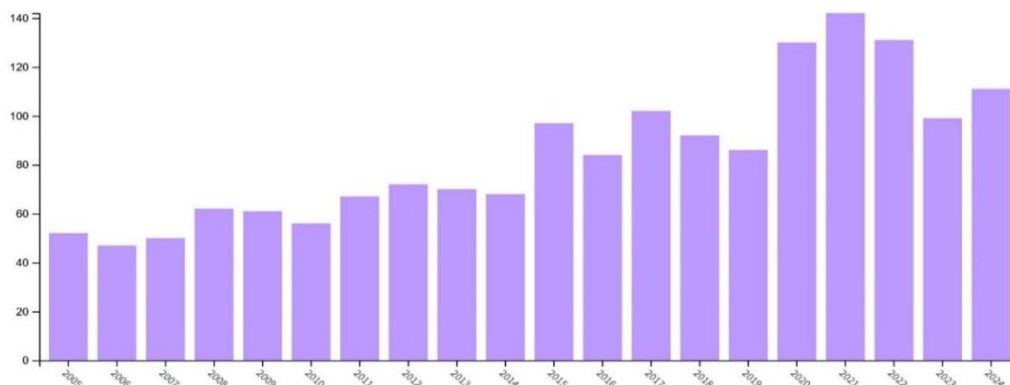


Figure 2. Dynamics of research on university costs, 2005-2024

Sursa: Web of Science

The bibliometric results show a clear correlation between the maturity of higher-education cost-accounting systems and the intensity of academic research in the field. Stimulating local research could thus be a prerequisite for modernising Moldova's university system. The study therefore aims to: (i) evaluate the current state of cost accounting in Moldovan higher education; (ii) examine relevant international experience; (iii) identify best practices; (iv) and formulate strategic recommendations for an efficient, transparent and sustainable national system.

Research was conducted based on the following fundamental questions:

Q1. What are the defining characteristics of international higher-education cost-accounting models?

Q2. What institutional and technical conditions enabled their efficient adoption?

Q3. What benefits and challenges emerged during implementation?

Q4. Which elements are relevant and adaptable to Moldovan public universities?

From these research questions three hypotheses are derived:

H1. International models enhance financial transparency and support strategic decisions based on real costs.

H2. Successful implementation depends on favourable institutional and technical conditions, including regulation and digitalisation.

H3. Elements of established models can be adapted in Moldovan HEI provided administrative capacity is strengthened, financing mechanisms aligned, and active governmental support ensured.

Methodology. A predominantly qualitative approach combines literature review with analysis of international and local regulatory frameworks. Data from diverse sources were benchmarked to pinpoint best practices and to ground recommendations scientifically while adapting them to the national context.

Content. At present, higher-education institutions in the R M lack a unified, functional cost-accounting system that would allow clear, detailed tracking of costs by activity, programme or beneficiary category (Court of Accounts of the RM, 2024).

Cost accounting within public universities is still under-developed; it is usually limited to recording expenditures by budget line, without any breakdown by cost centre, academic programme or specific activity. This methodological gap prevents universities from determining the true cost of educational services and from assessing how efficiently resources are used relative to outcomes. The level of digitalisation in existing accounting systems is low, fragmented and outdated, with no interoperability among financial, accounting and administrative modules. The lack of integrated information slows data processing, reduces accuracy and limits the ability to generate decision-relevant reports. Moreover, universities remain dependent on a per-student funding formula that is applied mechanically and does not reflect the real costs of educational delivery. As a result, decision-making

is vulnerable: choices are essentially based on rough estimates and historical precedent rather than on analytical information. The American system of university cost accounting—which could serve as a benchmark for Moldova – developed gradually from the 1920s and 1930s, when university administrators began to adopt more rigorous, structured practices (Bowen, 1980). As access to higher education expanded, U.S. institutions faced growing demands from funders to demonstrate resource efficiency, prompting the introduction of modern accounting tools for cost tracking and analysis (Wellman, 2010; Massy, 2003). In 1974 the National Association of College and University Business Officers (NACUBO) published the first *Financial Accounting and Reporting Manual for Higher Education* (FARM) (NACUBO, 1974), providing a unified framework for recording and reporting costs. FARM, which enhanced transparency, comparability and budgetary control across institutions, is regarded as a foundational milestone in the evolution of modern university cost accounting in the USA. During the 1980s–2000s, public-sector institutions adopted methodologies from the private sector and completed the implementation of integrated information systems for cost management (Dickeson, 2010). The demand for financial transparency, efficient resource use and alignment of budgets with institutional strategic priorities also intensified (Wellman, 2010). Table 1 summarises the contributions of key authors in the field of university cost accounting.

Table 1. Leading American authors and milestones in the development of university cost accounting

Author	Work/year	Main Contribution
Howard R. Bowen	The Costs of Higher Education (1980)	Formulated “Bowen’s Law”: universities spend all available resources to maximise prestige.
William F. Massy	Honoring the Trust (2003)	Introduced “cost responsibility” and methods for analysing academic productivity.
Michael F. Middaugh	Understanding Faculty Productivity (2001);	Developed tools for measuring and comparing academic productivity (e.g., Delaware Study).
Robert C. Dickeson	Prioritizing Academic Programs (2010)	Proposed cost-benefit evaluation methods for programme prioritisation.
Jane V. Wellman et al.	The Growing Imbalance (2008)	Analysed funding imbalances and promoted financial sustainability analysis.
Robert S. Kaplan	The Strategy-Focused Organization (2001)	Extended Activity-Based Costing (ABC) to universities; advocated precise cost allocation.

Source: prepared by the authors

These theoretical foundations and applied studies have produced methodologies that shaped the way universities analyse and manage costs, providing institutions with concrete tools for efficiency assessment, resource allocation and evidence-based decision-making. The most widely used and validated cost-calculation and control models in higher education include:

- **Activity-Based Costing (ABC)** – enables detailed identification of costs according to the activities performed (Kaplan & Norton, 2001; Granof, Plummer & Vaysman, 2000; Anguiano, 2013).
- **Responsibility Center Management (RCM)** – delegates financial responsibility to academic units, giving them autonomy over their own budgets (Strauss & Curry, 2002; Whalen, 1991).
- **Cost-of-Instruction Method** – calculates costs per credit hour, providing a framework for inter-institutional comparisons (Middaugh, Graham & Shahid, 2003).
- **Full Cost Recovery Model** – aims at the full recovery of costs for research projects (Goldman & Williams, 2000).

Conceptual and practical differences among these methods are illustrated in Figure 3.

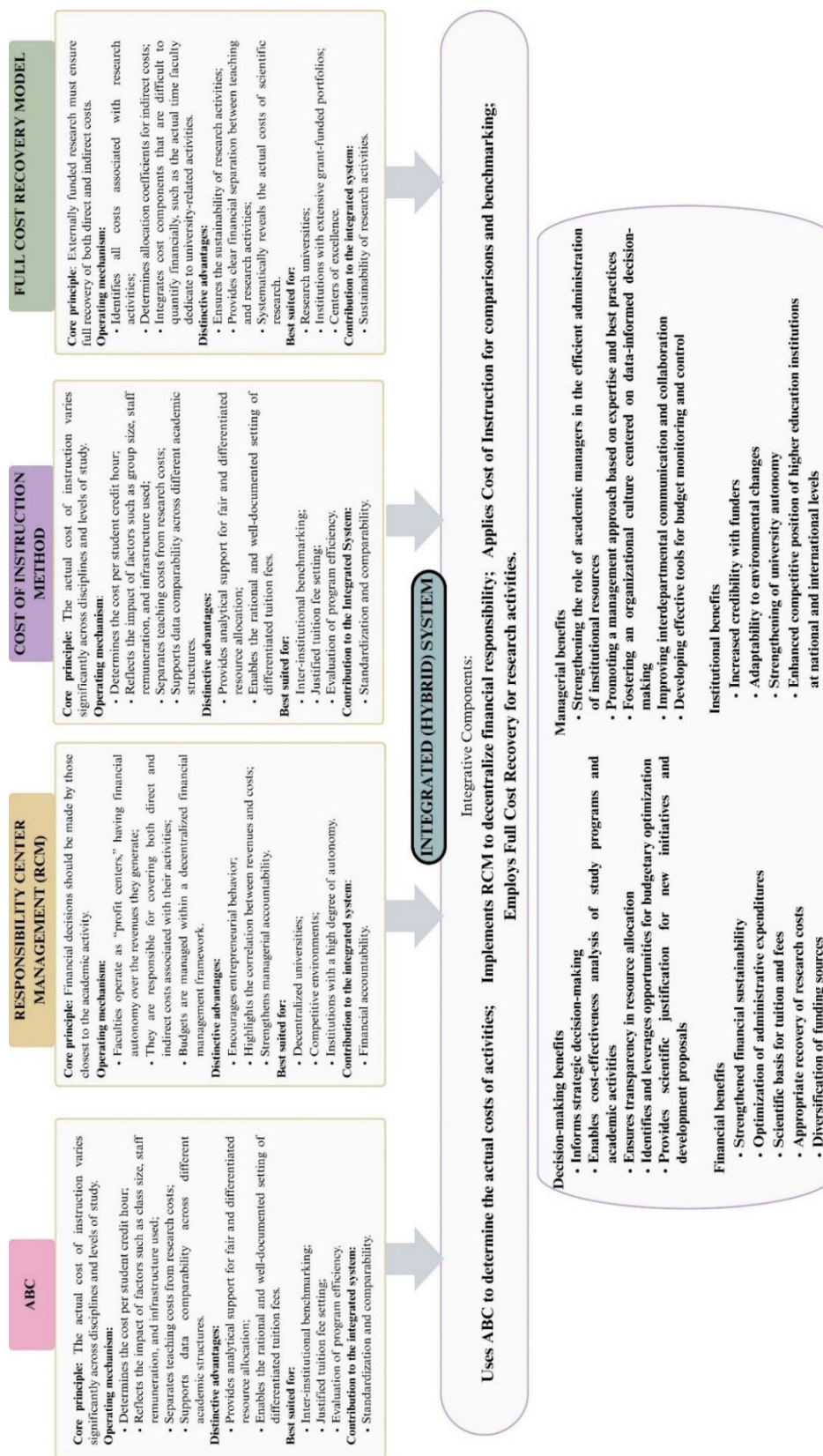


Figure 3. Cost accounting models in USA Higher Education: the advantages of adopting an Integrated (Hybrid) System

Source: developed by the authors

In conclusion experience from the United States shows that cost-accounting systems in higher education foster transparency, efficiency and strategic planning. For the RM, a gradual, context-sensitive adoption of these methodologies—built on a unified cost taxonomy, a national benchmarking framework, investments in analytical infrastructure and staff training—would create an advanced cost-accounting environment, optimise budget-allocation mechanisms and strengthen institutional financial governance.

Unlike the bottom-up, autonomous evolution seen in the U.S., Europe's transformation of university cost accounting unfolded as part of a broader public-sector reform agenda (Estermann & Claeys-Kulik, 2013). The Bologna Process mandated greater transparency and comparability, including in financial matters (Crosier & Parveva, 2013). At the same time, New Public Management reforms of the 1990s–2000s introduced private-sector financial tools, cost accounting among them (Bezes et al., 2012). The phased adoption of International Public-Sector Accounting Standards (IPSAS) facilitated a shift to accrual accounting, paving the way for more sophisticated cost systems (Grossi & Steccolini, 2015).

The European University Association's 2008 report **Financially Sustainable Universities** highlighted the need for coherent, high-performing full-cost systems to ensure long-term sustainability (Estermann & Bennetot Pruvot, 2011). Although the EU has no single regulation on university cost accounting, numerous harmonisation and support initiatives have emerged. Through its research programmes, the European Commission now requires full-costing methodologies as a condition for accessing EU funds (Estermann & Claeys-Kulik, 2013).

The **EUIMA** project (2010–2012) supported the roll-out of full-cost systems and documented the wide variation in accounting maturity across member states (Estermann, Bennetot Pruvot & Kupriyanova, 2020). In the research arena, strict funder reporting rules have driven the development of specialised costing tools, notably the **ESFRI** guidelines for estimating the full costs of research infrastructures (ESFRI, 2019). This framework promotes both European harmonisation and institutional capability in securing research funding.

Within this evolving European landscape, universities have adopted a variety of cost methodologies, reflecting administrative traditions, financial maturity and institutional capacity:

- **Full-Costing Method** – the dominant approach in Europe, especially in the Nordic countries, the UK, Ireland and parts of Germany, Austria and the Netherlands. It identifies and allocates all direct and indirect costs to the activities and services that generate them (Estermann & Pruvot, 2015). The UK's **TRAC** model, introduced in 1999, is a leading example: it combines ABC principles with academic time allocation to separate teaching, research and other costs (UKRI, 2021).
- **Uniform Cost-Accounting System** – typical of German-influenced countries (Germany, Austria). The **Hochschulkostenrechnung** model provides a nationwide framework that enhances comparability by classifying costs per student, programme and organisational unit (Wiest, 2010). Key features include ministry-level rules, a common chart of accounts and a hierarchical cost-centre structure, with cascading allocation of overheads.
- **Performance-Based Funding Models** – allocate resources according to objective indicators such as ECTS credits, research outputs, degrees awarded or graduate employment rates. Used in Finland, Sweden and Denmark, these models link funding to results and rely on cost data to evaluate efficiency.
- **Hybrid Methods** – blend institutional flexibility with local administrative realities, combining Activity-Based Costing elements with traditional overhead allocation. Examples include Spain's **CANOA** project and Italy's **Analisi dei Costi** model.

Each approach offers benefits and constraints depending on institutional context and administrative maturity. **Table 2** summarises the main advantages and limitations associated with each methodology.

Table 2. Comparative analysis of the advantages and limitations of accounting methodologies in European higher education

Methodology	Advantages	Limitations
Full costing	Ensures full transparency in the use of resources; mandatory for reporting in European projects (e.g. Horizon Europe); supports strategic decision making based on real costs	Requires advanced IT systems and detailed data; complex to implement in institutions with limited administrative infrastructure.
Uniform cost accounting	High inter-institutional comparability, financial transparency, moderate implementation costs, support for centralized budgetary policies, administrative simplicity	Low institutional flexibility, limited level of detail, reduced visibility over research and support activity costs, limited integration with local institutional strategies, risk of hindering accounting innovation
Performance-Based Funding Models	Direct correlation between performance and funding, encourages efficiency and competitiveness, supports the decision-making process	Risk of focus on quantitative indicators, potential neglect of quality and social mission, requires advanced IT systems and analytical infrastructure
Hybrid models	Adaptability to varied institutional structures, moderate administrative complexity, allows partial cost separation between functions (teaching, research)	Lack of a unified methodological framework, low comparability between institutions, requires a balance between detail and simplicity, dependent on local institutional capacity

Source: prepared by the authors

Cost accounting in European universities has evolved significantly over the past two decades, transitioning from rudimentary systems to sophisticated methodologies tailored to the academic context. The diversity of implemented models reflects differences in administrative traditions, regulatory frameworks, and organizational cultures across the various member states.

For the Republic of Moldova, the European experience offers a rich and valuable framework of practices and lessons learned, enabling the development of systems adapted to the local context while aligned with international trends. Gradual implementation, institutional capacity building, and the adaptation of methodologies to local specificities are key elements for the success of this process.

Table 3 presents opportunities for adapting international best practices to the realities of the Republic of Moldova and provides a structured comparison between the American and European models, along with recommendations for implementation.

Table 3. Comparative study of international university costing practices and their applicability in the Republic of Moldova

	American System	European System	Recommendations for the National System
Methodological approach	Institutional flexibility, adaptation to the specific context of each university; Use of the NACUBO model for the functional classification of costs.	National standardization for cost classification and allocation (e.g., the German Hochschulkostenrechnung model). Full Costing approach.	A hybrid approach: institutional-level flexibility in implementation, but with a national framework for cost classification standardization (inspired by NACUBO) to ensure comparability and reporting.

Cost calculation	Use of the ABC method for accurate allocation of costs to activities (teaching, research, services); Full Cost Recovery model for externally funded research projects.	Implementation of the TRAC model in the United Kingdom. Use of cost per ECTS credit and per scientific publication for resource allocation; Hybrid models.	Implementing ABC would improve the accuracy of cost calculation. Adopting the Full Cost Recovery model would support the efficient management of international research projects. The use of cost per student/credit could also be explored for specific analyses.
Indirect cost allocation	Sophisticated multi-level allocation systems; Use of cost drivers for accurate allocation; Differentiated indirect cost rates by type of activity; University-specific allocation formulas.	Nationally standardized models (in many countries); Simplified systems in Eastern and Southern Europe; Trend toward standardization of cost drivers; Pragmatic approaches to faculty-level allocation.	Development of a standardized set of relevant cost drivers; Implementation of a simplified two-step allocation model; Prioritization of administrative cost allocation; National-level standardization to ensure comparability.
Governance and accountability	Decentralized decision-making at the faculty level; Deans held accountable for budgets; Mature governance structures; Reporting oriented toward funders and governing bodies.	Relative centralization of financial decisions; Accountability to public authorities; Governance structures in transition (in many countries); Compliance-oriented reporting.	Gradual decentralization of financial responsibility; Creation of appropriate governance structures; Definition of institutional responsibilities in the financial decision-making process; Harmonization of autonomy with public accountability.
Integration with decision-making processes	Close integration with strategic planning; Extensive use in program evaluation; Application in resource allocation decisions; Alignment with performance management systems.	Variable integration with strategic planning; Alignment with quality assurance systems; Use in supporting performance-based funding; Application in optimizing the program portfolio.	Integration of the methodology with strategic planning; Use of cost data in program evaluation; Creation of a decision-making framework based on cost data; Strengthening managerial skills in understanding cost information.
Technology and infrastructure	Integrated ERP systems; Specialized modules for ABC; Advanced analytical tools; Business intelligence platforms.	Varying degrees of technological sophistication; Nationally standardized systems in some countries; Pragmatic approaches in certain regions; Gradual modernization.	Adaptation to existing IT systems; Modular implementation starting with essential components; Standardization of interfaces and data exchange; Planned gradual migration toward integrated systems.

Cost-based decision-making	Cost-benefit analysis for programs	Performance-based funding models (ECTS, publications, degrees)	Integration of cost analysis into the evaluation and restructuring of educational programs
Institutional Capabilities	Professionalization of the managerial accounting function.	Institutionalized training supported by ministries and national associations.	Initiation of a national training and support program for financial and accounting staff.
Example of Successful Implementation	University of Michigan: ABC integrated with strategic planning, budget decentralization at the faculty level. Identification of 20% of programs generating 60% of costs, resulting in annual savings of 2–4%.	TRAC Model (UK): standardized national implementation, separation of teaching and research costs, time allocation system for academic staff. Used as a basis for national funding.	Recommended model for the RM: 3-phase implementation plan (3–5 years); pilot testing in 2–3 representative universities; inter-university community of practice; methodology compatible with European funders' requirements.

Source: prepared by the authors

The comparative analysis highlights the complementarity of the two systems and the need for a selective approach for the RM. Successful implementation will depend on adapting methodologies to the local context, developing institutional capacity, and integrating them into university decision-making processes. The proposed hybrid model combines European standardization with American flexibility, offering a feasible pathway for Moldovan universities in their transition towards modern cost accounting systems.

Conclusions and recommendations.

In the context of modernizing university governance and increasing pressure for the efficient use of resources, the implementation of a functional cost accounting system becomes essential for public higher education institutions. The comparative analysis of international models—the American and the European—shows that there is no one-size-fits-all solution, but rather a set of best practices that can be adapted to local realities.

The validation of the research hypotheses confirms the relevance and applicability of international cost accounting models in the context of higher education. Thus, the hypothesis regarding the role of these models in promoting transparency and supporting strategic decision-making (H1) is supported by evidence from both the American and European contexts, which demonstrate the effectiveness of such practices in optimizing resource allocation. The hypothesis concerning the institutional and technical conditions required for implementation (H2) is also validated, highlighting the critical role of university autonomy, digitalization, and the regulatory framework. Regarding the adaptability of these models in the RM (H3), the research confirms the feasibility of a hybrid approach, contingent upon strengthening institutional administrative capacity, alignment with funding policies, and the involvement of public authorities.

The bibliometric analysis highlights that the development and implementation of cost accounting systems in higher education are closely linked to the level of scientific engagement in the field. Regions where research on this topic is well represented generally benefit from advanced accounting tools, integrated into university governance processes and supported by coherent public policies. This finding underscores the need to invest in the development of research on university cost accounting as a prerequisite for the modernization and professionalization of the national higher education system.

The study proposes a series of recommendations aimed at supporting public universities in the Republic of Moldova in developing their own cost accounting system—balanced, functional, and sustainable. These recommendations are based on international experience and focus on:

- The gradual and locally adapted implementation of standardized cost classification, defining cost centers in correlation with institutional flexibility, as promoted in the American model;
- Combining national regulatory initiatives with institutional efforts within a centralized methodological framework and targeted pilot projects;
- Investment in human capital development;
- Integration of cost accounting into decision-making processes;
- Leveraging international funding sources for the development and implementation of cost calculation and accounting methodologies.

The implementation of these recommendations would enable the design and development of a functional and flexible cost accounting system aligned with European standards. Cost accounting reform must also be supported by ongoing research, including the monitoring of the impact of new accounting practices on institutional performance. Future research directions should focus on evaluating implemented models, identifying success and/or failure factors in adapting and implementing international/national methodologies, addressing potential gaps, and developing tools for integrating accounting data with academic quality and organizational efficiency indicators.

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THE EVOLUTION OF RESEARCH IN FORENSIC ACCOUNTING: A BIBLIOMETRIC ANALYSIS

DOI: <https://doi.org/10.53486/dri2025.55>

UDC: 657.632:001.891(478)

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Abstract: *Research in the field of forensic accounting has become increasingly important in the last two decades, with the increase in the number of financial frauds, the globalization of markets and the development of digital technologies. From the perspective of bibliometric research on the topic of forensic accounting, the purpose of this article is to provide a comprehensive perspective of the evolution of the works in this field, collecting the data from the international database Web of Science, then using the VOSviewer and RStudio applications for bibliometric data analysis. The results of this study show the interest of researchers in this field, especially during the COVID-19 pandemic in 2020, it identified the main countries where forensic research was studied, journals, authors and topics addressed by researchers in this field. The conclusions identified certain gaps and future directions in forensic accounting such as the use of artificial intelligence in this field, focusing research on case studies and interviews with experts in the field, exploring the role of forensic accounting in identifying and preventing fraud.*

Keywords: *forensic accounting, bibliometric analysis, fraud detection, fraud*

JEL: M41, M42

1. Introduction

Against the background of the globalization of the economy, accelerated digitalization and the growth of commercial activities, forensic accounting is becoming an essential tool in detecting and preventing financial fraud. Major financial scandals, such as Enron, WorldCom or Pamflet, the global economic crisis of 2008 and, more recently, the COVID-19 pandemic, have highlighted the vulnerabilities of the business environment and the growing need for financial investigations. With the expansion of the online environment, new types of fraud have emerged, such as cyber scams, phishing, cryptocurrency fraud, and embezzlement through digital platforms, which amplifies academic interest in forensic accounting studies. The reason why I chose this topic is related to my research concerns within my doctoral studies, aiming to analyze and deepen the theoretical and practical aspects in the field of forensic accounting. The objectives of the research are to analyze the evolution of scientific research in the field of forensic accounting, to identify authors, articles, reference journals in this field, to identify gaps in the literature and to formulate proposals for future research directions.

To perform the bibliometric analysis I will use the quantitative method based on data collection from the Web of Science scientific database, by selecting the articles using the keyword "forensic accounting". I will analyze the frequency of publications, the number of citations, the authors and the main journals of publication, the mapping of academic collaborations and geographical distribution, the identification of the main thematic clusters used aiming to identify the main gaps and future directions in research.

The results obtained can be a useful reference point for researchers, as well as for practitioners involved in preventing and combating financial fraud, especially in the digital age.

2. Historical evolution

Since Antiquity, through the code of Hammurabi, aspects related to commercial relations, property and criminal justice are identified, requiring merchants and merchants to keep accurate records of their transactions and businesses. By recognising the value of written evidence and documentation necessary to resolve disputes and establish guilt or innocence, the Code has set a precedent for the existence and retention of financial records, essential documents that underpin the work of forensic accountants, becoming fundamental elements of forensic accounting.

Luca Pacioli, considered the "father of accounting", published in 1494 the work "Summa de arithmetica, geometria, proportioni et proportionalita" which included a section dedicated to accounting through which the concept of double-entry accounting was introduced. The double-entry accounting principles, introduced by Luca Pacioli, continue to underpin forensic accounting, providing a solid framework for tracking financial transactions, identifying misrepresentations, and detecting potential errors or fraud.

At the beginning of the twentieth century, large-scale economic crime cases in the US provided a path for the development of investigative accounting used in the detection of fraudulent financial activities, such as the cases of Charles Ponzi or Al Capone (Ceccar, 2024).

For the first time, the term forensic accounting was found in the accountant Maurice Peloubet in 1946, when he published the article "Forensic accounting – Its place in today's economy". Forensic accountants have been in great demand to investigate financial scandals that began in the 1980s (Crain et. al, 2019).

At the beginning of the twenty-first century, the major financial scandals and the collapse of renowned companies such as Enron, WorldCom or Parmalat, highlighted the need to increase the degree of specialization and development of forensic accounting, in order to cope with the increasing number of frauds, often related to customer relations, cybercrime, asset theft, bribery and corruption, money laundering and tax fraud (PricewaterhouseCoopers, 2022).

3. Literature review

In specialized works, forensic accounting is identified by several definitions.

In the view of the authors Crain et al. (2019), forensic accounting, at a general level, involves the communication of financial information and involves the application of special skills, such as: accounting, audit procedures, finance, quantitative methods, research and investigations.

In the study conducted by Botes & Saadeh (2018), forensic accounting is defined as "a method of applying financial expertise, investigative skills and legal knowledge to carry out fraudulent examinations, advisory services, disputes and other analyses, the outcome of which could lead to a court appearance".

Kranacher, M.J., Riley, R. (CECCAR Publishing House, 2023) define, in the simplest way possible, forensic accounting: "the intersection between accounting and law". Forensic accounting can involve either an attestation mission or a consultation mission.

The American Institute of Chartered Public Accountants (AICPA) defines forensic accounting as the application of the specialized knowledge and investigative skills of chartered public accountants to collect, analyze, and evaluate evidence, as well as to interpret and communicate findings in a courtroom, boardroom, or other legal or administrative setting.

According to the study conducted by Peterson K., O. (2023), most research has been conducted in America, while in Europe, Asia, and Africa it is in its early stages. The lack of awareness and education in this area makes it difficult for accountants to develop skills that could prevent and detect fraud, before reaching the courts (Kaur et al., 2023).

The practice of forensic accounting plays an important role in identifying vulnerabilities in corporate governance and contributes to improving processes in this area. At the same time, an effective internal control system increases transparency within companies, reducing the risk of fraud (Vlăsceanu, G., E., 2024).

4. Bibliometric analysis

Following the application of the search method in the Web of Science database by the keywords "forensic accounting", then by applying the filters for the type of documents "article" and for the research areas "business economics" and "behavioral sciences", 208 publications related to the subject of forensic accounting were generated, which are presented as follows:

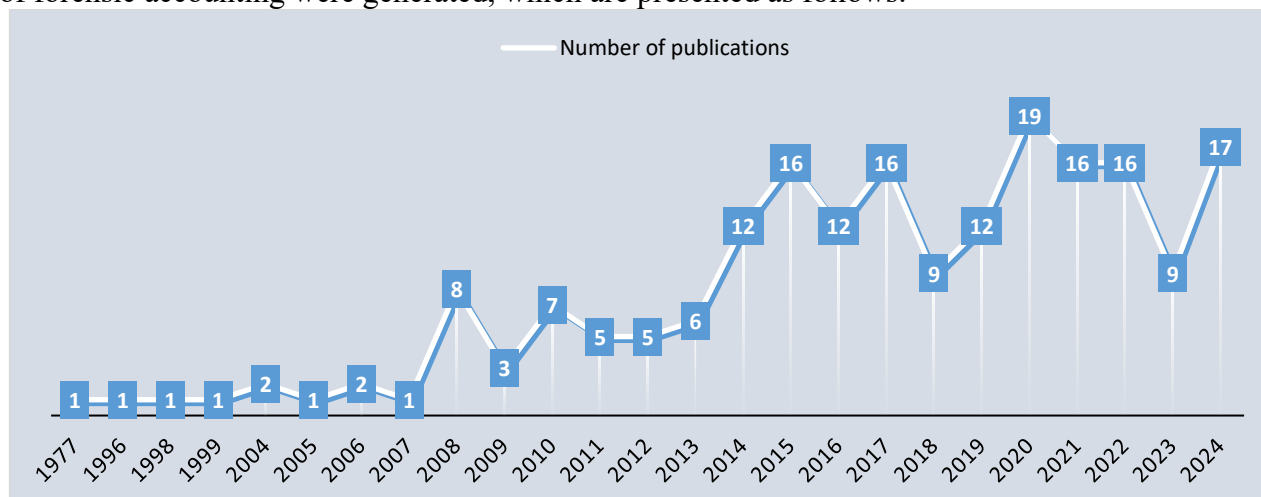


Figure 1. Evolution no. of publications on forensic accounting in the period 1977-2024

Sursa: Authors creation using the Web of Science database

Figure 1 shows the evolution of the works published between 1977-2024, which register the most publications in 2020, respectively a no. of 19 publications, followed by the years 2021 – 2022 with a no. of 16 publications, which demonstrates the increased interest of researchers in forensic accounting. The increase in the number of research in the field of forensic accounting in 2020 can be attributed to several factors, with the COVID-19 pandemic being a significant factor. The pandemic has created a volatile economic environment, which has led to increased fraud risks and the need for increased financial control. As businesses have faced unprecedented challenges, there has been an increased demand for forensic accountants to investigate fraud, assess financial damage, and provide expert information (Nourhene et al., 2024).

A study published in the Journal of Accountancy highlighted the unique challenges faced by forensic accountants in the economy affected by COVID-19, such as: difficulties in conducting interviews and witness statements physically due to social distancing restrictions, significant increase in fraud, disruptions in the coordination of financial investigations due to remote work, the need to adapt quickly to new conditions to maintain efficiency in fraud detection and prevention (Wiesenfeld, J., 2020).

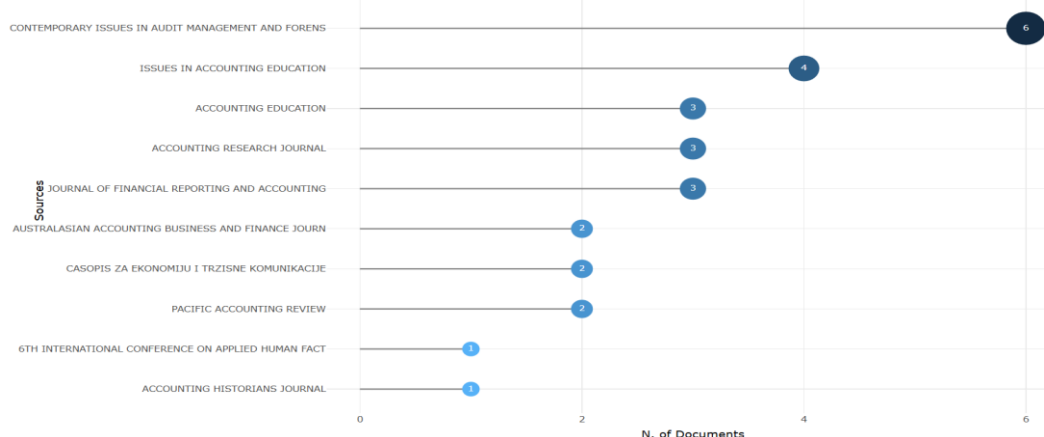


Figure 2 Most relevant source

Source: Authors creation using Bibliometrix (Biblioshiny)

Figure 2 shows the top 10 sources of publication of articles centered on the concept of forensic accounting. On the vertical axis are represented the sources, and on the horizontal axis the no. of documents related to each source. The journal with the most publications in the field of forensic accounting is *Contemporary Issues in Audit Management and Forens*, with no 6 documents, followed by the journal *Issues in Accounting Education*, with 4 documents. In the journals *Accounting Education*, *Accounting Research Journal*, *Journal of Financial Reporting and Accounting* there are a number of 3 documents in each. It can be mentioned that the most productive magazine is focused on auditing and fraud detection, which shows a major interest in transparency, ethics and financial integrity.

In order to capitalize on the main research directions of this topic, using the VOSviewer software, we used a bibliometric analysis of the literature. The analysis was based on the frequency of keywords in the titles and abstracts of scientific articles published between 1977 and 2024 on the Web of Science (WoS) platform. Thus, we have set a threshold of 2 keywords to appear together, and out of the total of 189 keywords, 24 meet the threshold.

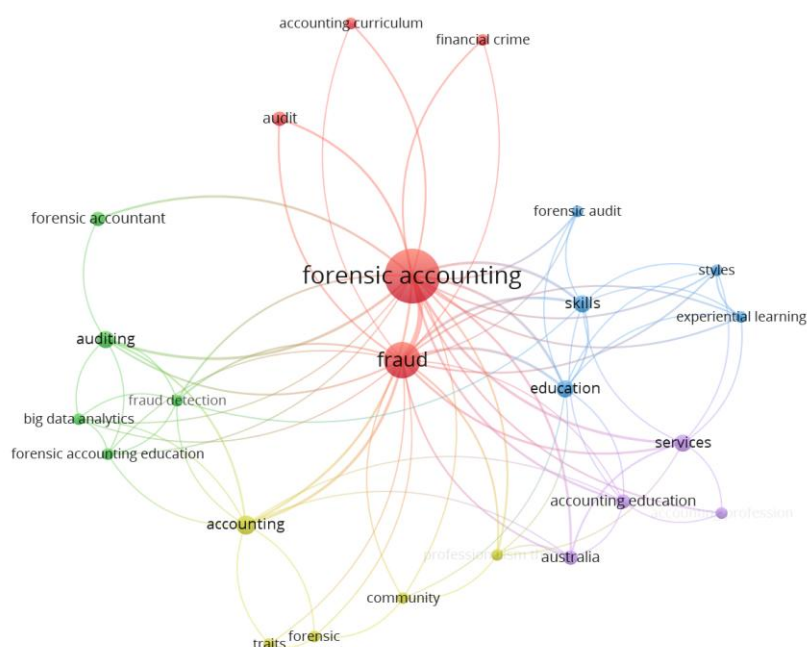


Figure 3. Co-occurrence cluster visualization of all keywords

Source: Authors' projection with VOSviewer

Figure 3 highlights the 5 significant clusters. It can be seen that among the largest circles, which mean the most cited words, there are terms such as "forensic accounting", "fraud", "audit", "accounting". This shows that most of the work focuses on the application of forensic accounting in fraud investigation and branches out towards education (education, accounting education), practice (skills, services, professionalism), technology (big data analytics, fraud detection).

The keywords in the cluster are presented according to the table:

Table 1 Keyword clusters in VOSviewer

Cluster 1 - red	Cluster 2 - green	Cluster 3 - blue	Cluster 4 - yellow	Cluster 5 - purple
accounting curriculum	auditing	education	accounting	accounting education
audit	big data analytics	experiential learning	community	accounting profession
financial crime	forensic accountant	skills	forensic	services
forensic accounting	forensic accountant education	forensic audit	professionalism theory	australia
fraud	fraud detection	styles	traits	

Source: Authors' projection

Table 1 shows the most dominant keywords for each cluster. The red cluster suggests the link between auditing, educational programs and financial crime in the field of forensic accounting. The Green Cluster focuses on advanced methods and technologies for fraud detection. The blue cluster is focused on skills, teaching methods and learning in the field of forensic accounting. The yellow cluster identifies the links between the accounting profession, professional traits and community, and the purple cluster shows interest in vocational training and the specific geographical context (Australia).

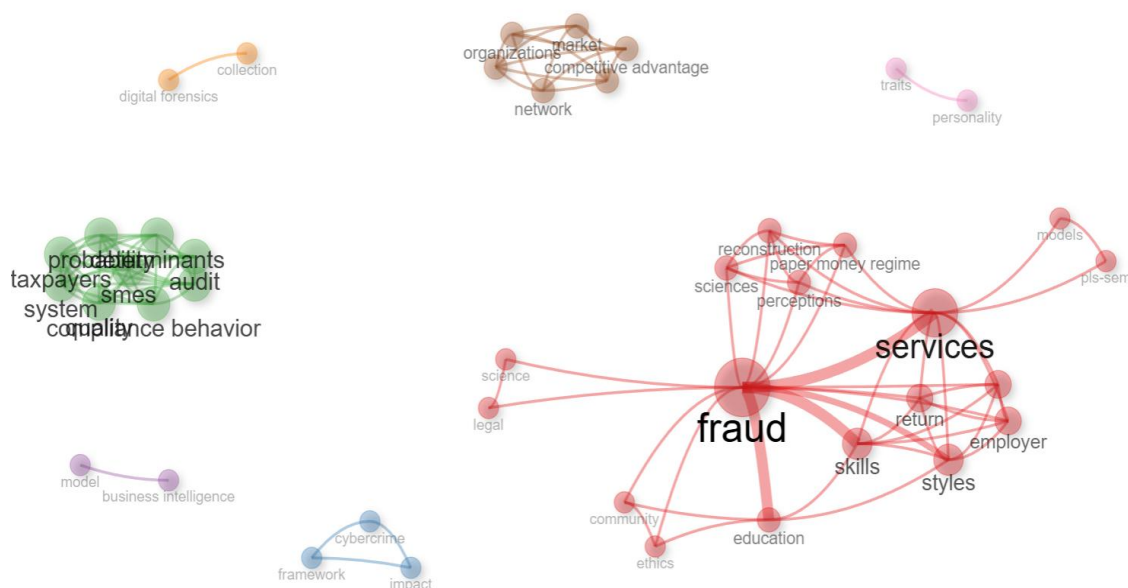


Figure 4. Thematic Map

Source: Authors creation using Bibliometrix (Biblioshiny)

In figure 4, the thematic map suggests the main area of research, namely fraud, related to educational, organizational, behavioral, technological and psychological factors. The red cluster has the most internal links, representing the core of the research. The green cluster is focused on topics related to auditing and taxation. The blue cluster deals with topics related to technological impact, and the brown cluster deals with organizational and psychological aspects.

As far as scientific evolution is concerned, as we can see in figure 5, the countries with the most papers are: USA with a no. of 16 documents, Turkey with a no. of 12 documents, Jordan with a no.

of 10 documents, Australia with a no. of 9 documents, China with a no. of 5 documents, Indonesia with a no. of 4 documents, Azerbaijan with a no. of 3 documents, India with a no. of 2 documents, Iran with a no. of 2 documents, Malaysia with a no. of 2 documents, Saudi Arabia with a no. of 2 documents, Canada one document.

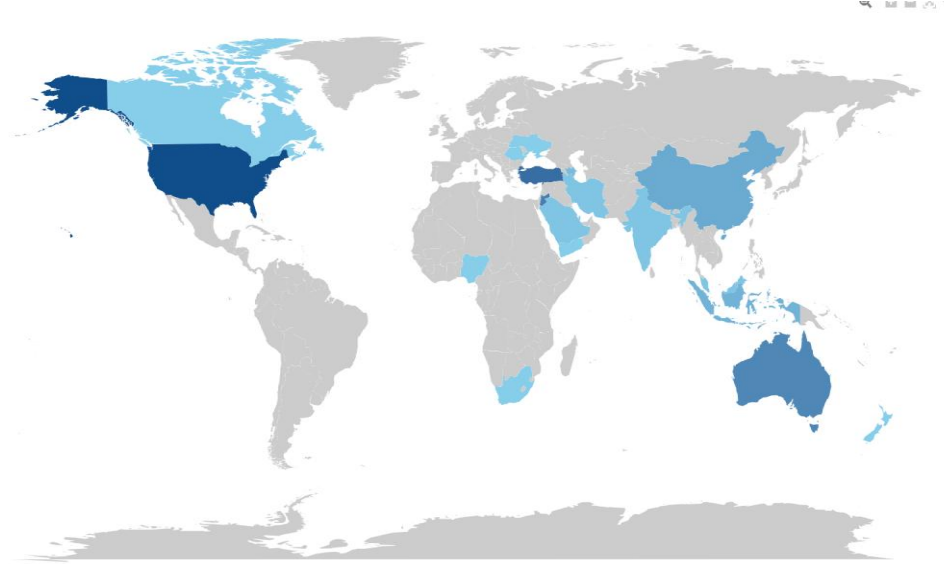


Figure 5. Countries' Scientific Production
Authors creation using Bibliometrix (Biblioshiny)

Figure 6 shows a graph with 3 fields for the first 20 articles with the following parameters: countries, journals to which most articles on forensic accounting belong and keywords.

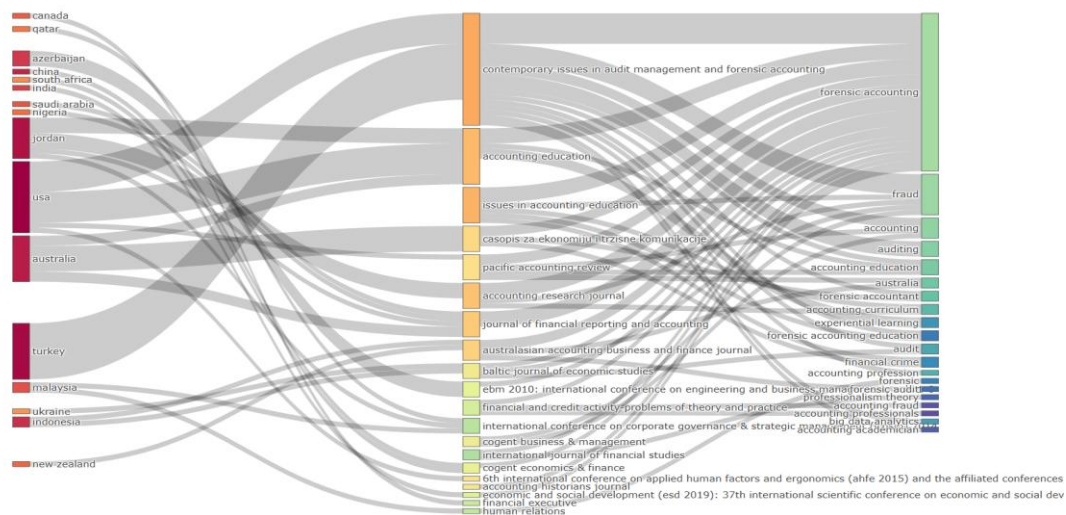


Figure 6. Three-Field Plot
Authors creation using Bibliometrix (Biblioshiny)

We notice among the top 3, the most relevant sources such as Contemporary issues in audit management and forensic accounting, Accounting education, Issues in accounting education. The three-field plot chart highlights the US, Turkey and Australia as the main contributors to the literature, focusing on topics such as forensic accounting, fraud and auditing, frequently published in high-impact journals such as *Contemporary Issues in Audit Management and Forensic Accounting* and *Accounting Education*.

Table 2 Most Global Cited Documents

Authors, year, magazine	DOI	Total citations
Rezaee, Z. and colab., 2019, Managerial Auditing Journal	10.1108/MAJ-08-2017-1633	40
Lawrence T.,B., 1998, Human Relation	10.1177/001872679805100901	27
Alshurafat, H., 2020, Accounting Education	10.1080/09639284.2020.1719425	24
Howieson, B., 2018, PAC Accounting Education	10.1108/PAR-01-2017-0005	21
Pearson T., A., 2008, Iss Accounting Education	10.2308/iace.2008.23.4.545	20
Van Akkeren, J., 2013, Pac Account Rev	10.1108/PAR-06-2012-0023	19
Heitger Le, 2008, Iss Accounting Education	10.2308/iace.2008.23.4.561	15
Kramer, B., 2017, Account Research Journal	10.1108/ARJ-06-2015-0082	15
Van Akkenren, J., K, 2022, Account Education	10.1080/09639284.2021.1960573	14
Digabriele, J., A., 2015, Account Research Journal	10.1108/ARJ-08-2014-0071	10

Authors creation using Bibliometrix (Biblioshiny)

Table 2 shows the most cited authors, the year and the journals in which they were published. The authors Rezaee, Z., Wang, J. are the most cited authors with the paper "Relevance of big data to forensic accounting practice and education" (2018), followed by the author Lawrence, T., with the paper "Examining Resources in an Occupational Community: Reputation in Canadian Forensic Accounting" (1998) and the authors Alshurafat, H., Beattie, C., Jones, G. & Sand, J., with the paper "Pereceptions of the usefulness of various teaching methods in forensic accounting education" (2019). These authors have had a significant impact on the literature, outlining the current directions of research in forensic accounting and education in this field.

5. Conclusions

Forensic accounting is a field of research and development in a context marked by the increase in financial fraud, the globalization of markets and the evolution of technology. The bibliometric analysis carried out on the basis of data extracted from the Web of Science, then using the VOSviewer and RStudio tools for data interpretation, aimed to highlight the academic interest in research in this field. The results of the research show a visible acceleration in the number of publications in recent years, especially during the COVID-19 pandemic, reflecting the idea that forensic accounting and fraud concerns have become increasingly in demand during this period. The most relevant keywords used by the authors in the literature were highlighted, such as fraud, forensic accounting, auditing, accounting education and artificial intelligence, reflecting the research directions. Geographically, the countries with the most publications are the United States of America, Australia and Turkey, followed by Canada, China and India, and the most cited authors are Rezaee, Z., Wang, J. with the paper "Relevance of big data to forensic accounting practice and education" (2018) – 40 citations. Studies in the field reflect an interdisciplinary approach, combining perspectives related to accounting with those in the field of education, technology, the internet and the notion of law, which suggests the need for collaboration between specialists from different fields.

At the same time, this study also highlights some important gaps and future directions, including those regarding the integration of artificial intelligence in the field of forensic accounting, the development of case studies and interviews with experts in this field, as well as the exploration of the role of forensic accountants in the prevention and detection of fraud.

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BIBLIOMETRIC ANALYSIS OF TRENDS IN INTELLECTUAL CAPITAL MEASUREMENT

DOI: <https://doi.org/10.53486/dri2025.56>

UDC: 657.421.3:[005.336.4+004.8]

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Abstract. *From an accounting perspective, information on intellectual capital must be presented in both financial and non-financial statements. In order to make the most balanced and realistic forecast for the future, it is necessary to assess trends in the measurement of intellectual capital up to 2025. Bibliometric analysis shows that the main trends since 1994 have been related to company performance, knowledge, innovation, corporate social responsibility, and human capital, while in recent years, studies have addressed intellectual capital together with the concepts of management, intangibles, big data, and disclosure. The digitization and use of artificial intelligence as an integral part of companies' activities requires updated regulations on reporting, and alignment with sustainability standards requires greater accuracy and transparency of information. In recent years, international regulatory institutions have made considerable efforts to standardize rules, but clear standards for measuring intellectual capital do not currently exist. Although the pace of technological development is rapid and it is difficult to predict the next 10 years, we have found that the main future trends are related to indicators, sustainability, reporting, competitive advantages, and financial performance, as well as modern multidimensional models for intellectual capital assessment.*

Keywords: *intellectual capital (IC), artificial intelligence (AI), digital economy. trends, measurement.*

JEL Classifications: M41

1. Introduction

Currently, entities are seeking innovative solutions to retain valuable intellectual capital whose activity and contribution contribute to both present and future benefits. Investors want to be as informed as possible and to assess as accurately as possible the activities of the companies in which they wish to invest. They therefore pay close attention to financial data, but also to non-financial data in the case of listed companies, in order to obtain as realistic a picture as possible. Moreover, banks, customers, current students, and future professionals have access to a wealth of information about policies and financial data via the Internet. It is well established that tangible assets are not the main drivers of profit. Human capital, through knowledge and skills, structural capital represented by the processes and databases used to carry out the activity, but also relational capital due to the establishment of healthy relationships with customers and suppliers are defining elements for the final result of the exercise, but also for future strategies and evolution. In this context, there is a tendency to include intellectual capital in non-financial reporting. In recent years, the Council of the European Union has developed a series of projects and directives, for example in Directive (EU) 2016/943 of

the European Parliament and of the Council of 8 June 2016, which specifies the importance of intellectual capital in relation to legal performance and market competitiveness. Other institutions that have taken steps in 2022 to include IC in technology companies are the European Financial Reporting Advisory Group (EFRAG) and the Institute of Chartered Accountants of Scotland (ICAS), and with regard to Romanian legislation, this requires companies with more than 500 employees to prepare and publish annual ESG reports, which also include information on intellectual capital policies. This provision is based on Ministry of Public Finance Orders No. 1938/2014, No. 3456/2018, and No. 85/2024.

With regard to financial reporting, methodological rules for the valuation of intellectual capital have not yet been established, although in the context of digital skills and the use of artificial intelligence by employees, clear regulations on the valuation of intangible assets by the competent institutions are needed. In order to understand the evolution of the concept and the need to measure intellectual capital, we have carried out a bibliometric analysis that will help us identify the most important aspects from 1994 to 2025.

2. Basic content.

With access to the internet, it is much easier to follow the evolution of the main problems that specialists in the field are seeking solutions for. The same is true in the field of accounting. The exchange of information, the confrontation of ideas, and the comparison of different working systems are much easier through digitization and the online environment (Rossi et al., 2018). This is beneficial both for doctoral students and for accounting practitioners who have learned to understand and signal the need to measure and highlight intellectual capital. The larger the company, the greater the need to report IC (Sharma & Dharni, 2017). This phenomenon can be explained by the diverse situations faced by management and the search for the best solutions to overcome them. In addition, there are many more working relationships: with customers, suppliers, banks, and between employees. A previous bibliometric analysis highlighted that between 2000 and 2020, countries such as Italy, Australia, and the United States produced the most scientific papers addressing emerging topics related to intellectual capital (Bamel et al., 2022). Another study presented the topic of intellectual capital reporting as a strategy, but also as a means of collaboration between the collaborating parties of an organization (Paoloni et al., 2023), which could contribute to the uniform distribution of information to them, resulting in increased reputation and sales due to customer attraction and retention. Other authors recognise that there is an important new industry, that of knowledge, pointing out that in practice few current techniques for measuring IC are known (Kannan & Aulbur, 2004).

The bibliometric analysis is based on the study of 655 papers resulting from entering the term "trends in intellectual capital" into the Web of Science search engine. We found that the first publication in this database was in 1994. A graphical representation of the number of publications per year is shown in Figure 1.

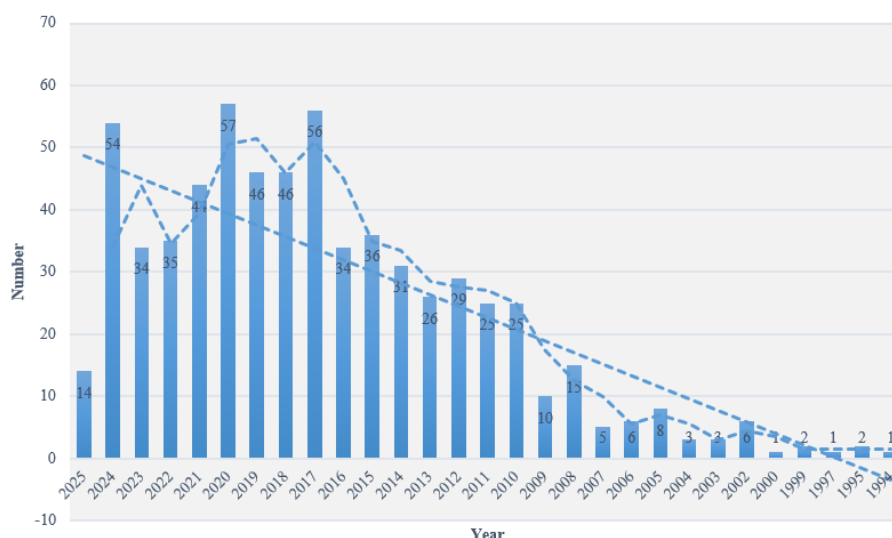


Figure 1. Annual scientific production

Source: processing authors using the Biblioshiny program

We note that 2017, 2020, and 2024 are the most productive years in terms of the number of papers produced, with a steady increase from 2009 to 2017. This increase can be explained by the fact that since 2017, many companies have started to integrate digital technology more into their activities, and in 2020, with the onset of COVID-19, the role of intellectual capital in finding the best strategies to overcome crisis situations but also for keeping companies running in general. 2024 is the year when artificial intelligence and intellectual capital were the focus of many scientific events, with more and more people looking for ways to report on them and use them together without them messing with each other.

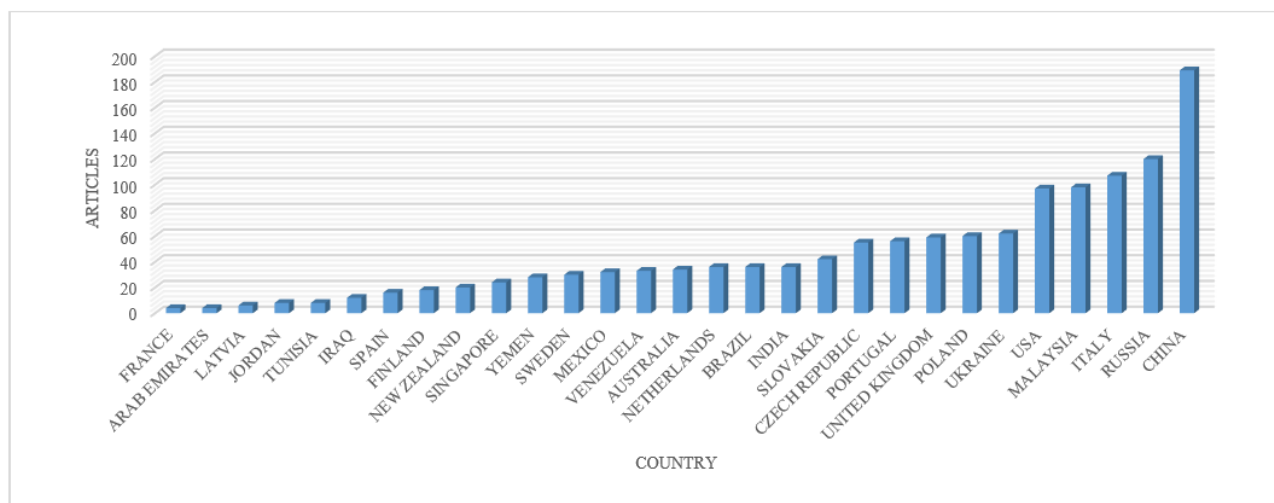


Figure 2. Countries' production over time

Source: processing authors using the Biblioshiny program

Figure 2 shows that among the countries with the highest interest in the term analyzed are: China with 189 articles, Russia with 120, Italy with 107, Ukraine with 62, and Portugal with 56. China is one of the countries with numerous developed brands and technologies, with investments in innovation. On the other hand, from a historical and political point of view, Russia has gone through important stages in terms of its economy, and in the context of the war with Ukraine and the measures taken by the EU regarding economic relations and currency circulation, it has directed major investments into research and development, brands, and local know-how. Italy is an important partner of EFRAG in

divided into 4 big clusters: intellectual capital, business performance, human capital, and financial performance. We noticed common terms: intellectual capital, measurement, impact, human capital, competitive advantage, firm, model, strategy. The purpose of the comparison was to verify whether the papers resulting from the two keywords addressed both the trends and the issues of intellectual capital measurement. Traditional methods of measuring IC, Market Capitalization Methods, focus on comparing either the market value with the book value of tangible assets, and the remaining difference is considered to be IC; or on determining the monetary value of IC by assessing individual values, but these methods often encounter subjectivity. At present, there is a desire to transition to hybrid models that will combine quantitative information with non-financial information. Furthermore, the aim is to highlight the connections between IC performance and the achievement of long-term benefits. From another point of view, we note that the mandatory sustainability reports reflect an awareness that human, relational, and structural capital can also be measured by non-financial indicators, which, although based on figures and calculations, also include narrative descriptions. This increases the understanding of the importance of allocating more resources to its development by determining employee retention rates, training and professional development expenses, and the level of process technology.

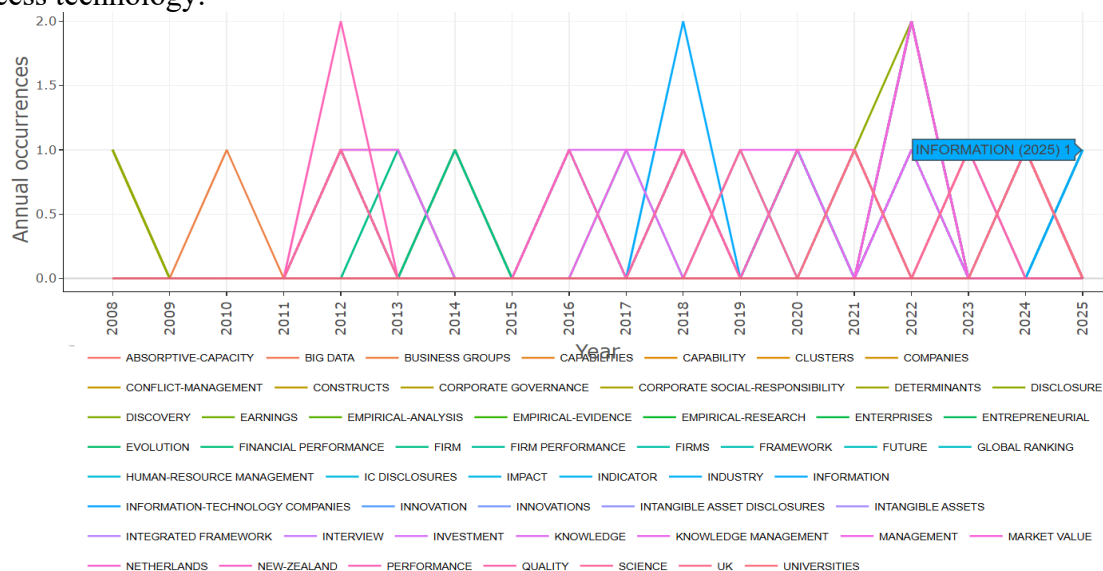


Figure 4. Words' Frequency over Time

Source: processing authors using the Biblioshiny program

Since 2008, we have analyzed the most frequently used keywords to identify the main issues that have been analyzed over time in relation to our research. Thus, we found that in 2008 the most frequently analyzed term was disclosure, in 2010 business groups, in 2012 performance, in 2013 knowledge, in 2014 firm performance, in 2017 management, in 2018 information, in 2019 sciences, in 2022 market value, in 2024 universities, and in 2025 information. We therefore conclude that practitioners and researchers in the field have identified close connections between intellectual capital, performance, and information. We believe that future trends will include key terms such as digitization, artificial intelligence, software, intangible asset valuation, sustainability, standards, IAS, and IFRS GRASP. Intangible assets are an integral part of business, especially in the context of the new digital economy (Butnaru, 2024). Intellectual capital cannot be measured without establishing specific indicators and methods that allow for comparability between different companies in different fields of activity. Artificial intelligence can create opportunities to analyze large amounts of data and values, but the final reasoning must be the product of intellectual capital. In principle, it should be borne in mind that all information made available through artificial intelligence must be designed for the human ability to understand and filter both financial and non-financial information.

3. Conclusions.

Intellectual capital is a rediscovered resource for the entire economy. Bibliometric analysis has shown that interest in measuring its contribution to company performance has been around for several decades, but according to the analysis, the number of papers addressing this topic is constantly growing. Reporting, information, performance, knowledge, and innovation are just a few of the terms that are analyzed together with intellectual capital, so it cannot be treated separately by practitioners. It is a valuable intangible asset that should not be viewed as an expense, but as a source of value creation. According to data from countries such as China, Russia, and Italy, most of the work on this topic comes from these countries. Access to information and digitization must standardize the level of appreciation of future economic benefits, and international bodies must develop clear standards and norms for measuring and reporting intellectual capital as soon as possible so that companies' situations are transparent, real, and comparable. We want a sustainable economy and integrated reporting based on quality information, but this is only possible after implementing practices that are adapted to current business needs and visions. Allocating more smart resources to figure out the value benefits of intangibles and reporting them will create competitive advantages for both investors and other stakeholders.

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SECTION 5: LAW

PERSPECTIVES AND PROBLEMS ARISING IN THE ESTABLISHMENT OF GUARDIANSHIP AS A MEASURE OF JUDICIAL PROTECTION

DOI: <https://doi.org/10.53486/dri2025.57>

UDC: 347.64(478)

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Abstract: *In this article we propose to make an analysis and evaluation of some aspects related to the application of legislation regarding the establishment of judicial protection measures, the grounds, forms and principles of judicial protection, in order to protect the rights and legitimate interests of the persons placed under protection. We will pay particular attention to the principle of respecting the wishes and feelings of the person concerned when establishing and implementing measures to protect, in this case, the incapacitated adult, the concerns of the international community in terms of protection based on the past and present wishes and feelings of the person concerned. The regulation of the procedure for the establishment of protective measures is the internal competence of the state, so that each state has its own treatment of this aspect. We will make recommendations for further research in the field of civil procedure for the establishment of judicial protection measures.*

Key words: *protective measure, provisional protection, legal representative, special civil procedure, legal representation, rights.*

1. Introduction

The object of judicial activity in civil procedure changes depending on the category of legitimate rights and interests to be defended in court. For these reasons, civil procedure also includes several types of procedure, including special procedure. Research methodology used. The results of the work were obtained by using the following methods of knowledge: synthesis, analysis, and comparison. The latter contributed to highlighting the way in which special procedures are regulated in the Code of Civil Procedure of the Republic of Moldova. Presentation of the basic content According to art. 280 para. (1), (2) and (3) of the CPC. (1) In special procedure, cases are examined by courts according to the rules for examining civil actions, with the exceptions and additions established in this code in chapters XXIII-XXXIV and in other laws. According to art. 279 para. (1) letter e) of the Code of Civil Procedure of the Republic of Moldova [2], "The court examines cases regarding contractual and judicial protection measures in a special procedure".

Regarding the notion and legal nature of the special procedure in the specialized literature, different opinions are expressed. Some authors also mention the fact that in the order of the special procedure, not only the legal facts are established, on which the emergence or extinction of personal or patrimonial rights of citizens or organizations depends, but the presence or absence of the non-contentious right is confirmed, as well as the legal status of the citizen or patrimonial property is also established [1, p. 117].

In paragraph (1) letter f) of article 302 of the CPC of the Republic of Moldova, the legislator provided for the possibility of expanding the number of cases to be examined in a special procedure on protection measures. The list of cases listed in paragraph (1) letter (a) – letter (e) of article 302 of the CPC of the Republic of Moldova is non-exhaustive. Thus, article 302 paragraph (1) letter (a) – letter

(e) of the CPC of the Republic of Moldova stipulates non-exhaustively the cases for establishing facts that have legal value, to be examined in the procedure on protection measures, as follows: a) for establishing, renewing or revoking a judicial protection measure (provisional protection, guardianship or curatorship); b) for modifying the conditions under which a judicial protection measure is exercised; c) to appoint and revoke the temporary guardian, curator, tutor, members of the family council, substitute curator, substitute guardian, special curator, special guardian; d) to challenge the decisions of the family council or the guardianship authority in any aspect related to the contractual or judicial protection measure; e) to challenge the fact of producing the effects of a protection mandate in the future, to suspend, revoke the protection mandate in the future, as well as to grant additional powers to the trustee or a special trustee; f) to resolve other issues regarding contractual or judicial protection measures which, according to the law, are within the jurisdiction of the court.

Pursuant to art. 64 para. (1) and (4) and art. 96 para. (1) and (4) of the Civil Code of the Republic of Moldova no. 1107 of June 6, 2002 (republished in the Official Gazette of the Republic of Moldova, 2019, no. 82, 86, art. 661), the Government published the Draft for the approval of the Regulation on the publicity of protection measures, which approves the Regulation on the publicity of protection measures (according to annex no. 1) and the Model of the extract on the judicial protection measure (according to annex no. 3). According to point 3 of the same draft, the decisions and rulings by which guardianship or curatorship were established, modified or revoked in respect of the minor by the guardianship authorities and family councils, as well as the court rulings by which judicial protection measures are established, modified or revoked (hereinafter – protection measures), issued from the moment of entry into force of Law no. 66/2017 on the amendment and completion of certain legislative acts and until the moment of entry into force of this Government Decision, shall be communicated by the issuing authorities to the authority competent to publicize the protection measures, within 30 days from the date of entry into force of this Government Decision.

At the same time, the Court Administration Agency is to submit a monthly Statistical Report on judicial protection measures established, modified and revoked by national courts to the competent authority for the publicity of protection measures.

By approving the Regulation on the publicity of protection measures, the aim is to regulate the manner in which publicity will be ensured for the establishment, modification and revocation of guardianship and trusteeship in respect of a minor, of the judicial protection measure in respect of a person of legal age or who has acquired full legal capacity in another way (hereinafter - publicity), the information disseminated on the occasion of the respective publicity and the right of interested persons to obtain extracts regarding the guardianship/trusteeship of the minor or the judicial protection measure. The competent authority for the publicity of protection measures is the Ministry of Justice, with the direct support of the Legal Information Resources Agency [2].

According to art. 74 of the Civil Procedure Code of the Republic of Moldova: „In cases established by law, the competent public authorities, on their own initiative, at the request of the participants in the process or ex officio of the court, may intervene in the process until the decision is pronounced in the first instance, as well as in the appeal court, in order to submit conclusions, according to their function, in order to defend the rights, freedoms and legitimate interests of other persons, the interests of the state and society.

The court may, as the case may be, ex officio introduce the competent public authority into the process to submit conclusions on the case under examination. The authorities mentioned in this article have the procedural rights and obligations of participants in the process specified in art. 56 of this code, as well as in other laws.

The provisions of the mentioned article stipulate another form of participation in civil proceedings of public authorities for the protection of the rights, freedoms and interests of other persons – submission of conclusions [3, p. 262].

Thus, the purpose of participation in the proceedings of public authorities for the submission of

conclusions is the fulfillment of their duties [4, p. 35] in order to protect the rights, freedoms and interests of other persons, the interests of the state and society.

Submission of conclusions by competent public authorities may take place on the basis of three grounds: on the public authority's own initiative; at the request of the participants in the process; ex officio of the court [5].

Submission of conclusions as a form of participation of public authorities in civil proceedings is made only if this is expressly provided for by law. Legal provisions may stipulate the obligation to submit conclusions or the possibility of this action [4, p. 36].

The cases of participation of public authorities in the trial for the submission of conclusions are provided, in principle, by the norms of family law, civil law and civil procedural legislation. Most often, the guardianship authority participates in the civil trial for the submission of conclusions.

The Civil Procedure Code of the Republic of Moldova stipulates the mandatory participation of the guardianship authority in the examination of the following cases: the establishment of judicial protection measures. According to art. 302 para. (3) of the Civil Procedure Code of the Republic of Moldova: "The court examining the application for the initiation of the trial regarding the protection measure requests the personal file from the guardianship authority at the domicile of the individual."

2. Trends and evolution of the procedure for establishing protective measures

By Law No. 133 of 15/11/2018, the Civil Code of the Republic of Moldova was modernized. To this end, the latest legislative developments at the international and European level were studied and taken into account, and in particular: The Draft Common Frame of Reference of the European Union, developed by the academic environment in Europe, published in 2008. In the part where certain provisions are taken from the DCFR, their interpretation and application took into account the official commentaries and illustrations accompanying the DCFR, the German, French and other Civil Codes were studied, the amendments were made according to the latest European and international trends in the matter, in order to make the legislation in the matter more accurate and predictable [8].

The amendments to art. 1408 and 1409 of the Civil Code of the Republic of Moldova adjust the terminology regarding incapacitated persons to the new terminology of the protection of the individual. At the same time, the provisions of the new Civil Code and the modernized Civil Procedure Code of the Republic of Moldova reflect the trends of international legislation towards equality between persons with full and partial discernment.

According to art. 66 of the Civil Code of the Republic of Moldova: "The court and the guardianship authority exercise general supervision of protection measures, according to the competence provided by law. Both the court and the guardianship authority may visit or request visits to protected persons and those in respect of whom a request for the establishment of a protection measure has been submitted". In the case of examining the request provided for in art. 302 paragraph (1), the court hears the individual. He or she may be accompanied by another person of his or her choice, who will not have the capacity of representative in the process. The hearing takes place in a secret session, which may be attended by the persons listed in art. 4830 paragraph (1) of the Civil Code. The person's lawyer is informed of the time and place of the hearing. The individual may request to be heard individually and in private, accompanied, if desired, by a person of his or her choice. If necessary, the individual may also be heard in the presence of the other participants. According to paragraph (3) of art. 308 of the Civil Code of the Republic of Moldova: "The individual may request to be heard individually and in private, accompanied, if desired, by a person of his or her choice."

If necessary, the individual may also be heard in the presence of the other participants. At the same time, if it deems it necessary, the court may conduct the hearing of the individual in the presence of the doctor treating him or in the presence of another relevant person". The provisions of the Code of Civil Procedure stipulate the mandatory participation in the trial by the guardianship authority when examining the following cases: the establishment of provisional protection (art. 297 CC of the RM); the establishment

of judicial protection measures in the form of guardianship and trusteeship (art. 102 CC of the RM).

In accordance with art. 94 of the Civil Code of the RM: "The request for the establishment of a judicial protection measure may be submitted by the guardianship authority. However, the guardianship authority may submit the request provided for in art. 94 paragraph (1) only if the persons indicated in paragraph (1) letters a)-e) have failed to submit it within 3 months from the date of their notification by the guardianship authority".

Art. 96 of the Civil Code of the Republic of Moldova stipulates the obligation to comply with the formalities of publicity of protection measures, under penalty of non-enforceability against third parties. At the same time, if by decision of the family council the guardian is appointed or revoked or by decision of the family council, as the case may be, of the guardianship authority, pursuant to Art. 136 of the Civil Code of the Republic of Moldova, the guardianship authority is obliged to send a copy of this decision to the competent authority for the purpose of carrying out the respective registration, except in the case of contesting the decision in court.

In the cases provided for by law, rights, acts, facts or legal relationships become opposable to third parties exclusively by notation, unless it is proven that they were known in another way, except in the case where the law results that mere knowledge of them is not sufficient to compensate for the lack of publicity.

The absence of the notation provided for in art.435 paragraph (2) point 15) CC does not eliminate the opposability against third parties if the advertising formalities provided for in the said article have been fulfilled (art.96 paragraph 5).

According to art. 302 of the Civil Procedure Code of the Republic of Moldova: "In the procedure regarding protection measures, the following cases are examined: for the establishment, renewal or revocation of a judicial protection measure (provisional protection, guardianship or curatorship); for the modification of the conditions under which a judicial protection measure is exercised; for the appointment and revocation of the provisional protector, curator, tutor, members of the family council, substitute curator, substitute guardian, special curator, special guardian; for contesting the decisions of the family council or the guardianship authority in any aspect related to the contractual or judicial protection measure; for the resolution of other issues regarding contractual or judicial protection measures which, according to the law, are within the jurisdiction of the court.

At the request of the participants or ex officio, the court may order a social investigation or the making of findings by any relevant authority or person. (art. 308/3 CPC). Public authorities that intervene in the process to submit conclusions shall only exercise the procedural rights and obligations of participants in the process specified by art. 56 CPC and other laws. Thus, the procedural rights and obligations of public authorities that participate in the process to submit conclusions are more restricted than in the case of the first form of participation in the process of public authorities in order to defend the legitimate rights and interests of other persons (art. 73 CPC).

At the same time, the action in defense of the interests of a person in respect of whom a measure of judicial protection (provisional protection, curatorship or guardianship) is established may be filed independently of the existence of the request of an interested person or his legal representative (art. 73 paragraph 1 CPC).

If the bodies, organizations, individuals who filed the lawsuit withdraw their action filed in the interests of the plaintiff, and the latter does not wish to intervene in the lawsuit, the procedural effects provided for in art.72 paragraph (2) occur.

Thus, the plaintiff's waiver of the claims filed in defense of the interests of the protected person does not deprive him of the right to request examination of the case on the merits. The issue of participation in the lawsuit of the competent public authorities for submitting conclusions is resolved by the judge at the stage of preparing the case for judicial debates (art. 185 paragraph (1), letter a) CPC).

The court examines cases in special procedure regarding contractual and judicial protection measures (art.279 par.1, letter e) CPC). In special procedure, the court examines cases with the participation of the petitioner, other interested persons, as well as public authorities according to art.74 CPC.

Individuals may defend their interests and rights protected by law in court personally or through representatives [7, p. 14]. Depending on the legal importance of the will of the represented persons for the emergence of judicial representation, we highlight: legally mandatory representation – for the emergence of which the consent of the represented person is not required; and non-mandatory representation – which can occur only at the request of the represented person [6, p. 58].

According to art.306 of the CPC of the Republic of Moldova: "In the case of a request for the establishment, modification or revocation of a judicial protection measure, the natural person may choose a lawyer or may request the appointment of a lawyer who provides state-guaranteed legal assistance" [9].

3. Perspectives and problems arising within the procedure for the establishment of protection measures

A person who has reached the age of majority or who has acquired full legal capacity in another legal way and who, as a result of a mental illness or a physical, mental or psychological deficiency, cannot fully be aware of his actions or express his will may benefit from a protective measure, established according to his condition or situation.

The protective measure aims to protect both the person and his patrimonial interests. Protective measures pursue the interest and well-being of the person in respect of whom they are established and promote, as far as possible, his autonomy.

The article 92 Civil Code of the Republic of Moldova, provides subsidiary nature of judicial protection measures: " **The judicial protection measure may be instituted by the court only if it is necessary and if the person is not sufficiently protected by applying the legal provisions regarding the maintenance obligation of the spouse and relatives, regarding the regime of the common property of the spouses, regarding the assistance in decision-making or by the mandate for the protection of the respective person in the future.**" Also, the measure of judicial protection must be individualized and proportionate to the degree to which, as a result of a mental illness or physical, mental or psychological deficiencies, the person cannot become aware of his actions or express his will." [10].

In case no. 2r-2374/22 before the Chisinau Court of Appeal, the validity period of the psychiatric-legal expertise is invoked, which is short at only 2 months, and in case the request for the establishment of the judicial protection measure is returned, it will be necessary to conduct a new expertise, a situation that creates inconveniences for both the incapacitated person and his/her caregiver, in the person of the appellant, the latter having to bear additional travel and expenses. [11].

In case no. 2r-1321/22 before the Chisinau Court of Appeal, it was held that art. 303 paragraph (1) of the Code of Civil Procedure establishes that the petitioner is exempt from paying the costs related to the process regarding the protection measure. Thus, corroborating the legal provisions cited above, the College concludes that in this case, the petitioner is exempt by law from paying the state fee for filing the application. As for the need to present the extrajudicial expert report, the College points out that, indeed art. 307 paragraph (2) of the Code of Civil Procedure provides that, the application shall be accompanied by the report of the extrajudicial psychiatric expert report of the person in respect of whom the institution of the protection measure is requested, issued no later than 2 months before the date of filing the application. However, art. 304 paragraph (1) of the Code of Civil Procedure provides that the court, ex officio or at the request of the participants, in preparing the case for judicial debates, may order the performance of a psychiatric examination of the individual. In the case, by application, the case was requested to be put on the list, the petitioner explained that her daughter has a childhood disability and is periodically subjected to an examination. At the same time, she indicated that she is

unable to pay the cost of an extrajudicial examination, requesting exemption from its payment. Here it is noted that art. 303 paragraph (1) of the Code of Civil Procedure establishes that the petitioner is exempt from paying the expenses related to the process regarding the protection measure. [12].

In case no. 2r-745/22 of the Chisinau Court of Appeal, it was held that according to the stated legal norms, the psychiatric expertise can be performed both extrajudicially and ex officio or at the request of the participants in the preparation of the case for judicial debates, thus the Civil Board considers the court's conclusion to return the application submitted by the petitioner premature. For the reasons mentioned, in order not to violate the appellant's right to a fair trial, provided for by art. 6 §1 ECHR, the Civil, Commercial and Administrative Litigation Board of the Chisinau Court of Appeal comes to the conclusion to admit the appeal, to fully quash the decisions of the Chisinau Court of Appeal, Centru headquarters of December 10, 2021 and January 13, 2022, with the return of the case to the trial court, in the same panel of judges, at the stage of receiving the application. [13].

In case no. 2a-1981/21 the Chisinau Court of Appeal held that, in accordance with art. 103 paragraph (2) of the Civil Code (edition of 01.03.2019) by way of derogation from paragraph (1) of the given article, in the case of the establishment of guardianship, the court, based on the psychiatric expert report confirming that, given the stage of development of science, there are no obvious signs that the person's condition will improve, may establish, by reasoned decision, a term of up to 10 years. [14].

According to the data of the National Bureau of Statistics of the Republic of Moldova, persons recognized as disabled (beneficiaries of disability pensions and state social allowances for disability) represent about 7 percent of the population with habitual residence in the country. The majority of persons recognized as disabled are aged 30-45. On January 1, 2024, according to data from the National Social Insurance House, the number of people recognized as disabled in the Republic of Moldova was 161.9 thousand people, including 11.4 thousand children aged 0-17 years. (Figure 1).

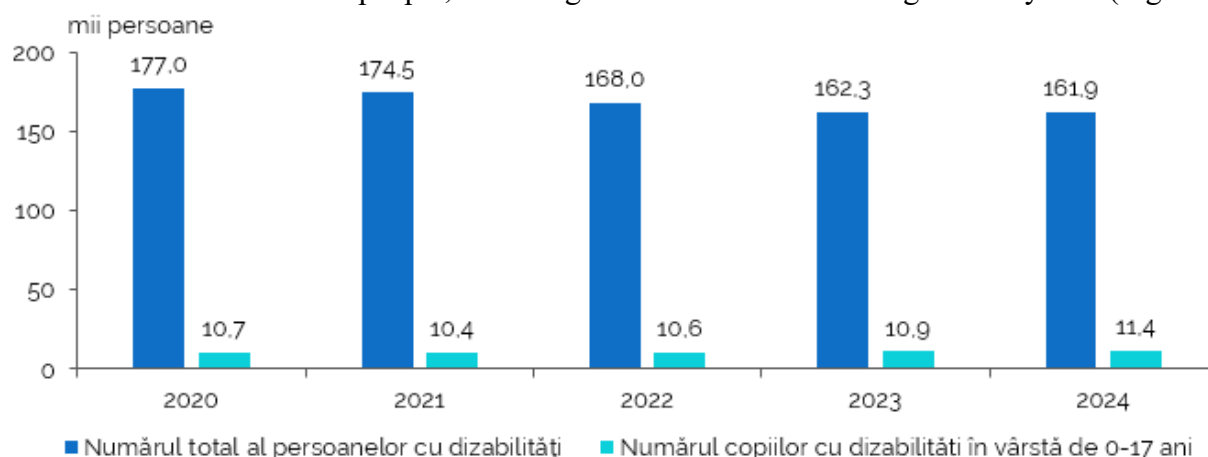


Figure 1. Number of people recognized as disabled on January 1, 2024

Source: www.bns.md

The demographic situation in the Republic of Moldova shows that the elderly population is growing both in absolute and relative terms. The share of elderly people recognized with primary disability constitutes 11.4% of the total number of people certified with primary disability (Table 1)

Table 1. Disability pensioners, by age group and gender, as of January 1, 2024

	2023			2024		
	Total	Woman	Man	Total	Women	Man
Total disability pensioners, thousands	105,2	53,8	51,4	101,7	52,7	49,0
including by age group (%):						
16-29 years	0,5	0,5	0,5	0,5	0,5	0,5
30-54 years	28,9	31,6	26,0	27,6	30,0	25,0
55-64 years	45,3	40,5	50,3	44,9	40,6	49,6
65 years and over	25,3	27,4	23,2	27,0	28,9	25,0

Source: The National Statistical Office of the Republic of Moldova

The share of people aged over 60 is continuously increasing. In the last five years, the share of the elderly in the age group 70-74 years in total elderly has increased by 6.0 percentage points (from 16.3% at the beginning of 2020 to 22.3% at the beginning of 2024), while the share of the other groups has decreased slightly. (Figure 2) [15]

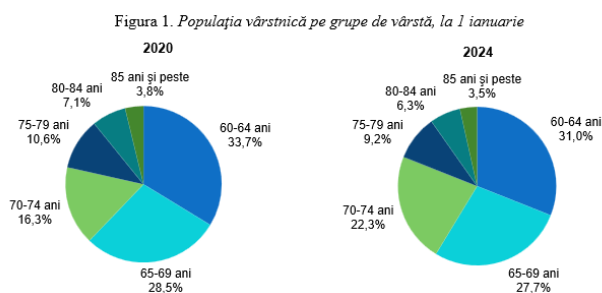


Figure 2. Elderly population by age group, on January 1, 2020 – and on January 1, 2024

Source: www.bns.md

Republic of Moldova that provides support to persons with disabilities, their family members who require protection, support and information through the Free Telephone Assistance Service for Persons with Disabilities at telephone number 080010808 (FTASPD). This service was launched in January 2017 by the Keystone Moldova Association and is funded by the European Union between 24.01.2017 and 27.04.2019. Since June 2019, the Keystone Moldova Association has been administering and managing the Free Telephone Assistance Service for Persons with Disabilities by contracting with the Ministry of Labor and Social Protection of the Republic of Moldova.

This National Service provides to disabled people and their family members: telephone information support; telephone counseling; multidisciplinary collaboration to resolve cases of rights violations; identification of suspected cases of violation of the rights of disabled people and reporting them to competent bodies and partner organizations; notification of situations of risk to the life, security and integrity of the disabled person. Disabled people, their family members, elderly refugees from Ukraine can also benefit from the assistance provided by FTASPD. [16]

The FTASPD service provides: information support on accessing services for refugees; support in completing online applications for requesting monetary assistance; support in accessing the services of mobile teams for disabled people, people with serious health conditions, in order to benefit from monetary assistance; identification of accommodation places for people with severe disabilities, families with children with autism; identification of assistive equipment and providing it; psycho-emotional support.

Measures to protect people with disabilities are:

-Assistance contract (Article 74,75 of the Civil Code of the Republic of Moldova), when the protected person (with disabilities) signs a contract with any freely chosen person (assistant). The assistant will be obliged to be present at the conclusion of legal acts and the making of other decisions by the protected person, to provide him with necessary information, to help him in communicating with third parties. The assistant can countersign the act concluded by the protected person.

-Mandate for future protection (Article 76-91 of the Civil Code of the Republic of Moldova), when the person who has reached the age of majority and has full legal capacity (the principal) can empower one or more persons (mandates) to represent him in the situation where, as a result of mental illness or physical, mental or psychological deficiencies, he will not be able to realize his actions or express his will in the future. The mandate may take the form of a power of attorney, a mandate contract or other notarized legal document. In this case, during the execution of the mandate for future protection, the mandate can be revoked only by a court decision, according to Article 83 of the Civil Code of the Republic of Moldova. In practice, if the agent exercises the protection mandate in the future in a way that harms the interests or well-being of the principal, the court may revoke the powers of attorney of the agent in whole or in part.

At the same time, the court may intervene in the manner of exercising the protection mandate in the future, to cancel the countersignature of the protection mandate in the future by the guardianship authority carried out according to art. 81 para. (1) Civil Code of the Republic of Moldova, if the legal conditions have not been met, as well as to interpret its content or to determine the conditions and manner of execution of the protection mandate in the future, according to art. 84 of the Civil Code of the Republic of Moldova.

In practice, if the trustee exercises the future protection mandate in a manner that harms the interests or well-being of the principal, the court may revoke the trustee's powers in whole or in part. At the same time, the court may intervene in the manner of exercising the future protection mandate, to annul the countersignature of the future protection mandate by the guardianship authority carried out in accordance with art. 81 para. (1) of the Civil Code of the Republic of Moldova, if the legal conditions have not been met, as well as to interpret its content or determine the conditions and manner of executing the future protection mandate, according to art. 84 of the Civil Code of the Republic of Moldova.

-Temporary protection (Article 97 of the Civil Code of the Republic of Moldova), the court may establish, by court decision, temporary protection with respect to a person who, pursuant to Article 65 paragraph (1) of the Civil Code of the Republic of Moldova, needs temporary protection or representation for the performance of only certain legal acts.

By way of derogation from paragraph (1), temporary protection may be established by the court by decision, for the period of the procedure for establishing guardianship or tutelage.

In judicial practice, civil cases arise regarding the need to establish temporary protection, ex officio, by the court, if the request for the establishment of a judicial protection measure in the form of tutelage is rejected on the grounds that the petitioner has not lived with the person under protection for the last 3 years in accordance with Article 108 of the Civil Code of the Republic of Moldova. [17]

In our opinion, in accordance with the provisions of the Civil Procedure Code of the Republic of Moldova, it is necessary for the court to express itself regarding the voting ban in this case, if according to the psychiatric expert report, it was concluded that the person concerned is indiscriminate and cannot be aware of his actions, having a diagnosis of mental disabilities that are irreversible over time according to the findings of the judicial expert doctor with at least 15 years of experience in the field.

By Decision No. 25 of 2018 of the Constitutional Court of the Republic of Moldova, it was found that Article 38 of the Constitution of the Republic of Moldova establishes that, in cases provided for by law, the right to vote may be restricted. The manner and conditions in which this can be achieved are listed in the provisions of Article 54 of the Constitution. At the same time, the Republic of

Moldova, in order to guarantee the right to vote to a person with mental disabilities, should be accompanied by the declaration of unconstitutionality of certain provisions of the Civil Code and the Criminal Code, which establish the nullity of the legal act concluded by a person in respect of whom a measure of judicial protection is established and, respectively, the impunity of criminal liability in the case of an irresponsible person. In the case of *Alajos Kiss v. Hungary*, 20 May 2010, the Hungarian government argued that depriving persons placed under guardianship of the right to vote ensures the maintenance of society's trust in the electoral system. The European Court confirmed the legitimacy of such a purpose (§ 40). The Court admits that this legitimate aim could also be invoked in the case of the electoral legislation of the Republic of Moldova. [18]

-Curatorship (Article 102-105 Civil Code of the Republic of Moldova), is established by the court over a person who, without being completely lacking in discernment, needs to be assisted continuously. Curatorship is established only if the person cannot be sufficiently protected through **temporary** protection. The maximum term of the guardianship can be 5 years.

-Guardianship (Article 102-105 Civil Code of the Republic of Moldova), is the last measure of continuous protection and is established only if neither **temporary** protection nor **curatorship** can ensure sufficient protection for the person. The maximum term of guardianship is 5 years, and as an exception 10 years.

Conclusions

The adversarial phase is the trial itself, which involves the mandatory hearing of the person whose placement under interdiction is requested, followed by the communication of the decision to place under interdiction, after it has become final in Romanian legislation according to art. 941 of the Romanian CPC [19, point 16].

The court and the guardianship authority that exercises general supervision of protection measures according to the competence provided by law, may visit or request visits to be made to the protected persons and those in respect of whom a request for the establishment of a protection measure has been submitted, according to the provisions of art. 66 of the Civil Code of the Republic of Moldova in order to find out the wishes of the person to be placed under judicial protection. When examining the case on the merits, the public authority will present the conclusion formulated in writing.

It is obvious that if the person to be placed under protection does not have discernment or has diminished discernment, or if the action has been filed and/or withdrawn by the guardianship authority, in order to prevent a conflict of interest, the lawyer appointed ex officio by the court will appear as his/her legal representative, for the representation and defense of his/her legitimate interests in court.

In the case provided for by the provisions of paragraph 58/1 paragraph (5) of the CPC RM, at the request of the protected person or ex officio, with the consent of the protected person, the court examining the case may appoint, by decision, a special curator who will assist the person in the respective case or a special guardian who will represent the person in the respective case (the capacity to exercise civil procedural rights of the person in respect of whom a judicial protection measure is established).

The procedural position of the guardianship authorities that intervene in the process regarding the establishment of the protection measure as an interested person to submit conclusions is to be differentiated from the procedural position of the petitioner in defending the interests of the beneficiary of the protection measure. In the latter case, the court must appoint ex officio a legal representative for persons with full and partial discretion, a measure similar to that established under Romanian law. If necessary, the guardianship court may appoint a special curator until the final resolution of the request for interdiction (art. 167 Civil Code of Romania). [20].

Thus, a provisional protection measure is established, and if the application is rejected, the guardianship established during the process ceases by law [20, 19, point 16]. In the opinion of the

Romanian authors, in the absence of a guardian or curator, certain persons with disabilities could benefit from a personal representative who would ensure that their rights are respected and exercised, this is the proposed legislative project to amend Law no. 448/2006 of Romania on the protection and promotion of the rights of persons with disabilities in order to introduce the personal representative, who will be a state employee. In the explanatory memorandum, the initiators of the bill argue that these new provisions will prevent violations of the rights of persons with disabilities and that such amendments are necessary, because in Romania there is currently no effective mechanism for independent representation [21].

Therefore, it is necessary to introduce some new provisions that would guarantee the representation of the legitimate interests of the protected person in court, for example by a legal representative established by law. The regulation of the procedure for establishing protection measures is within the internal competence of the state, so each state has its own treatment of this issue. Particular attention is paid to the principle of respecting the wishes and feelings of the person concerned when establishing and implementing protection measures, in this case, of the incapable adult, the concerns of the international community in matters of protection are based on the past and present wishes and feelings of the interested party [22].

In Romanian legislation, it was proposed that in the absence of a guardian or curator, certain persons with disabilities could benefit from a personal representative who would ensure that their rights are respected and exercised. The representative will be for persons who need someone to represent them, but who do not have such a form of legal protection. Judicial practice has shown that the civil procedural law of the Republic of Moldova does not cover all forms of representation of the person placed under protection before the court, and the cases, requesting the establishment of a judicial protection measure examined in the special civil procedure or at the request of any interested person or by the court ex officio, must be examined in adversarial manner.

When making any decision concerning the person in respect of whom a protection measure is established (the protected person) or his/her patrimonial interests, the court, the guardianship authority and the person entrusted with the protection (the assistant, the representative empowered by a protection mandate in the future, the provisional guardian, the curator, the tutor, the members of the family council) shall give priority to the wishes and feelings of the protected person, expressed independently or, at his/her request, with the help of the person of trust.

The wishes and feelings of the protected person shall have priority, even if they are likely to expose the protected person to a certain risk, except in the case where he/she exposes himself/herself to a serious risk that cannot be diminished by taking certain additional measures.

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COMPARATIVE LAW ELEMENTS REGARDING CRIMINAL LIABILITY FOR OFFENSES AGAINST SEXUAL FREEDOM AND INVIOABILITY OF THE PERSON

DOI: <https://doi.org/10.53486/dri2025.58>
UDC: 340.5:343.541(478)

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Abstract. *As the Republic of Moldova advances its efforts toward European Union accession, this paper undertakes an analysis of criminal law systems within selected European countries. The issue of criminal liability for acts that violate a person's sexual freedom and inviolability is a particularly sensitive and multifaceted topic in the field of comparative criminal law. It reflects not only the cultural and social characteristics of each jurisdiction but also broader developments in international human rights law. The legal treatment of such offenses differs considerably across EU member states, with national regulations shaped by diverse legal traditions, societal values, and cultural norms. This study explores the legislative frameworks governing sexual offenses in several EU countries, identifying both common patterns and distinctive national approaches.*

Keywords: *legal consent, sexual offenses, comparative criminal law, penal sanctions across jurisdictions*

Introduction

The evolution of criminal legislation in European states reflects a growing concern for the protection of sexual autonomy and human dignity. A comparative analysis of sexual offenses in the criminal codes of Romania, Austria, France, Germany, Belgium, Bulgaria, Italy, and the Czech Republic demonstrates the existence of a shared legal foundation grounded in the respect for consent, bodily integrity, and the protection of vulnerable groups, especially minors. This convergence is closely linked to the influence of international human rights instruments and to national efforts to respond to contemporary manifestations of sexual violence.

Basic content.

In Romanian legislation, criminal liability for sexual offenses is regulated under Chapter VIII of the Romanian Criminal Code (hereinafter referred to as the RCC), entitled “*Offenses against Sexual Freedom and Integrity*.” This chapter includes a range of serious unlawful acts aimed at protecting the physical and psychological integrity of individuals, particularly vulnerable victims such as minors. These provisions are of particular importance given the gravity of the offenses and their profound impact on the victims.

This section examines serious offenses against sexual freedom and integrity, as regulated by the Romanian Criminal Code. Rape (Article 218) encompasses any act of forced penetration or acts committed by exploiting the victim's vulnerability and is punishable by imprisonment from 3 to 10 years, with increased penalties in aggravating circumstances. Sexual intercourse with a minor (Article 220) is severely punished, depending on the minor's age and the specific circumstances of the act. The corruption of minors (Article 221) involves engaging in or inducing a minor to participate in sexual acts, with harsher penalties applied in cases involving the production of pornographic material. The recruitment of minors for sexual purposes (Article 222) is criminalized even when the act is merely attempted or preparatory in nature.

In Austria, the Criminal Code, under Title X, defines "*Criminal Offenses against Sexual Freedom and Integrity*." Article 201 classifies rape as the act of forcing a person, through violence, threats, or deprivation of liberty, to engage in or tolerate a sexual act, with penalties reaching life imprisonment in aggravated cases. Article 202 criminalizes sexual assault, punishable by imprisonment ranging from six months to fifteen years, depending on the severity of the offense. Article 205 addresses sexual abuse of vulnerable persons, while Article 205a penalizes violations of sexual autonomy.

Articles 206 to 208a are dedicated to the protection of minors, covering sexual acts involving minors, their pornographic representation, and the initiation of sexual contact, with punishments extending up to life imprisonment. Other relevant provisions include Article 211 on incest, Article 212 concerning abuse of authority, Article 213 on arranging sexual relations involving minors, Article 214 regarding the facilitation of sexual acts with minors, and Articles 215 to 215a, which sanction inducement to prostitution and the promotion of child pornography.

These legislative provisions reflect a strong commitment to safeguarding sexual dignity and integrity, particularly in relation to minors and other vulnerable individuals.

The French Criminal Code (hereinafter referred to as the FCC), under Section 3, regulates "*Offenses relating to sexual assault*," which include rape, other forms of sexual assault, incest, sexual exhibitionism, sexual and moral harassment, as well as offenses related to the recording and dissemination of violent images. Below is a detailed summary of the relevant legal provisions.

Sexual assault is defined as any sexual touching committed through violence, coercion, threat, or surprise, while rape involves a sexual act of penetration committed under the same conditions. The standard penalty for rape is 15 years of imprisonment, but this may be increased to 30 years or even life imprisonment in the presence of aggravating circumstances, such as the victim's minority, vulnerability, the perpetrator's position of authority, acts of torture, or the victim's death.

Incest is treated as an aggravated form of rape or sexual assault, and the court may order the withdrawal of parental authority. The law also penalizes sexual harassment with up to 3 years of imprisonment, and moral harassment with up to 2 years. Sexual exhibitionism in public is likewise criminalized.

Furthermore, legal entities may be held criminally liable, and the dissemination of violent images is prohibited, except in cases involving journalism or judicial proceedings.

The Criminal Code of the Federal Republic of Germany (hereinafter referred to as the GCC), under Section XIII titled "*Offenses Related to Sexual Life*," encompasses a wide range of offenses, as follows:

The German Criminal Code regulates a variety of offenses related to sexual life within Section XIII, including sexual abuse committed by individuals in positions of authority, such as educators, public officials, or healthcare professionals. These offenses are punishable by imprisonment ranging from 3 months to 5 years, and attempts are also penalized.

Regarding sexual abuse of minors, the Criminal Code imposes severe penalties, ranging from 6 months to 10 years of imprisonment, with life imprisonment in cases of particularly severe offenses or when the victim dies as a result. Sexual assault, rape, and sexual coercion are punishable by imprisonment, and if the offense results in the death of the victim, the penalty may extend to 10 years or more.

Furthermore, the German Criminal Code addresses offenses related to child pornography and the distribution of pornographic material involving children or minors. The penalties for these offenses are severe, ranging from 3 months to 5 years of imprisonment, and in aggravating cases, up to 10 years. Additionally, offenses such as pimping, exploitation of prostitution, and acts of public exhibitionism are penalized by imprisonment or fines. Other offenses include encouraging sexual acts with minors or facilitating prostitution, especially involving minors, which may result in sentences of up to 5 years of imprisonment.

The Criminal Code of the Kingdom of Belgium (hereinafter referred to as the CCB) reflects, in Chapter V titled "*Voyeurism, Offenses Against Decency, and Rape*", the following offenses:

Article 371/1 of the CCB regulates voyeurism, establishing imprisonment penalties between 6 months and 5 years for individuals who view or record (video or audio) a person without their consent while the person is undressed or involved in explicit sexual activity. If the recording is broadcasted or made accessible without the victim's consent, the punishment remains the same. If the victim is a minor, the sentence becomes much more severe: between 5 and 10 years for minors aged 16 or older and between 10 and 15 years for minors under 16. Voyeurism is considered to have been committed at the moment the act is executed.

Regarding Article 372 of the CCB, penalties are provided for offenses against decency committed without violence or threats upon a child under 16, or with the assistance of a minor. The penalty is imprisonment ranging from 5 to 10 years. If the offense is committed by a person in a position of authority or an ascendant of the victim, the sentence is increased, reaching between 10 and 15 years of imprisonment.

Similarly, Article 373 of the CCB penalizes offenses against decency committed through violence, coercion, threats, or other acts of violence against the victim. The penalty for such acts is from 6 months to 5 years of imprisonment, and if the victim is a minor or if the act is committed with the help of a minor aged 16 or older, the punishment can be between 5 and 10 years. If the victim is under 16 years old, the penalty can range from 10 to 15 years.

Further, Article 374 of the CCB establishes that an offense against decency is considered committed from the moment the act begins.

Additionally, Article 375 of the CCB regulates rape, defining sexual penetration without consent as a crime. The punishment for rape is between 5 and 10 years of imprisonment, and if the victim is 16 or older, the penalty can range from 10 to 15 years. If the victim is under 16 years old, the penalty varies between 15 and 20 years, and if the victim is under 14 years old, the sentence can range from 15 to 20 years. If the victim is under 10 years old, the penalty will be between 20 and 30 years.

Moreover, Article 376 of the CCB regulates penalties in cases where rape or offenses against decency result in the victim's death, with penalties ranging from 20 to 30 years. If these offenses are committed with additional violent acts such as kidnapping or threats with a weapon, the punishment will range from 15 to 20 years.

Similarly, Article 377 of the CCB details circumstances in which the sentence can be doubled, such as when the offender is an ascendant, a sibling, or a person in a position of authority over the victim, or if the victim is vulnerable for various reasons (e.g., ill, pregnant, or having physical/mental disabilities). The sentence can also be aggravated if multiple accomplices are involved in the commission of the crime.

In this context, Article 377bis of the CCB provides for an increase in the sentence by two years if the offense was committed due to hate, contempt, or hostility towards the victim's traits, such as race, gender, sexual orientation, religion, health condition, or other personal characteristics.

Moreover, Article 377ter of the CCB regulates the increase of the minimum penalty when the offense is committed against a minor under 16 years old and the offender had arranged a meeting with the intent to commit sexual violence-related offenses.

On the other hand, Article 377quater of the CCB establishes penalties for adults who, through information technologies, propose a meeting with a minor under 16 with the intent to commit a sexual offense. The penalty may be between 1 and 5 years of imprisonment if the proposal leads to a physical meeting.

Simultaneously, Article 378 of the CCB provides for the possibility of offenders being prohibited from certain rights and functions, such as a ban on working with vulnerable individuals or holding positions of authority in institutions that care for vulnerable persons.

Finally, Article 378bis of the CCB prohibits the publication or dissemination of the victim's image in offenses regulated by this chapter without the victim's consent. This offense is punishable by imprisonment ranging from 2 months to 2 years, and with a fine from 300 to 3,000 euros, or with either of these penalties alone.

The Criminal Code of the Republic of Bulgaria (hereinafter referred to as the *CCB*) in Section VIII titled "*Depravity*" stipulates the following offenses:

Article 149 CCB regulates depravity towards a person under 14 years of age and defines penalties for actions that involve attempts to satisfy sexual desires towards a person under 14 years of age, without copulation. The emphasis is on imprisonment penalties ranging from 1 to 6 years. Additional details in paragraphs (2), (3), (4), and (5) increase the severity of penalties if the acts are committed with violence, threats, or under conditions of vulnerability (e.g., victims in a state of helplessness).

Article 150 CCB addresses "*Depravity towards a person over 14 years of age*" and continues to explain penalties for acts of depravity towards persons over 14 years of age. Such offenses are punished with imprisonment ranging from 2 to 8 years if force, threats, or dependency are used, and more severe sentences apply for particularly serious cases (3 to 10 years).

In the same vein, Article 151 CCB titled "*Maintaining a sexual act with a person under 14 years of age*" regulates penalties for maintaining a sexual act with a person under 14 years of age, with sentences ranging from 2 to 6 years. Penalties are higher if the acts involve minors engaged in prostitution or multiple persons.

Article 152 CCB addresses sexual violence, defining acts of rape and corresponding penalties, which range from 2 to 15 years in prison, depending on the victim's age and aggravating circumstances such as violence or multiple offenders.

Article 153 CCB pertains to "*Sexual acts forced through material or service dependency*" and sets penalties for sexual acts forced through the use of material or service dependency, with sentences of up to 3 years in prison.

Article 154 CCB titled "*Sexual acts between close relatives*" criminalizes sexual acts between close relatives (ascendants-descendants, siblings) or between adoptive parents and adoptees, with penalties of up to 3 years imprisonment.

Similarly, Article 155 CCB "*Forced prostitution and acts of depravity*" addresses the issue of forced prostitution and acts of depravity, with penalties ranging from imprisonment of up to 3 years to imprisonment of up to 20 years, depending on the seriousness and circumstances of the offense (including recidivism and commission by organized groups).

Article 155a CCB "*Acts of depravity using information technology*" details offenses related to acts of depravity using information technology or other forms of contact to facilitate prostitution or the exploitation of minors for sexual purposes, with penalties ranging from 1 to 6 years in prison.

In the same context, Article 155b CCB "*Exploitation of minors for sexual purposes through information technology*" regulates offenses that involve recruiting minors for pornographic shows or acts of sexual exploitation, with sentences ranging from 1 to 6 years in prison.

Furthermore, Article 157 CCB, "*Sexual acts between persons of the same sex*" regulates acts of sexual satisfaction between persons of the same sex, imposing penalties for behaviors of this type that involve force, threats, or dependency, with sentences reaching up to 20 years for particularly serious cases.

In the same order of ideas, Article 158a CCB "*Recruiting minors for pornographic shows*" focuses on offenses involving the recruitment of minors for pornographic shows, with penalties ranging from 1 to 6 years, depending on the severity of the offense.

Finally, Article 159 CCB "*Creation and distribution of pornographic materials*" details penalties for the creation and distribution of pornographic materials, with imprisonment of up to 1 year. However, these penalties can increase if distribution occurs via the internet or other communication technologies.

In the **Penal Code of Italy** (hereinafter referred to as *CP of Italy*), under Section A II titled "*Offenses Against Personal Liberty*", articles such as Article 605 CP of Italy – *Kidnapping*, Article 606 CP of Italy – *Illegal Arrest*, Article 607 CP of Italy – *Unlawful Deprivation of Personal Liberty*, Article 608 CP of Italy – *Abuse of Power Over Arrested or Detained Persons*, and Article 609 CP of Italy – *Arbitrary Search and Body Search*, address abuses that affect the physical integrity and liberty of a person. These offenses are not directly related to sexual offenses, but are included in this section

because they involve the restriction or violation of personal freedom, a fundamental principle that must be protected within the rule of law.

Furthermore, Article 609-bis CP of Italy – *Rape* defines sexual violence (through violence, threats, or abuse of power) and punishes it with imprisonment between 5 and 10 years. If the victim is a minor or if the act involves aggravating circumstances (e.g., abuse of physical or psychological superiority), the penalty is more severe.

According to Article 609-ter CP of Italy – *Aggravating Circumstances in Cases of Rape*, sexual violence committed against minors or in aggravating conditions (e.g., the use of weapons, violence, or committed by a group) carries penalties from 6 to 12 years. If the victim is under 10 years of age, the penalty increases to 7 to 14 years.

Similarly, Article 609-quater CP of Italy – *Sexual Relations with a Minor* criminalizes sexual relations with a minor under the age of 14, or relations with a person in a position of authority over the minor (e.g., parent, guardian), with penalties ranging from 3 to 6 years. In less serious cases, the sentence may be reduced.

In line with Article 609-quinquies CP of Italy – *Corruption of Minors*, individuals who encourage a minor to witness sexual acts or participate in any other way in sexual activities, or who show them pornographic material to stimulate sexual desire, are punished with imprisonment between 1 and 5 years.

In the context of Article 609-sexies CP of Italy – *Ignorance of the Age of the Victim*, in cases of rape, corruption, or sexual relations with minors, the defendant cannot invoke ignorance of the victim's age as a defense, unless such ignorance was inevitable.

According to Article 609-septies CP of Italy – *Prior Complaint*, offenses specified in the articles relating to rape, aggravating circumstances, and sexual relations with minors require the victim's prior complaint, and the deadline for filing such a complaint is 6 months.

According to Article 609-octies CP of Italy – *Gang Rape*, the participation of multiple individuals in acts of sexual violence (gang rape) is punished with imprisonment from 6 to 12 years. The sentence may be aggravated based on aggravating circumstances.

In this order of ideas, Article 609-nonies CP of Italy – *Ancillary Penalties and Other Criminal Effects* provides that a conviction for sexual violence offenses may result in the loss of parental authority, prohibition from holding public office, suspension from certain professions, as well as other safety measures and restrictions for a period of at least one year after the sentence has been served.

In accordance with Article 609-decies CP of Italy – *Notification to the Juvenile Court*, in cases of offenses committed against minors, the prosecutor informs the juvenile court, and the court ensures emotional and psychological support for the minor throughout the procedures.

The Penal Code of the Czech Republic (Czech Penal Code) defines in Chapter III – "Offenses Against Human Dignity in the Sexual Sphere": Article 185 of the Czech Penal Code – "Rape". Paragraph (1) stipulates that the act of a person forcing another to engage in sexual acts through violence, threats of violence, or other serious harm, or exploiting the vulnerability of the person to commit this act, shall be punished by imprisonment from 6 months to 5 years. Paragraph (2) increases the penalty to between 2 and 10 years if the act is committed against a minor, with the use of a weapon, or through a sexual act or contact comparable to sexual intercourse. Paragraph (3) establishes a penalty from 5 to 12 years if the act is committed against a minor under 15 years old, against a person deprived of liberty, or if the act causes serious bodily harm. If the rape results in the death of the victim, the penalty under Paragraph (4) will be between 10 and 18 years. Paragraph (5) stipulates that preparatory acts are considered a criminal offense.

Regarding Article 186 of the Czech Penal Code – "Sexual Assault", Paragraph (1) regulates the act of forcing someone to masturbate, indecently expose themselves, or engage in other sexual behaviors through threats of violence or exploitation of vulnerability, punishable by imprisonment from 6 months to 4 years. Paragraph (2) applies the same penalty to a person who causes another to engage in sexual intercourse, masturbate, or indecently expose themselves, abusing the victim's dependence

or influence. If the act is committed against a minor or involves at least two people, the penalty increases to between 1 and 5 years (Paragraph (3)). If a weapon is used or the act is committed against a person deprived of liberty, the penalty increases to between 2 and 8 years (Paragraph (4)). If the sexual assault results in serious bodily harm, the penalty will be between 5 and 12 years (Paragraph (5)). If the sexual assault leads to the victim's death, the penalty will range from 10 to 16 years (Paragraph (6)). Preparatory acts are also considered a criminal offense under Paragraph (7).

Regarding Article 187 of the Czech Penal Code – "Sexual Abuse", Paragraph (1) provides that engaging in sexual acts with a minor under 15 years old, or committing sexual abuse against a minor by other means, shall be punishable by imprisonment from 1 to 8 years. If the act is committed by a person responsible for the minor's supervision, the penalty increases to between 2 and 10 years (Paragraph (2)). If the act causes serious bodily harm, the penalty will range from 5 to 12 years (Paragraph (3)). If the sexual abuse results in the death of the victim, the penalty will be between 10 and 18 years (Paragraph (4)). Preparatory acts are also considered a criminal offense under Paragraph (5).

Article 188 of the Czech Penal Code – "Incest" stipulates that the act of engaging in a sexual act with a direct line relative or a sibling is punishable by imprisonment for up to 3 years.

Similarly, Article 189 of the Czech Penal Code – "Pimping", Paragraph (1) regulates the act of inciting, organizing, employing, or enticing another person to practice prostitution, punishable by imprisonment from 6 months to 4 years. If the act is committed for the purpose of gaining substantial profits or as a member of an organized group, the penalty is between 2 and 8 years (Paragraph (2)). If the act causes serious bodily harm, the penalty will be between 5 and 12 years (Paragraph (3)). If the act results in the death of the victim, the penalty will be between 8 and 15 years (Paragraph (4)).

At the same time, Article 190 of the Czech Penal Code – "Prostitution That Threatens the Moral Development of Minors", Paragraph (1) stipulates that practicing prostitution near a school or places designated for minors is punishable by imprisonment for up to 2 years. Organizing or protecting prostitution in these places is punishable by imprisonment for up to 3 years (Paragraph (2)). If the act is committed in at least two locations or repeatedly, the penalty will range from 6 months to 5 years (Paragraph (3)).

Furthermore, Article 191 of the Czech Penal Code – "Distribution of Pornographic Materials", Paragraph (1) regulates the distribution of pornographic materials that include violence or lack of respect for human beings, punishable by imprisonment for up to 1 year. If the materials are intended for minors, the penalty is between 6 months and 2 years (Paragraph (2)). Distributing pornographic materials through organized groups or with the aim of gaining substantial profit can result in imprisonment from 6 months to 3 years (Paragraph (3)). If the act is committed as a member of an organized group or for the purpose of gaining considerable profit, the penalty will be between 1 and 5 years (Paragraph (4)).

Regarding Article 192 of the Czech Penal Code – "Production and Use of Child Pornography", Paragraph (1) stipulates that handling pornographic materials involving a minor or a person who appears to be a minor is punishable by imprisonment for up to 2 years. The production, import, export, or distribution of such materials is punishable by imprisonment between 6 months and 3 years (Paragraph (2)).

If these acts are committed by an organized group or with the purpose of gaining substantial profit, the penalty will range from 2 to 6 years (Paragraph (3)). The production or distribution of child pornography for the purpose of obtaining considerable profit or as a member of an organized group operating in multiple states carries a penalty of imprisonment from 3 to 8 years (Paragraph (4)).

In this context, Article 193 of the Czech Penal Code – "Abuse of a Minor for the Production of Child Pornography", Paragraph (1) regulates the act of persuading, organizing, employing, enticing, or exploiting a minor for the production of pornographic materials, punishable by imprisonment from 1 to 5 years. If the act is committed by a member of an organized group or with the intention to gain substantial profit, the penalty is between 2 and 6 years (Paragraph (2)). If the act is committed by an organized group operating across multiple states, with the purpose of obtaining considerable profit, the penalty will range from 3 to 8 years (Paragraph (3)).

In conclusion, the regulations in Chapter VI of the Penal Code of the Republic of Moldova are designed to strengthen the criminal liability of individuals and legal entities involved in crimes of sexual assault and harassment, while also providing concrete measures for the protection of victims and the prevention of recidivism. These regulations ensure a coherent and effective response, contributing to a fairer and more protected justice system for the victims of these crimes.

Key similarities with the regulations in the Penal Code of the Republic of Moldova include: the definition of rape by the lack of consent and the use of coercion, violence, or intimidation; the sanctioning of sexual acts with minors under the age of consent, even in the absence of violence; the incrimination of non-penetrative sexual assaults and sexual harassment.

At the same time, there are significant differences regarding: the age threshold for sexual consent (ranging between 13 and 16 years). Other comparative aspects concern legal terminology and the classification of acts (e.g., the separation between consensual sexual acts with a minor and the corruption of a minor); the level of criminal penalties and the degree of detail in the norms, with some systems being more extensive (e.g., Austria, Germany), while others are more concise (e.g., Bulgaria). In comparison with the Penal Code of the Republic of Moldova, it can be observed that the national legislation adheres to the general European framework, with clear regulations for rape, non-consensual sexual acts, sexual harassment, and sexual acts with minors. The Republic of Moldova maintains a system with progressive gradations of penalties depending on the severity of the offense and the circumstances of its commission, similar to the practices in most of the European countries analyzed. At the same time, the Moldovan Penal Code could benefit from certain adjustments to reflect international trends, such as: explicitly enshrining consent as a central element in defining sexual offenses; more nuanced criminalization of forms of psychological violence and abuse of power; strengthening regulations regarding the recruitment of victims through information technology.

Therefore, although the Moldovan legal framework is in line with European standards, full harmonization with the criminal laws of European Union member states requires a proactive and continuous approach to legislative reforms, in order to enhance the protection of fundamental rights and freedoms.

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THE INSTITUTION OF THE SURVIVING SPOUSE IN THE NEW REGULATION OF THE CIVIL LEGISLATION OF THE REPUBLIC OF MOLDOVA

DOI: <https://doi.org/10.53486/dri2025.59>

UDC: 347.65(478)

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Abstract. *Succession is a specific transmission, it is clearly delimited from all other patrimonial transmissions, which can only be carried out between persons in existence at the time of their occurrence. Thus, in order not to confuse the principle of successional transmission with transmission by acts between the living, it is worth mentioning that only the death of a human being can have the effect of transmitting the inheritance. Although our legislation admits the transmission of the patrimony both by acts between the living and by acts for cause of death, we believe that the only scope of the current patrimony transmission contract is that of the alienation of an inheritance or a portion of it. In this sense, we consider that when an heir sells the inheritance, the contract will have as its object the inheritance right considered in isolation, although this right refers to a universality or an undivided share of it.*

The provisions of the Constitution of the Republic of Moldova stipulate in art.46 paragraph (6) that: "The right to inherit private property is guaranteed", which means that the state is not limited only to the formal recognition of the right to inherit, but also ensures through its institutions the legal protection of this important right.

"Any natural or legal person has the right to have his property respected. No one may be deprived of his property except for reasons of public utility and under the conditions provided for by law and by the general principles of international law", stipulates art.1 of Protocol No. 1 additional to the European Convention for the Protection of Human Rights and Fundamental Freedoms (Rome, 04.11.1950), ratified by Decision of the Parliament of the Republic of Moldova No. 1298-XII of 24.07.1997.

Key words: *successional capacity, surviving spouse, deceased, joint property, estate, legal heir, succession, successional indignity, vacancy.*

Succession is one of the ways of acquiring property rights, which includes the transmission of the patrimony of a deceased individual to one or more individuals, legal entities or the state and represents one of the most important institutions of civil legislation.

The notion of inheritance is expressly provided for by the provision of the norm of art. 2162 paragraph. (1) CC of the RM, according to which "Inheritance is the transmission of the patrimony (successory estate) of a deceased individual (deceased, the one who left the inheritance) to one or more persons (heirs)."

Inheritance also means the transmission of patrimony (the totality of patrimonial rights and obligations that can be valued in money, viewed as a sum of active and passive values, closely linked to each other, belonging to certain individuals or legal entities) to of deceased individuals to one or more living persons (individuals, legal entities or the state).

If an inheritance has several co-heirs, each of them holds a share of the inheritance. It is the measure of the inheritance right of each of them. Determining the size of the share of the inheritance is one of the main functions of inheritance law. In turn, the share of the co-heir does not constitute a share of each asset that is part of the inheritance estate. The share of the inheritance can be alienated by the free co-heir (art. 2486 para. (1)) for various reasons (if he sells it, the purpose is to obtain money instantly; if he donates it, it is, as a rule, because he wants it so, for another person to take over his position within the inheritance estate).

As long as it is in undivided estate, the co-heirs cannot sell any share of a specific asset that is part of the estate (art. 2486 para. (2)).

An inheritance can have several "beneficiaries" with distinct rights: it can have one heir (sole heir) or

several co-heirs, and the other beneficiaries can only be legatees (they do not acquire assets directly from the deceased, but have the right to request a specific asset from the heir).

The classes of heirs and the degrees of kinship are technical-legal means that establish the scope of persons called by law to inherit. However, this scope is quite extensive and the law does not want an excessive fragmentation of successions. Therefore, among the persons with a legal vocation to inherit, the law establishes a certain specific order of calling to inherit.

The new regulation of the Civil Code in the field of legal inheritance has added two more classes of legal heirs, thus, currently, five classes of legal heirs who can inherit are regulated as follows (OCTAVIAN CAZAC, *The Legacy*, Ed. Animus, 2022, 250 p., ISBN 978-9975-87-989-7).

Conducting a comparative analysis between the provisions of the Civil Code of the Republic of Moldova from 2002 and the amendments made to it starting from March 1, 2019, we can note an important change in the regulation of legal inheritance. In its initial form, the Civil Code recognized a smaller number of classes of legal heirs, which meant that, in the absence of close living relatives, the inheritance of the deceased reverted to the state. This solution could be considered unfavorable for more distant relatives, who, although they had a blood relationship with the deceased, had no inheritance rights. It is worth noting that the surviving spouse, as a legal successor, is not included in any of the five classes of heirs. The surviving spouse competes with any class of legal heirs and collects a fixed share established by the legislator as a priority, as a legal heir.

Through the current regulation, the legislator has introduced two additional classes of legal heirs, which means that there are currently five classes, compared to three as there were previously. This expansion has a significant positive impact on the distribution of the inheritance patrimony, as it allows other, more distant relatives to inherit in the absence of those in the higher classes.

Thus, by including these new classes, the aim is to ensure continuity in the transmission of the patrimony within the family, preserving its connection with the deceased's relatives, even if they are not of close degree. Instead of the assets becoming the property of the state, which would have meant, in many cases, a total alienation from the presumed will of the deceased, the law now offers the chance for these assets to remain within the family, even through more distant relatives – such as cousins, uncles, aunts or their descendants (OCTAVIAN CAZAC, *The Legacy*, Ed. Animus, 2022, 250 p., ISBN 978-9975-87-989-7).

I believe that this legislative reform represents an important progress in the field of inheritance law, as it reflects a fairer approach and closer to social realities. Distant relatives, who may have had a close relationship with the deceased or contributed to his care, now have a real chance to benefit from the inheritance left. At the same time, the risk of the assets ending up in the possession of the state without solid justification is reduced, especially in cases in which there are relatives who, even if they are not of close degree, can be considered morally and socially entitled to inherit.

The amendments to the Civil Code of 2019 brought more justice and humanity to the regulation of successions, contributing to the consolidation of the principle of preserving the patrimony within the family. Currently, the Civil Code of the Republic of Moldova provides for five classes of legal heirs, which ensures greater flexibility in the transmission of wealth and broader legal protection for the relatives of the deceased, including the surviving spouse who competes with the higher class and collects a fixed share, as a legal heir.

The right to legal inheritance of the surviving spouse of the deceased has its foundation in the presumed desire of the *de cuius*, but also in the solidarity between the spouses and in the idea of the community of property that they had during the marriage. This right has moral and economic considerations. From a moral point of view, the surviving spouse has a merit in acquiring the deceased's property and accompanying him in life - a moral relationship as close as that of descendants (DEAK FR., POPESCU ROMEO, *Succession law treaty*. Vol.II, Ed. Bucharest: Universul Juridic, 2014, 347 p., ISBN 978-606-673-308-3.).

The conditions imposed by the legislator for the surviving spouse to inherit are divided into positive

conditions - the capacity for succession, the vocation for succession and negative conditions - that of not being unworthy of the deceased (CHIBAC GHEORGHE, BRUMA SORIN, ROBU OXANA and CHIBAC NATALIA, Civil Law. Contracts and successions, Chisinau, Tipografia Centrală, 2014, 172 p.). This means that the right of inheritance, recognized to the surviving spouse, is based on a quality that can be lost. Only a marriage concluded at the state civil status bodies gives rise to rights and obligations between spouses. Thus, taking into account several factors, including social realities or Christian traditions of our people in the field of marriage and family relations, the legislation of the Republic of Moldova establishes that a marriage can only be concluded between persons of different sexes, that is, between a man and a woman. This condition is expressly mentioned in art.48 paragraph 2 of the Constitution, art.2 paragraph 3 and art.11 paragraph 1 of the Family Code. At the same time, art.15 paragraph 1 letter h) of the Family Code expressly provides that it is prohibited to conclude marriage between persons of the same sex. Therefore, only the person who was legally married (registered marriage) to the person leaving the inheritance has a succession vocation to his inheritance. However, some exceptions to this rule are also admitted. They refer to persons who lived together but did not register the marriage, since the legislation in force at the time when they founded their family did not require the registration of the marriage and they considered the religious celebration or the recognition of the legal effects of the de facto conjugal relations sufficient. In the specialized literature, it is mentioned that by the Ukaz (decree) of November 28, 1946, the Presidium of the Supreme Soviet of the MSSR ordered that marriages concluded before June 28, 1940 be considered valid in accordance with the laws that were in force on the territory of Bessarabia at that time. However, in this context, a court decision is necessary to recognize the marriage as valid under the conditions described above, in order to produce legal effects including in matters of inheritance. The surviving spouse is called to the succession of his or her predeceased spouse regardless of gender, duration of marriage with the deceased, financial status, whether or not children resulted from the marriage, or whether the spouses were living together at the date of opening the inheritance or, on the contrary, were actually separated.

The status of spouse can be lost through divorce and with the divorce the presumed affection of the deceased, which legitimizes the right of inheritance of the surviving spouse, also disappears.

In case of divorce, the marriage is dissolved from the moment of filing such a request. Since the divorce produces effects only for the future, not for the past, the status of spouse is preserved, until the date of admission of the request for the dissolution of the marriage in the procedure, in accordance with art.168 of the Civil Procedure Code.

The status of spouse can also be lost due to the dissolution of the marriage by a court decision establishing the nullity of the marriage or the court pronounces the annulment of the marriage. In the case of nullity, the marriage is dissolved with retroactive effect, so that from a legal point of view, the spouses are considered to have never been married to each other and, therefore, the issue of inheritance rights no longer arises, the status of spouse that the surviving spouse had at the date of opening the succession being dissolved with retroactive effect.

The surviving spouse is not part of any class of heirs, it is a separate category of legal heir, which competes with any class of legal heirs.

The estate of the deceased spouse is made up of the personal assets of the person leaving the inheritance and the assets remaining after deducting the share due to the surviving spouse from the common assets. The surviving spouse is entitled to a share of the common assets due to him as a co-inheritor plus a share equal to that of the children and parents in the estate.

The estate of the deceased spouse, to which the surviving spouse is called, is made up as follows:

- of the personal assets of the person leaving the inheritance, which according to Article 22 of the Family Code are: assets acquired before the conclusion of the marriage; assets received as a gift or based on other gratuitous agreements; goods acquired by inheritance; goods for personal use, with the exception of expensive jewelry and other luxury items, regardless of the time and manner of acquisition. At the same time, the category of personal goods, according to Article 20 of the Family Code, also includes prizes, allowances and other payments that have a compensatory character (material assistance, compensation for health damage, etc.)

- from the goods remaining after deducting the share due to the surviving spouse from the common goods. Goods acquired by spouses during marriage are, according to Article 20 of the Family Code, common goods. Their division is made in the event of the death of one of the spouses by mutual agreement between the surviving spouse and the other successors of the person leaving the inheritance, and in case of disagreement, by court order.

The surviving spouse inherits in his own name and not by representation, he is a reserved heir, if he meets the additional conditions imposed by the legislator.

From the legal texts cited above, we can deduce that only by exercising the fundamental right to marriage can a man and a woman acquire the quality of "husbands", and the conclusion of marriage, as its main effect, leads to the founding of a family. Being considered the "natural and fundamental element of society", the family cannot be born through a marriage concluded between persons of the same sex. As some authors argue, marriage between persons of the same sex, being against nature, does not give rise to the family as a natural and fundamental element of society, such a marriage cannot determine the emergence of a natural family.

The status of a married person brings a complex of rights and duties, both of a personal and patrimonial nature, for the benefit, respectively, of each of the spouses. These rights and duties will accompany the marriage throughout its duration. Personal relationships constitute the main content of the relations between spouses, so that all family patrimonial relations are, as some authors claim, "subordinate to the purpose of personal relationships and the main tasks of the family". These relations concern: the name and domicile of the spouses, the obligation of moral support, the obligation of conjugal fidelity, their citizenship and the capacity to exercise the right of the person who marries before reaching the age of 18 (GHEORGHE CHEBAC; A. BOYS; ALEXANDRU ROTARI; OLEG EFRIM, Civil law. Special contracts. Chisinau, Cartier Publishing House, 2005).

In addition to granting the surviving spouse the status of legal heir and, consequently, the assignment of an inheritance share, the inheritance law additionally grants him the right to furniture and household movable objects, in accordance with art. 2186 of the Civil Code of the Republic of Moldova.

In order to make it possible for the surviving spouse to inherit together with different classes of relatives, according to the tradition of continental European inheritance law, the spouse is not part of any class of heirs.

The new regulation in art. 2185 CC RM grants the surviving spouse the right to $\frac{1}{4}$ of the inheritance in case he comes to the inheritance in competition with the first class of heirs; $\frac{1}{2}$ when he comes to the inheritance in competition with the second class of heirs, and in the absence of the first and second class heirs or if they are renouncers or unworthy, the surviving spouse collects the entire inheritance. Art. 2187 regulates an exceptional situation in inheritance law, namely the case when the surviving spouse is excluded from the legal heirs. This article establishes the conditions under which the surviving spouse no longer has the right to inherit from the deceased spouse, even if, normally, he would have had such a right under the law (OCTAVIAN CAZAC, The Legacy, Ed. Animus, 2022, 250 p., ISBN 978-9975-87-989-7).

According to par. (1) of art. mentioned, the loss of the right to inherit can occur in two main cases:

- a) The first case concerns situations in which, at the date of opening the inheritance (i.e. the moment of death), the divorce procedure had already been initiated. More precisely, if the deceased

filed a divorce action, acknowledged the action filed by the other spouse or filed a divorce application according to the law, the surviving spouse loses the right to inherit. This provision reflects the idea that, although the marriage was not formally dissolved by a final decision, the clear intention to break the marital bond was already expressed, and the emotional and family bond was seriously damaged.

b) The second case concerns the nullity of the marriage. If, at the time of death, the marriage was declared null and void by a court decision or there were grounds for declaring nullity and an action had been brought in this regard, then the surviving spouse is also deprived of the right to inheritance. In such cases, it is considered that there was no real legally valid marriage between the spouses, which is why there can be no right to inheritance either.

Paragraph (2) adds an important clarification and introduces a humanitarian exception: although the surviving spouse may be excluded from the inheritance, his right to maintenance remains unaffected. This means that, regardless of the circumstances leading to the deprivation of the right to inherit, the spouse may still benefit from material support under certain conditions, in accordance with the provisions of the law.

This regulation plays an important role in protecting the principle of fairness and good faith in inheritance law. It prevents a person who was in open conflict with the deceased or had a legally non-existent marriage from benefiting from his or her assets after death. At the same time, the legislator ensures a minimum of social protection for the surviving spouse, by maintaining the right to maintenance.

In conclusion, the new regulation, by expanding to five classes of legal heirs and excluding the surviving spouse from the classes of legal heirs, granting him or her a special status, ensures a broader coverage of possible succession situations, offering clear solutions in cases where close relatives are no longer alive. Thus, the rules regarding the inheritance of the surviving spouse represent an essential legal mechanism that structures the hierarchy of legal heirs and guarantees a rational, coherent and fair distribution of the deceased's patrimony within the family.

In order to improve the legal framework, namely the way in which the surviving spouse collects the estate, based on the special status granted by the legislator, the deceased's affection for him, we would propose that the surviving spouse compete only with class I of legal heirs and with the deceased's parents, as part of class II of legal heirs. In competition with the descendants of the parents class II, with class III, with class IV and class V, the surviving spouse, if he meets the conditions to be able to inherit, should collect the entire estate, excluding the aforementioned successors from the inheritance.

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STRUCTURAL ELEMENTS OF CONCEPTUAL MODEL OF SUSTAINABLE DEVELOPMENT OF SOCIETY'S LEGAL SYSTEM

DOI: <https://doi.org/10.53486/dri2025.60>

UDC: 340.12(478):061.1EU

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Abstract: *The object of the research in the article is the process of sustainable development of society's legal system, considered as the optimal variant of its dynamics in modern conditions. The purpose of the study is to identify the structural elements of the conceptual theoretical model of sustainable development of society's legal system and their general characteristics. The study was prepared within the framework of the subprogram 01.05.01 National Security of the Republic of Moldova in the Context of Accession to the European Union: Legal, Political and Sociological Approaches, implemented by the Institute of Legal, Political and Sociological Research of the Moldova State University, and reflects the results of fundamental research in the field of general theory of law, conducted using a comprehensive methodology, the instrumental basis of which was the method of theoretical legal modeling. It is concluded that the implementation of the model under consideration in relation to the development of the legal system of Moldova is capable of ensuring the harmonious integration of the country's legal system into the European legal space, and further study of this model allows for a scientifically sound approach to establishing the most "vulnerable" elements of the legal system of the Republic of Moldova from the point of view of the national security interests of the country.*

Key words: *legal system, sustainable development, conceptual model, structural elements.*

1. Introduction.

The choice made by the citizens of Moldova in favor of further development of the country's course towards European integration [1] makes it particularly relevant to study the state of the dynamics of the country's legal system, which it must achieve in order to harmoniously integrate into the legal space of the European Union and "synchronize" the internal rhythms of its dynamics with the rhythms of the dynamics of the European legal space.

The study of the modern stage of the legal history of European countries, for which the most favorable conditions were created after the Second World War, contributing to the integration of the legal systems of European states into a single legal space [2], allows us to characterize this largely unique historical example as a process of sustainable development of the European legal space achieved thanks to a whole range of internal and external factors.

It is the state of sustainable development of the legal systems of European countries that accompanied the integration processes in Europe and contributed to their expansion and deepening. Therefore, it is this state of the legal system of society that becomes the conceptual model of the dynamics of the legal system of Moldova, the implementation of which can contribute to its harmonious and long-term integration into the legal space of the European Union. However, the theoretical justification and description of the conceptual model of sustainable development of the legal system of society has not yet received its deep scientific development in the general theory of law, in connection with which this direction of research in the field of fundamental legal science seems, undoubtedly, innovative and of great importance for the scientific support of the implementation of legal aspects of the integration of the Republic of Moldova into the European Union.

2. Methodology for studying the structure of the conceptual model of sustainable development of society's legal system.

From the point of view of scientific analysis, various states of the legal system of society initially appear as abstract theoretical constructs that can be supplemented or in some other way "corrected" taking into account certain historical, cultural and other features of individual national legal systems, but initially these states are recognized precisely as scientific abstractions that do not depend on the factor of legal geography. This circumstance makes various states of the legal system of society the subject of analysis of the general theory of law as a fundamental legal science that studies the most general patterns of the emergence, development and functioning of legal phenomena [3].

The legal system of society as an object of theoretical and legal analysis is a rather complex and comprehensive formation with systemic properties. From the point of view of the approaches of the modern system of social and humanitarian knowledge to the study of such complex and comprehensive objects with the properties of the system, one of the most justified methods of cognition that allows taking into account the specified features is considered to be the modeling method [4]. With regard to the study of the legal system of society, it should be clarified that in this case, an adequate way of modeling its states, taking into account its legal nature, is the method of theoretical legal modeling [5], which allows theoretically constructing models of legal phenomena. In this regard, the method of theoretical legal modeling can be considered as an instrumental basis that allows studying various states of the legal system of society by constructing their abstract models. At the same time, we would like to draw attention to the fact that for the study of understudied states of the legal system of society, it is most necessary to create conceptual models. This is explained by the fact that conceptual models make it possible to obtain the theoretical description of the modeled state of the system, based on the conceptual apparatus of the fundamental theory in the relevant area of scientific knowledge, which is necessary in a situation where the relevant scientific problem is not sufficiently studied. With regard to the theoretical legal modeling of understudied states of the legal system of society, we should talk about the creation of a conceptual model of the corresponding state of the legal system, which could provide its theoretical description using adequate scientific terminology, which constitutes the conceptual apparatus of the theory of law as a fundamental legal science.

However, it is also necessary to take into account that the specific algorithm of theoretical legal modeling of the states of the legal system of society depends on the type of the conceptual model that is planned to be created. It seems that at the initial stage of scientific analysis of understudied states of society's legal system, the priority is the creation of structural models that allow us to understand the internal structure of this complex formation, which is necessary for its further scientific analysis. At the same time, the algorithm of theoretical legal modeling should include the method of structural analysis, which is necessary for establishing the structural elements of the conceptual model under study. Thus, the methodological basis for studying the structure of the conceptual model of understudied state of sustainable development of society's legal system should be recognized as a combination of the methods of theoretical legal modeling and structural analysis.

3. The criterion for identifying the structural elements of conceptual model of sustainable development of society's legal system.

The key issue that must be resolved at the first stage in the study of the structure of the conceptual model of sustainable development of society's legal system is the question of the criterion for identifying its elements.

Several scientific schools of comparative law offer their own criteria for classifying legal systems [6, 7], which can be taken into account when solving the question we have posed. However, it should also be taken into account that these criteria were proposed to solve another scientific problem, namely, to classify legal systems as integral entities, and not to identify the internal structure of an abstract model of the legal system of society. In this regard, it is necessary to take into account the

limited possibilities of using existing approaches to classifying legal systems in the field of comparative law in solving the question we have posed and to continue searching for an answer to this question in the field of general legal theory.

In fundamental legal theory, the question of the structure of the legal system was considered primarily as a question of the structure of a static model of the legal system [8]. At the same time, the structure of an abstract model of the dynamic states of society's legal system is a much less studied issue, leaving the question of the criterion for identifying the structural elements of the dynamic model of society's legal system open.

When faced in such a situation with the need to solve a problem that goes beyond the existing system of knowledge, legal theory, like other sciences, often resorts to the heuristic possibilities that the use of a philosophical approach provides [9]. Therefore, in the search for a criterion for identifying the structural elements of a conceptual model of sustainable development of the society's legal system, it seems necessary to pay attention to the dialectical category of "development" [10], which is used to describe the state of society's legal system in our theoretical model.

Development is a natural and irreversible form of the dynamics, which presupposes certain qualitative changes. The nature of these changes may be different depending on the direction in which development is taking place and what this development is: progressive or regressive, gradual or abrupt, stable or unstable, etc. However, the fact of the irreversibility of the changes themselves remains undeniable and in the context of the analysis of the development of complex entities, which include the legal system of society, the different speed of changes that occur with the heterogeneous components of such complex entities comes to the fore.

In this regard, the use of a philosophical approach to the analysis of the dialectical category of development, which can be based on the fact of the certain qualitative changes that cannot occur equally quickly in heterogeneous components of complex formations, allows us to assume that it is the speed of the dynamics of individual components of the legal system of society that can act as a criterion necessary for identifying the structural elements of our dynamic model of society's legal system.

Our analysis of the scientific literature devoted to the specifics of individual constituents of the legal system of society and the related "dimensions" of social and spiritual matter allowed us to divide all constituents of society's legal system into four groups, each of which has its own rate of dynamics. Based on the most common generalized characteristics in the terminology of modern legal theory, used for the collective designation of the constituents of the legal system included in these groups, we combined them into the following "components" of the conceptual model of sustainable development of society's legal system: 1) spiritual and cultural component; 2) organizational component; 3) institutional component and 4) normative component.

4. General characteristics of the spiritual and cultural component of the conceptual model of sustainable development of society's legal system.

As a structural element of the conceptual model of sustainable development of society's legal system, the spiritual and cultural component unites those constituents of the legal system of society that have an ideal nature, that is, associated with the mental sphere, and are most closely connected with the phenomena that make up spiritual matter, since they are all subject to the rhythms of the dynamics of the phenomena of society's legal consciousness and the phenomena derived from it.

The spiritual and cultural component of the model under consideration may include such constituents of society's legal system as: various levels of legal consciousness of society, the legal mentality of society, the legal culture of society, the style of legal thinking, the legal ideology of society, as well as other phenomena of an ideal nature that can be considered within the framework of the already named constituents (for example, stereotypes of legal thinking), as well as more complex formations considered both as elements of the already identified constituents and as relatively independent constituents of the spiritual dimension of society's legal system (for example, the spirituality's

dominants of the legal culture of society, as well as legal psychology, most often considered in general theory of law as a structure element of legal consciousness).

Even a fairly superficial review of the listed here constituents of the spiritual and cultural component of our conceptual model convinces us that all of them either directly relate to the structure of society's legal consciousness, or to one degree or another are its derivatives, preserving their mental nature. If we try to analyze how quickly the indicated constituents of the spiritual and cultural component of the model under consideration are capable of undergoing some qualitative changes, which are an indicator of their development in one direction or another, we can see that all of them are capable of qualitative changes only over relatively long time periods.

Within the framework of the cyclic paradigm most widely used in the system of modern social and humanitarian sciences [11, 12], qualitative changes in the state of the phenomena under consideration are usually associated with the completion of the full "life cycle" of generations. Let us clarify that in this context it is customary to speak of generations in a sociological sense, implying by the change of generations a qualitative change in the way of thinking, usually "measured" by a period of 25-30 years on average, and in some theories by a longer period. Indeed, it is impossible to imagine that, for example, society's legal mentality, which is the result of its historical and cultural genesis, can undergo qualitative and sufficiently massive changes in a shorter period than those indicated here. Of course, in some of its cultural basis, even after 25, and even after 100 and several hundred years, the legal mentality retains certain archetypes of legal consciousness that determine its cultural self-identity. However, at the same time it is also obvious that with the change of each generation, there really are some qualitative changes in the motives of legal behavior, ideological attitudes, stereotypes of legal thinking and other mental phenomena that correspond to the "spirit of the times". At the same time, these changes, accumulating, can lead to what is commonly called in science "civilizational shifts". But be that as it may, the study we conducted shows that, compared to the rhythms of the dynamics of other structural elements of our conceptual model that we have identified, the rate of change in the dynamics of the spiritual and cultural component is the slowest, which allows this component to demonstrate stability over the longest time periods compared to other components.

The latter circumstance allows us to discover in the spiritual and cultural component of the model under consideration the maximum "potential for stability" among its constituent structural elements, relying on which the legal system is capable of stabilizing its state of instability caused by the behavior of other components of the system. This same circumstance allows us to see in the spiritual and cultural component of our conceptual model the real "foundation" of this system, on the state of stability of which the sustainability of the development of the entire society's legal system as a whole largely depends.

5. General characteristics of the organizational component of the conceptual model of sustainable development of society's legal system.

In the organizational component of the conceptual model of sustainable development of society's legal system, we included such constituents of society's legal system as: legal relations; legally significant events, at least partially dependent on the will of the participants in society's legal life; as well as legal practice, represented by various types of legal activity and the legal experience formed in them.

The unifying moment in the characteristics of the specified constituents of society's legal system, which determines their common rates of development, is their direct connection with acts of legal communication between numerous participants in society's legal life and individual legal interactions of the latter that constitute these acts. It can be said that all constituents of the legal system related to the structure of this component of the model under consideration are, to a greater or lesser extent, derivatives of human activity that has legal significance and constitutes those exchange processes that make up society's legal life. Assuming interaction, these exchange processes reveal the closest connection with the nature of legal communications that occur on one of the "dimensions" of social

matter – the dimension of social communications. In this regard, the rate of development of the constituents of the organizational component coincides with the rhythms of development of legal communications.

Adhering to the cyclic paradigm we have already outlined in matters of development of phenomena studied by modern social and humanitarian sciences, we believe it is appropriate to link the rates of qualitative changes in the dynamics of the constituents of the organizational component of the model under consideration with the full cycle of legal communication. Such a cycle presupposes the presence of not only direct but also feedback connections that form those very "exchange processes" that make up society's legal life in its activity aspect. In this sense, indeed, we see the organizing role of the constituents of this component of the model under consideration in relation to society's legal life. Without the component under consideration, the legal life of society is impossible; it is deprived of the organizing forms in which legal life is capable of proceeding.

Using what seems to us a very convincing analogy, we can compare the dynamics of the organizational component of our conceptual model with the work of the circulatory system, thanks to which the "life" of the legal system becomes possible. At the same time, the cycle of legal communication that we have identified, corresponding to the rate of change of the constituents of this component, can be compared with the "pulse" of society's legal system, thanks to which it is continuously updated and therefore sustainable, that is, continuous and stable development of the organizational component is a necessary condition for the normal dynamics of all other components of the considered dynamic model of society's legal system.

Comparing the rate of development of the organizational component of the conceptual model of sustainable development of society's legal system with the rate of development of its other components, we believe that the dynamics of the organizational component is the most high-frequency, due to which this structural element of our model plays the role of a kind of "connecting link" of this system. This role of the organizational component is explained by the fact that it is due to its dynamics that the actual connection between the individual constituents of each component of this model is realized, which makes the cycle of legal communication a kind of "breathing" of society's legal system.

6. General characteristics of the institutional component of the conceptual model of sustainable development of society's legal system.

As a structural element of the conceptual model of sustainable development of society's legal system, the institutional component includes various legal institutions of society: law-making, law enforcement and human rights institutions; institutions implementing justice; so-called "alternative forms" of justice including institution of mediation; institutions implementing the interpretation of legal norms and others. In other words, we can say that this component includes legal institutions of the state and civil society, varying in their competence and capabilities.

In addition to the general patterns underlying the dynamics of legal institutions and distinguishing them from other components of the model under consideration, the unifying feature of the institutional component is its close connection with legal actors as an integral part of the legal system of society. However, in creating our theoretical model of the legal system on the scale of the entire society, we see the expediency of identifying institutional entities as a relatively independent component of the dynamic model of the legal system of society, which acquire qualitatively different opportunities to influence the internal mechanisms of this system. At the same time, we do not "throw out" personalized legal actors from the structure of the model of the legal system we are constructing, but we believe that, being a necessary condition for the very fact of the existence of the legal system, personalized legal actors "dissolve" in its components, identified for the purposes of scientific analysis.

Thus, the mentality of personalized legal actors, which makes it possible to identify the ideal constituents of the legal system, "dissolves" in the spiritual and cultural component. The legal behavior of personalized legal actors, which forms legal communications and related legal interactions, "dissolves" in the structure of the organizational component. Finally, the will of personalized legal actors, which determines the content and dynamics of legal norms, "dissolves" in the normative component. However, at the level of the general patterns of sustainable development of society's legal system that interest us, only massive and collective actors can become enough significant, at the level of which such patterns are capable of forming, which allows us to unite institutional legal actors into a relatively independent component of the legal system, subject to its own rhythms of dynamics, and not "dissolving" in the chaotic mass of individual legal acts, legal ideas, emotions, etc.

Our analysis of the legal institutions of society has allowed us to establish that in its dynamics, associated with the cycle of development of social institutions that form another "dimension" of social matter, the institutional component of our model of society's legal system acquires the possibility of qualitative changes only under conditions of rotation, that is, renewal of the composition of these institutions. Therefore, in fact, the speed of qualitative changes in the legal institutions of society is determined by the cycles of its rotation.

The peculiarity of the institutional component, which distinguishes it from other structural elements of our conceptual model, is an extremely close connection with the political system of society, in connection with which the influence of the peculiarities of the political system of a particular society (the degree of its democracy and openness, the peculiarities of the political elite, etc.) turns out to be the strongest precisely on this component of the dynamic structure of society's legal system, which makes the institutional component a kind of "conductor" of political influence on society's legal system. In this regard, the sustainability of the development of the institutional component turns out to depend not only on the stability and quality of the rotation cycles of society's legal institutions, but also on the peculiarities of the political system of society. At the same time, we can also assume that the influence of this political factor is predominantly mediated by the rotation cycles we have designated, the stability and quality of which, in turn, directly depend on the state of the political system.

Verification of these assumptions requires continuation of this study and conducting a functional analysis of the identified structural elements of our conceptual model in the context of their connection with politics and other factors external to society's legal system.

7. General characteristics of the normative component of the conceptual model of sustainable development of society's legal system.

The normative component in the structure of the conceptual model of sustainable development of society's legal system is formed by the array of all legal norms officially in force in society, which, from the point of view of theoretical analysis, can be grouped by institutions, branches of law and optional elements of the theoretical design of the legal system, and are actually consolidated in the system of legal sources of law recognized in society, forming an inseparable unity with them, since changing the content of such legal norms is impossible without changing their legal form. Therefore, the normative component should include not only the legal norms themselves, but also the external forms of their official legal consolidation (legal sources of law), as well as the positions of authorized entities interpreting the current legal norms. In our opinion, only such a broad understanding of the structure of the normative component of our dynamic model of society's legal system can give the most realistic idea of the officially recognized legal norms actually in force in society.

In this case, special attention should be paid to the consideration of the place of legal custom in the structure of the conceptual model we are creating, since, unlike the legal norms that sanction the application of customs and are enshrined in official legal sources of law, the customs themselves do not have such a legal form, and therefore, in our opinion, it would be correct to attribute this source

of law either to the structure of the organizational component as the legal experience that is formed in it, or to the structure of the spiritual and cultural component – depending on whether we are talking about a business custom that is formed in current legal activity, or about a custom that retains its force in the longer term, actually becoming an element of society's legal culture. It seems necessary to us to carry out such a differentiation of legal customs with sources of law that have a legal form, since in the context of the analysis of the rates of dynamics of these sources of law it becomes obvious that, having a different nature, they are subject to different patterns and therefore their dynamics are described by different structural cycles of development.

In this context, the status of the so-called latent legal norms and “shadow law” deserves separate consideration. Like legal customs, they do not have an officially recognized legal form of securing their content. However, even when in conflict with legally secured legal norms, latent and shadow norms nevertheless form an idea of the normative array that is actually recognized and operating in the legal system of society. It should also be recognized that from the point of view of the criterion of the speed of development that we have used as the basis for identifying the structural elements of our conceptual model, we see that latent and shadow norms are subject to the rate of dynamics of other components of the legal system – organizational and spiritual and cultural. This same circumstance allows us to discern the ability of the two components named here to perform a compensatory function in relation to the normative component in a situation where officially recognized and legally secured norms of law prove incapable of satisfying a certain social demand existing in society and, in this sense, prove ineffective.

What is the rate of dynamics of the normative component of the model under consideration from the point of view of the cyclic paradigm we have taken as a basis? It is obvious that, having limited the normative component for the reasons stated above to legal sources of law and only to those legal norms whose content has an officially recognized legal form, we see the specific dynamics of the component under consideration, which distinguishes it from the rates of dynamics of other components, with the cycle of action of legal norms. In the general theory of law, the beginning of this cycle is associated with the moment the source of law that enshrines the norm comes into legal force, and the end of this cycle is associated with the moment this source of law loses its legal force. A fundamentally important point in understanding the patterns of the dynamics of the normative component is the realization that the cycle of action of legal norms depends on the volitional acts of institutional legal actors endowed with law-making competence, which reveals the closest connection of this component with the institutional component of our dynamic model of the legal system. At the same time, the direct connection of the rates of dynamics of the normative component with the above-mentioned volitional acts determines the “floating” type of its cyclical dynamics, which can be: both operational (for example, in the case of emergency and subordinate law-making), and long-term (for example, in the case of any fairly large-scale legal reform).

This “floating” type of dynamics of the normative component, along with the analysis of other factors of lawmaking, allows us to assume that the dynamics of the normative component is predominantly the “resulting” dynamics derivative of dynamics of the institutional component, and to a somewhat lesser extent (due to the mediating role of the institutional component) is the “resulting” dynamics derivative of dynamics of other components of our model. At the same time, on the one hand, a direct connection between the normative component and the organizational component and the spiritual and cultural component could become an ideal situation of direct connection between social requests formed in the legal system and the “response” to these requests from the normative component. However, such a direct connection is possible only in an ideal model that does not take into account the objective presence and role of legal institutions in the legal life of modern society and can be considered of limited applicability, perhaps, only in relation to primitive forms of social organization of people's lives in an archaic society.

In addition, the distinction between operational and long-term cycles of the dynamics of legal norms allows us to substantiate the specifics of the cycle of legal reform, the cycle of emergency rule-making, as well as other possible varieties of the cycle of action of legal norms, subordinated to the general logic of the beginning and end of this cycle described above, which nevertheless has its own specifics in the situations we have indicated and others described in the scientific literature.

However, it should also be noted that, while experiencing the influence of the deeper dynamics of the other components of the legal system that we have examined, the dynamics of the normative component is simultaneously a "mechanism for changing" the institutional, organizational component and, to a lesser extent, the spiritual and cultural component of the model we are constructing.

8. Conclusions.

Firstly, it should be noted that the study of the general patterns of the dynamics of the process of sustainable development of society's legal system, characterizing the rhythms of development of the European political and legal space, is of great importance for the scientific provision of harmonious integration of the legal system of the Republic of Moldova into the legal space of the European Union. Secondly, the theoretical justification and description of the conceptual model of sustainable development of society's legal system, which has not yet received deep scientific development in the general theory of law, is an innovative direction of research in the field of fundamental legal science. Thirdly, the most adequate methodological basis for studying the structure of this conceptual model at the first stage of its research should be recognized as a combination of the method of theoretical legal modeling with structural analysis, supplemented by our analysis of the dialectical category of "development" and the cyclic paradigm, which has received wide application in the system of modern social and humanitarian sciences.

Fourthly, the criterion for identifying the structural elements of the conceptual model of sustainable development of society's legal system, as well as for other dynamic models of the legal system, can be the speed or, in other words, the "rates" and "rhythms" of development of individual constituents of society's legal system, which will be different for phenomena of different nature and which allowed us to identify four components of the model under consideration: 1) the spiritual and cultural component; 2) the organizational component; 3) the institutional component and 4) the normative component.

Fifthly, the consideration of the features of the development cycle of the spiritual and cultural component allowed us to theoretically substantiate not the nominal, but the actual role of this component as a kind of "foundation" in the structure of our conceptual model, concluding that it is this component that is the main stabilizing factor in the sustainability of the development of the entire legal system as a whole.

Sixthly, the examination of the features of the development cycle of the organizational component allowed us to discern in the rhythms of its dynamics a kind of "breath" and "pulse" of society's legal life, which determines the fulfillment by this component in the structure of our conceptual model of the role of a "connecting link" between all of its constituents.

Seventhly, the examination of the characteristics of the development cycle of the institutional component allowed us to see in it a kind of "conductor" of political influence on all other components of the considered model of society's legal system.

Eighthly, consideration of the characteristics of the development cycle of the normative component led us to the conclusion that its dynamics are of a "floating" nature and are, on the one hand, the "resulting" dynamics derivative of dynamics of other components, and, on the other hand, the "mechanism of change" of other components.

Ninthly, the consideration of the structural elements of the conceptual model of sustainable development of society's legal system allows us to conclude that it is possible to use the proposed approach to their identification for the analysis of other dynamic states of society's legal system, the

study of which allows us to expand the existing ideas of the general theory of law on the structure of the dynamic model of the legal system and the general laws of its dynamics, which, in turn, allow us to take a scientifically sound approach to establishing the most "vulnerable" elements of the legal system of society from the point of view of the interests of national security of the Republic of Moldova and to develop scientifically sound recommendations aimed at preventing such vulnerabilities.

The article was prepared within the framework of the subprogram 01.05.01 National Security of the Republic of Moldova in the Context of Accession to the European Union: Legal, Political and Sociological Approaches, implemented by the Institute of Legal, Political and Sociological Research of the Moldova State University, and reflects the results of the study using a comprehensive methodology based on the method of theoretical legal modeling.

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THE IMPLICATIONS OF COHABITATION REGARDING THE CHILD BORN OUT OF WEDLOCK

DOI: <https://doi.org/10.53486/dri2025.61>

UDC: 347.628.42

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Abstract: Due to the modernization of individuals' thinking within a society, their perceptions of life and the way of living in a broad sense change rapidly and uncontrollably. In modern society, we observe that even the concept of family is beginning to take increasingly diverse forms. In a first understanding we have the idea of traditional family, a concept that is represented by the idea that a man and a woman have to marry with the purpose of having and raising a child—this concept being distinct from that of the modern family. Today, many young people conceive of a family even in the absence of an official marriage, a situation where the two partners choose to live together in cohabitation. This paper focuses on analyzing cohabitation as a concept that is becoming more and more common, much more so than in previous years. Cohabitation affects not only the legal regime of the couple's assets but also the way in which the child is raised and educated, an aspect deeply explored in this article. Lastly, reference is made to the succession rights of cohabiting partners. The research is based on methods such as the analysis of numerous factual situations in relation to the surrounding environment, targeting a diverse group of individuals from distinct family and social backgrounds. It was observed that young people with a more traditional mindset tend to come from rural areas or small towns, where the family represents the social nucleus. Subsequently, a careful analysis of the legal texts was carried out, revealing a significant legislative gap, which led to the emergence of proposed legal reforms. The analysis of legal texts was conducted in a comparative manner, considering both civil codes from Romania and the Republic of Moldova, as well as the Civil Codes of countries such as France and Spain.

1. Introduction

The union between two individuals for the purpose of founding a family is often realized through marriage, which can be officiated in either a religious or spiritual context depending on the culture, or in a civil context, by a registrar. This step is essential and absolutely necessary for the union between the two spouses to have legal effects. Although, from a legal standpoint, the family is most commonly established through marriage, many people opt for the alternative of cohabitation, which may seem simpler, but in reality, presents many disadvantages. This form of union is not protected by Romanian civil law.

According to the **Explanatory Dictionary of the Romanian Language**, cohabitation is defined as "the coexistence of a man and a woman without fulfilling the legal requirements of marriage." (<https://dexonline.ro/>, 30.04.2025, 20:00 PM) The notion of cohabitation originates from the Latin language, where, in Roman law, it referred to "sleeping in the same bed with someone" or "staying in bed with someone," with the Romans using the expression *cum cubare*. This gave rise to the term *concubinatus*, which referred to a union between a man and a woman that resembled marriage, much like in contemporary law. Unlike adultery or incest, which were severely punished by law, cohabitation in Roman law was not subject to legal sanctions. There were no reciprocal obligations between cohabitants; they did not have the obligation of respect or fidelity, unlike in Byzantine law, where such obligations were incumbent upon both parties. Furthermore, a child born from a cohabiting couple did not have recognized filiation from the father.

Regarding the child born outside of marriage, the situation improved during the Byzantine period when the father was legally obligated to provide necessary support for the child.

Considering that this form of coexistence is a simple fact, accepted by law but not regulated, the current Civil Code or special laws have not provided a definition for cohabitation. A definition of cohabitation is only found in legal doctrine. It is defined as "a coexistence with relative stability

between a man and a woman who do not have a marriage bond." Additionally, in doctrine, cohabitation is defined following the analysis of a Constitutional Court decision and a legislative proposal for its regulation, as "a factual union between two persons of different sexes, who live together in a stable and permanent manner, creating the appearance of a marriage."

2. Cohabitation in the Concept of Foreign Legal Systems

When comparing with legal systems from other countries, we observe that in states like France and Spain, for example, civil law regulates cohabitation as a distinct legal institution.

In France, cohabitation is regulated by Articles 515 to 518 of the French Civil Code as a form of partnership between cohabitants. These partners remain the owners of their respective property, and no form of joint ownership arises from cohabitation. Moreover, they do not have the right to jointly adopt a child. However, cohabitants may establish conditions for their cohabitation through a contract called a "cohabitation agreement," which can be drawn up either by a public notary in an authentic form or under private signature.

The issue of children born from cohabitation arises. A child born in this context is considered a child born outside of marriage, and both parents have the obligation of care and maintenance. They can enter into an agreement to regulate the exercise of parental authority.

Similarly, in Spain, cohabitation is regulated by law. It is recognized on the condition that the couple has lived together for a certain period, which varies depending on the region. For example, in Catalonia, this period must be at least 2 continuous years.

This approach significantly aids the members of a modern and non-conformist society, whose principles increasingly deviate from those of the traditional family. In Western countries, there is a strong inclination towards such relationships, where the partners seek to establish a family but do not wish to formalize the marriage. In Europe, this has become an alternative regulation for such couples, in particular for the same-sex couples who ultimately seek to formalize their relationships through civil partnerships.

In the Republic of Moldova, the Family Code does not regulate cohabitation as a legal institution. A child born from cohabitation, like in Romania, is considered a child born outside of marriage, but in terms of rights, the child is treated similarly to one born within marriage. This is reinforced by Article 58 of the Moldovan Family Code, which states: "Parents have equal rights and obligations towards their children, regardless of whether the children are born in or outside of marriage, or whether they live together with the parents or separately."

Filiation towards the mother is established through medical documents issued for this purpose, while the filiation towards the unmarried father is established through the father's recognition of the child. (Noul Cod Civil al României, art. 408. alin.) The presumption of paternity operates similarly to Romania, but according to the Family Code, it can be challenged by a joint declaration from the parents submitted to the civil status authority. (Noul Cod Civil al României, art. 408 alin. 2,3)

3. Cohabitation in Romania:

In Romania, cohabitation is not regulated by law, unlike in some other European states. Cohabitants are simply individuals who live together and maintain a relationship resembling that of married couples.

Firstly, regarding their property, cohabitants do not own joint property unless it was acquired through one of the legal methods of acquiring joint ownership, other than the form of ownership that arises from marriage. Cohabitants do not benefit from a matrimonial regime concerning property, as is specific to marriage. At the end of the cohabitation relationship, former cohabitants do not have the right to initiate partition proceedings for the property acquired during the cohabitation, except if joint ownership has arisen through a contract. However, the partition here is not conditioned by the dissolution of the cohabitation relationship, unlike the partition after a divorce. (Lucia Irinescu - Dreptul familiei, editura Hamangiu 2024, București, p 48-50)

Secondly, with respect to the situation of the child, the law does provide for certain legal effects. For instance, the presumption of paternity is recognized and applicable for the cohabiting father, as regulated by Article 426 of the Civil Code: "Paternity is presumed if it is proven that the alleged father cohabited with the child's mother during the legal period of conception." From this, we deduce that for the presumption of paternity to operate, the period of conception must coincide with the cohabitation period. According to Article 412, paragraph 1 of the Civil Code, the legal period of conception is the interval between 300 and 180 days before the birth. (Noul Cod Civil al României art. 412 alin.1, 2)

There are no issues regarding the filiation with respect to the mother. However, the child born from cohabitation is considered a child born outside marriage, and parental authority is exercised as such. Cohabitation is proven by any means of evidence and is seen in doctrine as a *de facto* status. (Lucia Irinescu -Dreptul familiei, editura Hamangiu 2024, pg47-50) A child born outside of marriage whose filiation has been established is treated by law as if born within marriage. They have the same rights regarding domicile, name, citizenship, parental authority, maintenance, and inheritance from both parents and their relatives. Parental authority is generally exercised jointly by both parents when they live together.

Moreover, cohabitants cannot jointly adopt a child, but they may do so separately. They can also opt for assisted human reproduction with a third-party donor, even though they are not married, as the special law and the Civil Code do not require marriage as a necessary condition. (Noul Cod Civil al României articolul 441, alin 3)

What happens if the cohabitation relationship ends, and the parents no longer live together, but a minor child was born during the cohabitation? In this situation, the parents exercise parental authority in the same way as divorced parents. As a general rule in divorce cases, it will be exercised jointly by both parents. In cases of disagreement between parents on how to exercise parental authority, they may turn to the guardianship court. There are exceptions to the rule of joint exercise, when parental authority is exercised by one parent or another person. (Lucia Irinescu - Dreptul familiei, editura Hamangiu 2024, București, p 482)

Exercising Parental Authority by One Parent:

This occurs when there are justified reasons, according to Article 398, paragraph 1 of the Civil Code. Justified reasons include:

- Alcoholism
- Mental illness
- Repeated and serious violation of parental authority by the other parent
- Drug addiction
- Conviction for committing crimes such as violence, sexual offenses, human trafficking, or drug trafficking
- Parental alienation (when the child manifests unjustified or disproportionate repulsion, resistance, or hostility towards one of the parents)

According to Article 397 of the Civil Code, the parent will exercise all rights and obligations that would have belonged to both parents while respecting the Principle of the Best Interests of the Child. Parental authority may also be exercised separately by one parent when the cohabitation has ended, for objective reasons. (Nou Cod Civil al României articolul 397 482. alin 2)

Article 507 of the Civil Code mentions that parental authority is exercised by one parent when the other is objectively unable to exercise their rights and obligations. The law specifies the following situations:

- One of the parents (cohabitants) has died
- One of the parents (cohabitants) has been declared deceased by a court decision

- One of the parents (cohabitants) is under special guardianship (but can still oversee the child's upbringing and education)
- One of the parents (cohabitants) is missing, has abandoned the family, or is serving a custodial sentence
- One of the parents (cohabitants) has been deprived of parental rights

If the child is not recognized by the father of the former cohabitant, filiation is established only with respect to the mother, and parental authority will be exercised accordingly.

Furthermore, parental authority for a child resulting from cohabitation can be exercised by other persons or institutions instead of the parents when the guardianship court places the child for valid reasons in an institution, with a relative, or another person close to the minor. This situation arises when both parents have shown serious neglect towards the child, suffer from illness, or are objectively unable to exercise parental authority. (Noul Cod Civil al României art. 507, 508)

Inheritance Rights:

A child born from cohabitation (outside of marriage) will have the same inheritance rights as a child born within marriage. The child has inheritance rights to both the mother's and the father's estate if filiation has been established with both parents. If it is believed that if the child is not recognized by the father, the child has the right to file an action to establish filiation towards the father and thereby gain inheritance rights to the father's estate.

A negative effect of the cohabitation situation on the child is that, in the case of a child born from the parents that are not married, the filiation towards the father is established more easily and quickly without requiring a special procedure, therefore the child often being recognized immediately. There are no doubts regarding the child's filiation to the father, and the presumption of paternity operates automatically, being overturned only in exceptional cases (for instance, if the father was abroad during the legal period of conception or was serving a custodial sentence). On the other hand, in the case of a child born from cohabitation, the presumption of paternity can be easily overturned, and the issue of establishing paternity arises more often in such cases, leading to disputes being resolved through the courts.

I believe that the cohabitation relationship is not conducive to the harmonious psychological development of the child, as the parents bear different surnames, and the child has only one parent's surname, most often the father's, if the father recognizes them. This leads to confusion for the minor child and raises questions such as, "Why does my mother have a different surname from mine?" "Why does my classmate have the same surname as both of his parents, but I don't?" Such questions can disrupt the harmony necessary for a child's development, which might seem insignificant to cohabitants but are of great importance to the child.

Although parental authority is exercised jointly, the union between the two individuals brought by marriage does not exist, even if both respect the legal rights and obligations toward their child. Such a union provides certainty in family relationships, which must be solidified and harmonious in order to educate a child in a healthy environment. I believe that this might slightly affect, though not significantly, the Principle of the Best Interests of the Child, this principle being the fundament of this institution. For example, in Moldova, the Family Code provides that when spouses opt for partitioning their property during marriage or after divorce, property transferred to the names of minor children belongs to the child and is not part of the divisible estate. This is not possible for cohabitants, which creates a significant disadvantage for the child's estate, leaving a child born outside marriage deprived of an essential right.

The Romanian legislator should introduce concrete regulation to assist couples who, for various reasons, cannot or do not wish to marry. Such regulation should target the following aspects:

- The possibility of entering into a notarial agreement where the cohabitants define their rights and obligations to each other and their minor children.

- The regulation of a legal regime for property acquired during cohabitation, specifying a matrimonial-like regime.
- The possibility of ending this legal regime through judicial or contractual partition.
- The dissolution of cohabitation.
- The establishment of filiation for the child.
- The way in which parental authority is exercised.
- The manner and limits in which cohabitants must contribute to the child's upbringing and education, both during cohabitation and after its termination.
- The legal effects of the dissolution of cohabitation for both the life of the minor child and the joint property acquired during the cohabitation.
- In the event of the death of one cohabitant, the surviving one should have a legal share of the property acquired during the cohabitation.

4. Conclusion:

In conclusion, while cohabitation may seem like an option for many couples, it comes with numerous inconveniences since it is not regulated by law in Romania, as mentioned above. The simplicity of cohabitation is merely apparent, as complications can arise when the two cohabitants decide to separate, particularly concerning the minor child. I believe that regulating cohabitation within a well-defined legal framework would greatly assist in resolving issues regarding property and the upbringing and care of children. Adopting a model similar to that of France or Spain would be highly beneficial. The law should at least give cohabitants the possibility of entering into agreements in authentic notarial form, in which they can define the acquisition of property, the subsequent division of it, and especially the way parental authority is exercised, subject to the guardianship court's approval.

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- 10.Civil code of Spain

PROTECTING CHILDREN'S RIGHTS THROUGH CRIMINAL LAW MEASURES

DOI: <https://doi.org/10.53486/dri2025.62>
UDC: 341.231.14-053.2:343.62(498)

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Abstract. *In today's increasingly complex world, protecting children through criminal law has become a growing priority, especially as new forms of abuse and exploitation threaten their safety and development. This article explores how Romania addresses these challenges, focusing on how its legal system aligns with global standards such as the United Nations Convention on the Rights of the Child and the Lanzarote Convention. The best interests of the child are in the right of the child to normal physical and moral development, socio-affective balance and family life. The research employs a comparative legal approach and draws on both statutory analysis and academic commentary. The analysis identifies several weaknesses in practice, particularly in areas such as inter-institutional coordination, specialist training for justice professionals, and support services for young victims. While Romania's legal framework is comprehensive on paper, its implementation often falls short. To bridge this gap, the paper proposes a multidisciplinary strategy that integrates legal reform with educational and social support measures. Key recommendations include improving institutional collaboration, enhancing professional training. The considerations from the given paper, we think, can open the way for us to the problem of the correct solution of the use of legal concepts and theories before the courts.*

Key words: Criminal law, Children's rights, legal framework, extrajudicial measures

JEL: K10, K14

1. Introduction

In the Romanian literature, it is noted that the correct explanation of the meaning of the concept of a child is likely to help to exercise and defend its rights as best as possible, protection achieved including by criminalizing and punishing the facts that affect this value, and on the other hand it would be of major interest for the correct understanding of the content of the concept of the child in relation to another concept such as minor, with which it would often be confused or could be used as a synonym. Moreover, we also note that, both in Romanian legislation and in the legislation of the Republic of Moldova, for example, in the civil code, in the penal code, in the Law no. 123/2024 amending and completing the Law no. 272/2004 on the protection and promotion of the rights of the child [3], there is no unitary terminology. So, etymologically, the term child comes from the Latin *infans* meaning that does not speak. *Infans* was what we now call a small-aged child.

Examining the issue, we will continue to make some considerations regarding the notion of a child as regulated in national and international law, without exhausting the subject. The testimony of this is also a saying from the elderly: *until your parents pass away, you are a child*.

2. Basic Content

Taking this into account, we specify that the Declaration of the Rights of the Child & then in the International Convention on the Rights of the Child of 1989 defines the child as "any human being under the age of 18, except when the law applicable to the child sets the limit of majority under this age" [1]. Hence, we point out that until the adoption of the Convention there was no legal definition international documents in the matter making only general references by reporting the subject to the political or social environment. Evidence of this is clear from the fact that Romania was among the first states to ratify the UN Convention, in the year immediately following its adoption in the United Nations General Assembly, by Law no.18 of 28 September 1990[5]. In this respect, it can be stated without reservation that in the UN Secretary General's Report, three categories of children were

distinguished on the situation of children: a) those who depend totally on their family in meeting all needs and are not yet of school age (from conception to 6—8 years); b) those who depend for their physical and mental development both by the family and by the school within compulsory general education (age from 6—8 years to 12 – 13 years); and c) adolescents, the last stage before full integration into the adult world and whose environment is, accordingly extended to all other state institutions.

As such, the exact definition of the term child is of practical importance in the light of the fact that certain legal provisions regulating legal institutions with application in the field of child protection (minor) establish measures and age-related responsibilities.

Childhood is the first stage a person goes through, it is the period when it is formed, develops psychically, physically, acquires a logical thinking (*crescit enundo*). During this stage of child development, the child lacks the ability to understand and manifest his will according to the provisions of the criminal law. This incapacity is a normal one, because it is not the result of an anomaly or a pathological condition, but results from the natural course of human existence. Because of this, children cannot be subject to repressive measures (punishments), this incapacity being assumed as absolute (presumption *iuris et de iure*). This absolute legal presumption of criminal incapacity represents, according to Article 113 of the Criminal Code, the first stage in determining the limits of the criminal liability of minors [2].

Protection measures can be taken against children, education, when it is found that they have a negative conduct, but cannot resort to punishment, because the child does not have the ability to understand, to become aware of what he is doing, of the consequences of his actions and therefore cannot understand neither the meaning of the punishment, the product of its application. For the child, punishment would mean suffering designed to spoil his character, sometimes even change the positive educational basis he already has formed. The duration of this stage (childhood) cannot be defined, because it depends on strictly psycho-physiological conditions and criminal conditions. The limit of this stage of childhood can also be extended depending on the region, climate, education, race, living conditions.

For example: 7 years in India and Switzerland, 10-12 years – in Ireland, 14 years – in Germany, Russia, Japan, Republic of Moldova, 15 years – in Sweden, Denmark, Finland and Poland, 16 years – in USA and Kazakhstan [6]. Age periods of mental development depend to some extent on the number of years lived and the degree of maturation of the child's organism, but they may not coincide with his chronological age. Therefore, age periods have at least four aspects: chronologically – from birth to the present; biological – is determined by the degree of maturation of the organism, by the state of the nervous system; psychological – is determined by qualitative changes in mental and sociological development – is characterized by social maturity, the roles that the individual has in society. Therefore, it has always been admitted and everywhere that the child in childhood, even if its upper limit was and is currently variable from one criminal law system to another, can never be subject to criminal liability.

The second stage that a man goes through in his normal development is adolescence, period of completion of training, of psycho-physical fixation. This period can also be considered transitional (perfecting), because the teenager has characteristics both from mature man and from the child, the component of maturity evolving as we approach the period when the teenager becomes mature. Adolescence is divided into two stages: adolescence proper, in which the component close to childhood prevails and the end of adolescence, in which the component of maturity prevails.

In the first phase, the psycho-physical ability is not complete, since the teenager does not have the full ability to understand the importance and consequences of the act, in certain circumstances or situations, compared to a mature man. Thus, in the first phase of adolescence, the psycho-physical capacity is unfinished, relative. The same teenager may be considered capable of understanding the

importance and consequences of the act in a particular situation and incapable of dealing with another situation in fact. Their understanding must be established on a case-by-case basis.

In the second phase of adolescence, the adolescent finds himself in full psycho-physical perfection; his capacity is close to that of a mature man in terms of his ability to understand and you. The education of the adolescent means, from a psychosociological point of view, its adaptation to the limitations and prohibitions of the social environment. Adaptation to the physical and social environment, emphasizes the author of Piaget, represents „a balance between two contradictory mechanisms, assimilation and accommodation, the acquisition of which lasts throughout childhood and adolescence and defines the proper ordering of these periods of existence”.

The protection of the minor is carried out first by extrajudicial means.

We specify that the range of extrajudicial means as well as legal ones is very wide. The detailed exposure of all would go beyond the framework of the present thesis; that is why we are limited only to the signaling of the most important guarantees and which, we believe, are useful to be succinctly rendered.

We ought to first evoke the rules of social coexistence which are nothing but moral rules signify the unity of right and morals. This unity is also expressed in the fact that many of the norms of morality, through legal regulation, become legal norms which, besides the force of public opinion, when appropriate, are ensured also by the force of constraining the criminal norms. Always, throughout its existence, mankind has felt the need to establish norms and rules of behavior, that is, to regulate the relations between them. These rules, along with other principles and customs, establish the behavior of people in society, in the family, in personal life and being generated by social existence, are attributed to various facts a certain appreciation and significance, are considered moral or immoral, good or bad, useful or harmful.

The appearance of the family, especially the monogamous family, has determined the establishment of rules of conduct „on relations between young and old, parents and children, wife and husband – rules that have long had a customary character. If from ancient times it was required that children (young people) respect the elderly, it is no less true that from the same times are known „customary rules” that oblige parents to take care of the growth of their children.

In ancient times the parents – father – were those who taught their child how „the craft of arms”, hunting or shepherding, agriculture or metal processing, this parental care was mainly aimed not only to provide an extra labor force, but especially the preparation for life of the young offspring.

Young people in a gint or tribe have always understood their purpose and the purpose of their education respecting the elders considered wise because of the school of life[4]. The decisions of the wise men's or elders' council were laws for the tribe's members, binding on all, and today there are still tribes in South America or Micronesia, which provide examples of exemplary disciplinary conduct among young people.

This atmosphere, long created, has allowed some customary rules to become rules of law, when due to the specific economic conditions of polarization of material wealth of class separation of people, state and law appear. Thus, it was imposed that an objective necessity of rules as rules of conduct, of the members of a family, of society, to be inscribed in laws.

Particularly useful, by their efficiency, are therefore also the legal means that exercise, by their norms, a significant action to protect the minor.

In the achievement of this legal protection, the various branches of our law are contributed by the specific regulations of each. Although different and complex in scope and content these multiple and various means constitute, together, a complex system of measures of law.

In the fundamental law of the Romanian state was inscribed as the basic principle in Article 49, according to which: *„Children and young people enjoy a special regime of protection and assistance in the realization of their rights. The State shall grant allowances for children and aid for the care of sick or disabled children. Other forms of social protection of children and young people shall be*

established by law. The exploitation of minors, their use in activities that would harm their health, morality or endanger their normal life or development are prohibited. Minors under the age of 15 cannot be employed as employees. Public authorities are obliged to contribute to ensuring conditions for the free participation of young people in the political, social, economic, cultural and sports life of the country" [5]. This fundamental law permeated by a profound humanism reflects the concern not only for marriage, the family, and the interests of the mother and child, but also, in general, for the care of man with his needs and interests.

On the basis of the fundamental right of children to be provided with the necessary conditions for the development of physical and intellectual skills enshrined in the Constitution, the child enjoys broad socio-economic and cultural rights and freedoms, which ensure their real and full participation in shaping their own future. Here, it is the place to specify that the fundamental law is not only limited to proclaiming these rights or freedoms of citizens, but also provides for the material and legal guarantees of the exercise and defense of human personality and fundamental rights of citizens. In such a context, the protection of minors becomes one of the fundamental principles of constitutional law.

The civil code adopted by Law no. 287/2009 of 25 June 2009 is the basic matter in which the principles and norms underlying family social relations are included. In this code are also inscribed the basic principles of the protection of minors. For example, in Article 488 of the Civil Code, it is stipulated that: *"parents have the right and the duty to raise the child, taking care of his physical, mental and intellectual health and development, his education, teaching and professional training, according to their own convictions, characteristics and needs of the child; they are obliged to give the child the necessary guidance and advice to properly exercise the rights that the law recognizes him/her"*[4].

In this respect, we specify that the family in general presents itself as a form of special social relations between persons who are bound by marriage or kinship, thus including in its composition spouses & parents, children, but also only single spouses constitute a family.

Having as purpose the analysis of the protection of the best interests of the child from all points of view; we find that the duties of the parents are numerous and varied. They originate not only from the civil code, but also from other national as well as international normative provisions. They refer both to the person and to the goods of the minor and create in the charge of the subjects as many responsibilities.

The need to protect the child and through the mediation of the criminal law is among the most important objectives of the criminal law; the person of the child being defended, both in terms of his physical personality (life, bodily integrity) and his moral personality (dignity, honor, freedom, etc.) values that define the personality of the child in any type of society.

In order to fulfil this obligation, our criminal law ensures the protection of minors by establishing a very broad and varied framework of criminal offences, on the basis of which it establishes criminal liability for unlawful acts that directly or indirectly affect the multiple rights and fundamental freedoms of the person. It is correctly emphasized that the criminal law must intervene, as the last ratio, (according to Professor George Antoniu) in the relations between parents and children because more serious custodial sanctions are provided, if the violation of parental obligations is criminal [1]. This protection of the minor is carried out on the one hand *post factum*, after the criminal act has been committed, and on the other hand, *ante factum*, preventive, creating an atmosphere that prevents, in the future, parents or other persons from committing such criminal acts.

Moving to the penal code, we find provisions that directly protect the minor, namely, in the rules on the causes of non-imputability, aggravating circumstances, and safety measures.

- Article 27 provides for the minority of the perpetrator;
- The code in force lists in Article 77 the circumstances that constitute aggravating circumstances
- the rape provided by art. 218 Criminal code or sexual assault (art. 219).
- trafficking in human beings in the form provided for in Article 210 of 1, letter b)
- the exploitation of begging provided for in Article 214 of 1.

3. Conclusion

Criminal law serves as one of the most vital instruments in the architecture of child protection, offering a structured and enforceable means of responding to serious violations of children's rights. However, the mere existence of laws, no matter how well drafted, is not sufficient.

To optimize the protection of children's rights through criminal law, several measures are necessary: continuous professional training for prosecutors, judges, and police officers specialized in children's rights; adoption of child-friendly procedures, such as hearing minors in specialized rooms with the assistance of a psychologist; strengthening preventive education in schools regarding children's rights; effective collaboration between social services and criminal prosecution bodies. Furthermore, Romania should intensify efforts to implement restorative justice measures for minors.

Only through such a multidisciplinary and proactive approach can the abstract ideals of child protection be translated into a sustainable and humane reality. As Romania continues to navigate the evolving landscape of child rights protection, it must prioritize not only legislative compliance, but also the cultural and institutional transformation necessary to uphold the dignity and well-being of every child in practice, not just in principle.

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THE ROLE OF THE UNITED NATIONS IN THE MANAGEMENT OF HEALTH CRISES: EBOLA AND COVID-19

DOI: <https://doi.org/10.53486/dri2025.63>

UDC: 341.123:616.9

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Abstract: *This research examines how the United Nations (UN) responded to two of the most significant health crises of the 21st century: the Ebola outbreak in West Africa (2014–2016) and the COVID-19 pandemic (beginning in 2020). Through a comparative methodology, the study highlights the differences between the tactics applied, the speed of intervention, the organizational structures mobilized, and the challenges faced in each context. For the Ebola situation, the UN intervened through a newly established specialized mission (UNMEER), while for the COVID-19 pandemic it opted for the development of pre-existing bodies, emphasizing the importance of the World Health Organization and programs such as COVAX. According to the evaluation, the knowledge acquired during the Ebola crisis exerted a beneficial influence on the subsequent management of COVID-19. However, the scale and complexity of the pandemic revealed fragilities in the international public health system, suggesting the necessity of fundamental transformations to effectively respond to future health emergencies.*

Keywords: *United Nations, global health crises, pandemic response*

1. Introduction

In the context of accelerated globalization, biological threats have the capacity to rapidly cross national borders, transforming local health emergencies into global crises with profound implications for human security, economic stability, and social cohesion. The United Nations, in its capacity as the main multilateral forum at the global level, is called upon to play a central role in coordinating international responses to such crises (Moon et al., 2015).

Two major events of the last decade have tested the global public health architecture in unprecedented ways: the West African Ebola epidemic (2014-2016) and the COVID-19 pandemic (2020-present). These crises, although fundamentally different in the characteristics of the pathogens involved, transmission dynamics, and geographical scope, offer valuable opportunities for comparative analysis and the extraction of essential lessons for future global health emergency management strategies.

This research aims to systematically examine the following aspects:

- Institutional structures and intervention mechanisms activated by the UN in each of the two crises
- The speed and effectiveness of the coordinated international response
- Specific challenges encountered and strategic adaptations implemented
- The impact of the Ebola experience on the subsequent management of the COVID-19 pandemic
- Essential lessons for strengthening global response capacity to future health threats

Through this analytical approach, the study contributes to the specialized literature on global health governance and offers relevant perspectives for reforming the international health emergency response system.

2. Context and Particularities of the Analyzed Health Crises

2.1. Ebola Epidemic (2014-2016)

West African Ebola Outbreak

The hemorrhagic fever epidemic initiated in Guinea during December 2013, rapidly expanding into Liberia and Sierra Leone territories, subsequently affecting additional African states including Nigeria and Mali. The pathogen's distinctive features - exceptionally high fatality rates ranging from 25% to 90% depending on strain variants, coupled with direct bodily fluid transmission mechanisms - posed substantial barriers to epidemic control (WHO, 2016).

Contributing deteriorating circumstances encompassed:

- Compromised medical infrastructures weakened by prior armed conflicts
- Cultural funeral ceremonies and ancestral practices that enhanced viral spread
- Insufficient emergency response capabilities and medical equipment
- Population skepticism toward governmental and international intervention efforts

Upon crisis conclusion, the viral outbreak had generated approximately 11,300 fatalities from nearly 28,600 documented infections, establishing itself as the most devastating hemorrhagic fever epidemic in recorded history (UN, 2016).

2.2. The Global COVID-19 Health Emergency (2020-Ongoing)

The coronavirus disease outbreak, attributed to the novel SARS-CoV-2 pathogen initially detected in Wuhan, China during late 2019, presented vastly different epidemiological characteristics compared to the Ebola crisis. Distinguishing features included:

- Enhanced contagion potential through respiratory droplets and pre-symptomatic carriers
- Moderate case fatality rates nonetheless capable of saturating healthcare capacities
- Unprecedented velocity of international dissemination reaching every continent within months
- Extensive socioeconomic disruption exacerbated by containment measures and economic shutdowns

At the time of analysis completion, the global health emergency had resulted in excess of 7 million verified fatalities and approximately 770 million officially documented cases, with actual figures presumably higher due to surveillance limitations (WHO, 2021).

3. United Nations Ebola Crisis Management

3.1. Organizational Framework

Initial international mobilization was characterized as delayed and fragmented. Only following rapid situation deterioration did the UN Security Council approve Resolution 2177 in September 2014, uniquely designating a health emergency as a global security threat (UN Security Council, 2014).

This resolution facilitated the creation of the United Nations Mission for Ebola Emergency Response (UNMEER), representing the organization's inaugural health-focused emergency deployment. The mission's operational framework centered on four fundamental components:

- Viral transmission containment
- Patient care and treatment provision
- Critical public service continuity
- Regional sociopolitical stabilization

3.2. Implementation Obstacles and Strategic Modifications

The intervention encountered multiple operational impediments including insufficient inter-agency coordination, rural infrastructure limitations, cross-cultural communication difficulties, and affected population marginalization. UNMEER responded through adaptive, context-specific methodologies, notably incorporating traditional and religious authorities into community engagement initiatives (Moon et al., 2015).

4. United Nations COVID-19 Pandemic Response

4.1. Operational Approach and Mechanisms

Contrasting with the Ebola intervention model, the coronavirus response prioritized strengthening pre-existing institutional frameworks rather than establishing novel structures. The World Health Organization functioned as the central coordinating body, formally declaring an international health emergency on January 30, 2020, followed by pandemic designation on March 11, 2020 (WHO, 2020).

Primary intervention components comprised:

- Scientific protocol development and global dissemination
- Research coordination for therapeutic, diagnostic, and preventive interventions
- Strategic Preparedness and Response Plan execution
- COVAX initiative implementation for global vaccine equity
- Resource provision to economically constrained nations

4.2. Operational Complications and Mitigation Strategies

The pandemic response encountered novel challenges including:

- Political interference in public health decision-making processes
- Information distortion campaigns and public health measure resistance
- Inequitable medical countermeasure distribution patterns
- Simultaneous global crisis management complexity

5. Comparative Analysis of UN Interventions

5.1. Comparative Table: Ebola versus COVID-19

Table 1. Comparative Table: Ebola versus COVID-19

Analysis Criterion	Ebola Epidemic (2014-2016)	COVID-19 Pandemic (2020-present)
Nature of the pathogen	Virus with very high mortality and moderate transmissibility	Virus with moderate mortality and very high transmissibility
Geographical extent	Regional (West Africa)	Global (all continents)
UN intervention structure	Dedicated specialized mission (UNMEER)	Mobilization of existing agencies (WHO, UNICEF, etc.)
Speed of reaction	Initially slow, progressively accelerated	Early alert, but uneven international coordination
Major challenges	Deficient health infrastructure, stigmatization, traditional practices	Misinformation, politicization, inequalities in access to medical resources
Results recorded	Epidemic controlled after approximately two years	Pandemic partially managed, with multiple waves of reinfection
Dominant strategy	Geographical isolation and prevention of spread	Strengthening health systems and mass vaccination

5.2. Lessons Learned and Transfer of Experience

The experience accumulated during the Ebola epidemic influenced certain aspects of the response to COVID-19:

- Recognition of the importance of early mobilization of international resources
- Understanding the crucial role of risk communication for the adoption of preventive measures
- Development of intervention protocols and logistic chains for emergency situations

However, the magnitude and specificity of the COVID-19 pandemic required fundamentally different approaches, revealing limitations of previous lessons in the context of a simultaneous global crisis.

5.3. Organizational Transformations and Operational Modifications

Both health emergencies catalyzed significant alterations within the international public health governance framework:

- Following the West African Ebola outbreak, the World Health Organization established the Health Emergencies Programme, designed to enhance rapid response capabilities and coordination mechanisms.
- During the coronavirus pandemic, the development of the COVAX facility was expedited to guarantee equitable access to immunizations and essential medical supplies across nations.
- Additionally, regional surveillance networks for disease monitoring were strengthened alongside expanded laboratory testing capacities.

These developments represent crucial advances toward establishing a more resilient global infrastructure for biological risk prevention and crisis management.

6. Implications for Global Public Health System Reform

6.1. Structural Vulnerabilities Revealed by Health Crises

Both the hemorrhagic fever epidemic and the coronavirus pandemic exposed fundamental weaknesses within the international health emergency management architecture:

- Unreliable funding mechanisms dependent on voluntary state contributions for international agencies such as WHO.
- Implementation challenges for coordinated interventions due to insufficient political consensus among member states.
- Inadequate numbers of trained specialists capable of conducting large-scale rapid response operations.
- Absence of swift and effective resource mobilization protocols during emergency situations.

6.2. Recommended Reform Pathways

Based on comparative analysis findings, the following strategic directions are proposed to strengthen UN capacity for addressing future health emergencies:

1. Establishment of a permanent rapid response system for health emergencies, equipped with stable funding mechanisms and qualified personnel reserves.
2. Enhancement of WHO's regulatory authority and improved enforcement of International Health Regulations provisions.
3. Development of integrated platforms for real-time epidemiological data collection, analysis, and dissemination capabilities.
4. Implementation of binding agreements governing equitable production and distribution of therapeutics and vaccines during crisis situations.
5. Expansion of research and innovation investments to anticipate and rapidly counter pandemic-potential pathogens.

7. Conclusions.

The comparative analysis of UN interventions in the case of the Ebola epidemic and the COVID-19 pandemic reveals a significant evolution in the approach to global health crises, but also the persistence of profound structural vulnerabilities. While the creation of UNMEER represented an innovative response to a severe regional crisis, the COVID-19 pandemic demonstrated the limits of the current global health architecture in the face of a planetary-scale threat.

To effectively face future pandemics, which in the context of globalization and climate change are becoming increasingly likely, the United Nations will need to implement profound structural reforms, strengthening multilateral cooperation and the technical capacities of its specialized agencies. The

experiences accumulated in managing these two major crises provide a valuable basis for building a more robust, more equitable, and more efficient system for protecting global health.

Ultimately, the success of these reforms will depend not only on the political will of UN member states but also on the capacity to mobilize adequate resources and to integrate lessons learned into new institutional structures and operational mechanisms.

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THE RECEPTION OF THE CONSTITUTIONAL RIGHT TO RELIGIOUS FREEDOM IN THE SPECIALIZED LITERATURE

DOI: <https://doi.org/10.53486/dri2025.64>

UDC: [342.4:343.42]:001.891(498)

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Abstract: *This paper proposes an exhaustive literature review that discusses how Romanian constitutional law literature can reflect the constitutional right to religious freedom. The authors of these academic resources have been recognized through this research as being the ones who shaped and developed the field of constitutional law, and as those who verified the applicability of the constitutional norms in some concrete cases of their juridical praxis. Another dimension of the interaction was with the thematic literature on religious freedom, a body of literature that results from interdisciplinary approaches. The authors of these books are jurists, theologians, historical sociologists, and others, specialists who have shown concern for this field of research. The methodology used in this paper involved a summary analysis of the specialized literature to identify relevant academic sources, as well as possible gaps in research on the right to religious freedom from a constitutional perspective. This paper aims to inspire current debates and future research in the field of constitutional religious freedom guarantee and protection.*

Key words: *religious freedom, constitutional law, legal literature, Romanian constitutionalism*

JEL: Times New Roman, 12 pt http://www.aeaweb.org/journal/jel_class_system.php.

1. Introduction

The constitutional law is a branch of public law which, according to legal doctrine, "regulates the constitutional rules on the organization and functioning of the state, public authorities and the guarantee of fundamental human rights". The definitions relating to constitutional law include "the fundamental rights and freedoms of citizens, as well as the relations between state and citizens" as part of the subject matter of constitutional law. Thus, religious freedom is among the constitutionally guaranteed rights. From this perspective, the legal literature of constitutional law should also include in its content the analysis of freedom of conscience and religion. This research will highlight how the topic of religious freedom is reflected in constitutional law literature.

The concern for understanding, guaranteeing, and protecting the right to religious freedom can also be derived from specialized thematic literature, that is, books and articles written on this topic. This type of literature, in general, analyzes religious freedom from various perspectives, such as legal, theological, historical and sociological, or interdisciplinary approaches. In the research conducted, this represents a second category of literature that was examined. The authors of this type of literature are, in general, people directly interested in this field due to their profession and activity. The religious sphere, especially after an intense period of 40 years of communist-atheist propaganda in Romania, did not represent a major area of interest, except mainly for those directly involved in religious activity.

2. Religious freedom in constitutional law literature

Romania has a rich constitutional law literature that reflects, on the one hand, the continuous concern of constitutionalists in explaining and deepening the constitutional doctrine, and on the other hand, it reflects a constant and contextual evolution of the doctrine related to various social and political moments in the country's history.

2.1. Romanian constitutionalists: their writings and particularities

Professors with a rich and valuable activity, as well as reference authors in the field of constitutional law, are considered the following: Antonie Iorgovan (1948-2007), Ioan Muraru (1938-2021), Nicolae Popa (1939-2024), Tudor Drăganu (1912-2010) and Ioan Vida (1946-). Antonie Iorgovan is known as the main author of the 1991 Constitution, being given the title of "father of the 1991 Constitution". He worked as a law professor at the University of Bucharest, being the author of reference books in Romanian legal literature, such as "Treatise on constitutional law (vol. I–II)", a particularly appreciated book.

Professor Ioan Muraru has worked since 1960 as a professor at the Faculty of Law of the University of Bucharest, as well as a judge at the Constitutional Court of Romania (1992-2001) and People's Advocate (2001 – 2011). In the field of law, he is the author of textbooks, courses and monographs and over 100 studies on constitutional law, among which we can mention: "The Constitution of Romania - commented and annotated " (Muraru, 1992), „Romanian Parliamentary Law ” (Muraru, 1994)), "The Constitution of Romania. Commentary on Articles " (Muraru & Tănăsescu, 2024), " Constitutional Law and Political Institutions " (Muraru, 2003), "Liber Amicorum - On the Constitution and Constitutionalism "(Muraru, 2006).

Nicolae Popa was a university professor at the University of Bucharest, where he taught the courses: "General Theory of Law" and "Legal Sociology ". He worked as a judge at the Constitutional Court of Romania (1996-2004), and from 2004 to 2009, he was president of the High Court of Cassation and Justice. Among Professor Nicolae Popa's contributions to legal literature are: "The Constitution of Romania. Knowledge of the State and Law" (Popa, 1979), "Law and Rights " (Popa, 1991), "For a General Theory of the State and Law" (Popa, 2003), "The Jurisprudence of the Constitutional Court and the European Convention on Human Rights " (Popa, 2005), "General Theory of Law (Syntheses for Seminar - 2005)" (Popa, 2005).

Tudor Drăganu was a professor of constitutional law at Babeş-Bolyai University in Cluj-Napoca, being elected an honorary member of the Romanian Academy in 2003. His most important contributions to legal literature in Romania include: " Introduction to the theory and practice of the rule of law " (Drăganu, 1992), " Constitutional law and political institutions " (Drăganu 1995, 1998 edition).

Ioan Vida was a scientific researcher at the Institute of Political Sciences (1971-1977), a law professor at the National School of Political and Administrative Studies, and is currently a doctoral supervisor at the West University of Timișoara. Between 2001 and 2010, he worked as a judge and president at the Constitutional Court of Romania. Among his published books are: "General Theory of Law" (Vida, 2016), "The Constitutional Court of Romania. The Justice of Politics or the Politics of Justice ? Second Edition, Revised and Added " (Vida, 2020), and "Formal Legistic " (Vida, 2020).

Alongside these prominent professors and authors who have significantly marked the evolution of constitutional law in Romania, the specialized literature of the last 30 years has been enhanced by the works of a significant number of constitutionalists, some of whom I have mentioned in Table 1, as well as some of their papers.

Table 1. Romanian professors and constitutional law publications

No.	Name and surname	University	Specialization	Representative books
1.	Corneliu-Liviu Popescu	University of Bucharest	constitutional law and human rights	"Human rights in the jurisprudence of the Constitutional Court of Romania", Hamangiu, 2009.
2.	Elena-Simina Tănăsescu	University of Bucharest	constitutional law	co-author – "The Constitution of Romania. Commentary on Articles", C.H. Beck, 2022; co-author - "Constitutional Law and Political Institutions", 16th

International Scientific Conference
"DEVELOPMENT THROUGH RESEARCH AND INNOVATION" IDSC-2025,
The 6th Edition, May 16th, 2025. Chisinau, Republic of Moldova

No.	Name and surname	University	Specialization	Representative books
				edition, Ed. C.H. Beck, 2024; "Constitutional Litigation", C.H. Beck, 2025
3.	Ștefan Deaconu	University of Bucharest	constitutional law	"The Constitution of Romania. Commentary on the Articles", C.H. Beck, 2008;"Constitutional Law", C.H. Beck, 2024.
4.	Verginia Vedinaș	University of Bucharest	administrative and constitutional law	"Dictionary of Public Law - Constitutional and Administrative Law", Universul Juridic, 2009.
5.	Ioan Stanomir	University of Bucharest	comparative constitutionalism	"Freedom, Law and Justice: A History of Romanian Constitutionalism", Polirom, 2005; "Constitutionalism and Postcommunism: A Commentary on the Constitution of Romania", University of Bucharest Publishing House in 2005 Co-author - "Inventing the Constitution", C.H. Beck, 2009
6.	Mihai Bădescu	Bucharest Academy of Economic Studies	constitutional law and general theory of law	"Constitutional Law and Political Institutions". 14th Edition, Ed. Hamangiu, 2021
7.	Marieta Safta	"Titu Maiorescu" University of Bucharest	constitutional law	"Constitutional Law and Political Institutions" Vol. I, 8th revised edition Hamangiu, 2023; Co-author – "Constitutional Litigation Course", Hamangiu, 2020; "Constitutional Justice in the European Union", Hamangiu, 2022; Co-author – "Constitution of Romania. 5th Edition. Updated July 20, 2023", Hamagiu 2023
8.	Marius Bălan	"Alexandru Ioan Cuza" University of Iași	constitutional law	"Constitutional Law and Political Institutions. Vol. 1. General Theory of the State and the Constitution. The Romanian Constitution in the European Context", Hamangiu, 2015
9.	Mircea Criste	West University of Timișoara	constitutional law	"Constitutional Law. A Citizen's Right", Universul Juridic, 2019. "Short Constitutional Itinerary", Universul Juridic Publishing House, 2024
10.	Dănișor, Dan Claudiu	University of Craiova	constitutional law	"Constitutional Law and Political Institutions: General Theory", C.H. Beck, 2007; "Constitution of Romania Commented. Title I. General Principles", Universul Juridic, 2009
11.	Marius Andreescu	University of Pitesti	constitutional law	Co-author - "Constitutional Law. General Theory. Fundamental Rights, Freedoms and Duties", 4th edition, Sitech Craiova Publishing House, 2015

The reflection on the constitutional law literature attempted to identify the specific particularities of each specialist. Thus, Professor Corneliu-Liviu Popescu stood out through his contribution to the

theoretical understanding of the Constitution, the application of constitutional norms, and also through his commitment to the constitutional reform effort.

Professor Elena-Simina Tănăsescu has a balanced, interdisciplinary, and profound approach to Romanian and European constitutionalism, being a factor of influence in the debates concerning the rule of law, the revision of the Constitution, and the institutional balance between the powers of the state. The academic contribution of Professor Ștefan Deaconu was noted in the in-depth research on the Constitutional Court, the nature of constitutional control, and the fundamental institutions of the state. Professor Verginia Vedinaș is recognized for her contribution to a clearer and deeper understanding of the relations between the administration and the Constitution. Professor Ioan Stanomir brings the historical perspective and that of political philosophy to the approach to constitutional law.

The academic contribution of Professor Mihai Bădescu was particularly notable in the field of the general theory of constitutional law, arguing for constitutional law as an autonomous branch by affirming specific fundamental dogmas and principles. The experience and expertise in constitutional law of Professor Marieta Safta were reflected in the practical approach to constitutional law topics, with a special emphasis on constitutional control, the functioning of public institutions, as well as in the comparative approach with the constitutional justice of the European Union. Professor Dan Claudiu Dănișor brings to constitutional research and debate the philosophical approach to the general theory of law and the Constitution. The former Prosecutor General of Romania, Professor Mircea Criste, brings a change in constitutional thinking, from a focus on institutions to one focused on the citizen, on rights and values. This does not mean that Professor Criste gives up examining the constitutional norms regulating the organization and functioning of the state or public authorities, but the vision that constitutional law is a means of forming civic consciousness and not just a branch of legal sciences. Professor Marius Bălan's contribution to constitutional law consists in the comparative approach of Romanian constitutional regulations to the norms of the European legal system. Through this approach, Professor Bălan shows that understanding the constitutional norm is possible through a contextual approach. The main contributions of Professor Marius Andreescu concern constitutional jurisprudence, as well as the relationship between national law and international law.

2.2. Reception of the right of freedom of religion and conscience in the constitutional law literature

In the constitutional literature, we note a slightly imbalance regarding the analysis of the subjects that explore the regulatory object of constitutional law, such as the organization and competences of the public authorities and the relations between the public authorities, compare with texts which analyze the fundamental rights and freedoms of the citizens, and the relations between the state and the citizens.

So, one cannot speak of a total ignorance of the subject of religious freedom in the specialized literature, but only of a reduced research on this topic.

However, there are also a few books that refer explicitly, and in a more extensive study, to the constitutional right to religious freedom. Some of these academic works can be mentioned, such as: "Constitutional Law. A Citizen's Right" (Criste, 2019), „Constitutional Law. General Theory. Fundamental Rights and Freedoms" (Nicolau, 2022), „Freedom, Law and Justice: A History of Romanian Constitutionalism" (Stanomir, 2005), "Human Rights in the Jurisprudence of the Constitutional Court of Romania" (Popescu, 2009).

Mircea Criste's Professor's perception of constitutional law is simply reduced to a citizen's right. In this sense, he portrays constitutional law as a relational right as well as a substantial right. As for freedom of conscience, it is seen following the general idea of the book, namely as an integral part of the fundamental freedoms of any citizen, that is, part of what he calls "substantial right" (Criste, 2015). Ingrid Nicoulau treats religious freedom in the section in which she analyzes fundamental

rights based on the explanations of article 29 of the Constitution, not as an isolated right, but rather the relationship between religious freedom and other rights. Professor Ioan Stanomir critically analyzes what freedom means in the Romanian context, being an adherent of the principles of liberal society, and this perspective gives him a particular understanding of religious freedom, considering that it is central to liberal thinking and Western constitutional traditions (Stanomir, 2005). In other words, we can deduce that what Professor Stanomir is saying is that religious freedom is the heart of other freedoms. Stanomir is the one who has a critical approach towards constitutional formalism, that is, the discrepancy between the constitutional text and its application in political, legal, and social reality. Thus, during the communist period, religious freedom was just a formula devoid of content. In Professor Popescu, Corneliu-Liviu, we can notice some particularities regarding religious freedom, namely religious neutrality, mainly based on the jurisprudence of the European Court of Human Rights (Popescu, 2009), as well as the danger of state abuse towards religions, as was the case with the confiscation of church property.

This overview of the literature on constitutional law leads to the conclusion that we have in Romania a rich and diverse bibliography of constitutional law, but it is much more directed towards analyzing public authorities and the relationship between the citizen and the state, and less towards exploring the rights and freedoms of the citizen. A possible explanation for this would be the communist philosophy and the communist regime which, contrary to the claims and emphasis on the "working class", the state was central, and the will of the state leadership, and the common good, understood of course as what is good for the Communist Party and its leaders, was above the personal desires of the citizens. Individual freedoms were to be subordinated, even annihilated, to efforts to build a socialist society. It seems that the trend in legal scholarship, especially constitutional legal scholarship, is moving more and more towards giving greater weight in current analysis and debate to fundamental rights and freedoms, including religious freedom.

3. Thematic literature on religious freedom

Religious freedom has become a concern in Romania, in the post-communist period, not only for lawyers but also for experts in other fields. Some of these writings will be reviewed in this section.

Among the first Romanian authors to write about religious freedom, immediately after the December 1989 Revolution, was Ilie Fonta, former presidential advisor (1992-1995) and secretary of state for religions (1995-1996). In the book "Religious Freedom in the Contemporary World," published in 1994 by Stephanus Publishing House, Professor Fonta introduces the Romanian public to documents and specialized analyses on religious freedom. UN documents on religious freedom, provisions of the constitutions of some countries regarding freedom, religious legislation and normative acts from different states, and various topics regarding the manifestation of the right to religious freedom are presented. The basic thesis of this writing was to argue for the need for religious life in Romania to be regulated not only constitutionally, but also through a law on religions. The context of the appearance of this book must be taken into account, namely, the beginning of the debates between the representatives of the religions and the Secretariat for Religions regarding the elaboration of a new law on religions. A new work by the same author appeared in 1998 in Cluj-Napoca, the book "Religious Freedom in Romania". The book has a theoretical approach to religious freedom, but also a contextual one, making direct reference to the themes of the debates that took place in Romania at that time and the regulatory situation of religious life. Professor Fonta also refers to the writings of the sociologist Constantin Cuciuc, who in the early 1990s published books on the sociology of religions. Ilie Fonta also published the article "Religious Freedom and Orthodoxy" (Fonta, 1999)

At the beginning of the 2000s, one can note, among other publications, the book by Mihai Pătrășcanu, "Human Rights and Religious Freedom in Romania" published by ALL Publishing House, Bucharest, in 2001. Pătrășcanu is a Romanian jurist who has shown concern for human rights, especially for the right to religious freedom. In the book, he analyzes and compares national

regulations on human rights and religious freedom with international standards in the same field. Of course, within this analysis, the relationship between the state and religious cults is examined, noting both the progress achieved in the last ten years and the existing and potential challenges regarding religious freedom in a society undergoing democratization.

A book written from an interdisciplinary perspective, theology and law, is "Religious Freedom in Romania", published in 2006 by the Romanian Academy Publishing House by Professor Ioan Ică Jr., son of Professor Ioan Ică. In this book, religious freedom is approached from a historical, legal, and theological perspective, analyzing how it was perceived by Romanians in various historical periods. Of course, the author cannot fail to examine the relationship between the state and the church, as well as the legislative framework regarding religions in Romania. All this foray led to conclusions regarding the challenges existing up to that point in Romania, as well as the importance of interfaith dialogue and respect for human rights.

In 2003, Florin Buhuceanu published under the University of Bucharest, "The State and Religions in Romania", an academic study in which the relationship between the state and religious cults in the post-communist period is analyzed, emphasizing the need for an open dialogue between the state and the various religious and minority communities. Buhuceanu, a former theologian, president of the ACCEPT association, is a human rights activist, especially for the rights of sexual minorities. This work has been quite often maintained in specialized studies.

University professor Verginia Vedinaș, a specialist in public administration and constitutional law, published in 2003 at Lumina Lex Publishing House the book "Freedom of Religious Beliefs". The book addresses topics such as: the historical evolution of religious freedom in Romania; the constitutional and legal framework of freedom of conscience and religion; the relationship between the state and religious cults; and aspects regarding the rights of religious minorities. This interdisciplinary perspective on law, administration, and religious freedom is extremely valuable for an exhaustive understanding of the subject.

The article "Religious Freedom Between Pluralism and Secularism" by Mihai Maci, published in the magazine Dilema Veche in 2013, discusses the so-called "tensions" and "balances" between religious freedom, confessional pluralism, and the principle of secularism in a democratic society. For example, Maci investigates how the state could guarantee, without any privilege or discrimination of any cult, religious freedom, and at the same time maintain neutrality towards the religious beliefs of citizens. The author works as a university lecturer at the Department of International Relations and European Studies of the University of Oradea.

The book by Ben-Oni Ardelean, associate professor at the Baptist Theology Faculty of the University of Bucharest, entitled "Religious Freedom: A Normative Approach", which appeared in 2011 at the Didactic and Pedagogical Publishing House, is a complex academic investigation of the concept of religious freedom presented in a legal, political and theological perspective. The author advocates a normative approach, that is, one that not only investigates to what extent religious freedom is applied, but also how it should be guaranteed and respected in a pluralistic democratic framework. In this work, Ben-Oni Ardelean offers an important contribution to the field of Romanian specialized literature regarding religious freedom. He manages to combine both theoretical analysis with practical and applicative perspectives, as well as critical discourses or debates. His book is also addressed to theologians, jurists, political scientists, or those interested in the relationship between religion and state in a democratic society.

The article "Religious freedom and the right of religious freedom" by Nicolae Drăgușin was published on December 11, 2024, in the magazine Dilema veche. The text represents a review and theological reflection of the volume "Prayer, a political problem" by Jean Daniélou, which was translated into Romanian. The author demonstrates that the "earthly fortress" — the social and political space — must allow the exercise of religious freedom, not only as a formal right, but also as a living reality that allows faith to affirm its existence in public life.

The book " Religious Freedom Between Politics and Policies: A Political Analysis of International Standards, National Legislation and Government Practice in the Pandemic" by Cătălin Raiu was published in 2021 by Doxologia Publishing House. As the title suggests, the work provides a detailed analysis of the impact that religious freedom has suffered in the context of the COVID-19 pandemic, addressing international standards, national law, and government practices. In a sense, this book is about how well-established religious freedom is in being able to cope with difficult contexts. Cătălin Raiu is a lecturer at the Faculty of Administration and Business of the University of Bucharest.

Thus, what can be seen from the brief interaction with the Romanian post- communist literature on freedom of conscience and religion is that this has become a field that arouses an interdisciplinary concern that has brought together contributions from law, theology, sociology, and political science. Among the authors are Ilie Fonta, Mihai Pătrășcanu, Ioan Ică Jr., Verginia Vedinaș, and Ben- Oni Ardelean, who have analyzed both the provisions of national and international legislation, as well as the state-cult relationship and the challenges of democratization. Recent works, signed by Cătălin Raiu and Nicolae Drăgușin, mainly deal with freedom of conscience in crisis contexts and the pluralistic public space, expressing at the same time the need to preserve this fundamental right within a robust democratic framework.

The book " Freedom of Conscience and Freedom of Religion. The legal regime of religious organizations in Romania. Legal norms, case law, considerations and evaluations " by Dragoș Penca, published in 2024 by Editura Universitară, is a reference book in the field of Romanian religious law. The work is structured in six thematic chapters, preceded by a theoretical introduction that details the objective of the study: the analysis of how, from the perspective of Romanian law and jurisprudence, the fundamental rights related to freedom of religion and conscience are respected. Relations between the state and religious cults are discussed, including the autonomy of cults, material and fiscal support and constitutional implications. The book examines the process of official registration of religious denominations, the legal status of clerical staff, the regime of church property, religious education, including in denominational institutions

4. Conclusions

In practice, it is clear that the analysis of fundamental rights and freedoms from a constitutional perspective cannot be avoided as long as they exist in constitutions. The section on rights and freedoms effectively became part of the structure of constitutions at the end of the 18th and beginning of the 19th centuries, and the reason for such integration into constitutional texts seems to be the influence of the ideas of the Enlightenment regarding individual freedom, natural rights and the role of government. Of course, this period coincides with the emergence as part of the structure of constitutional law training programs, as well as constitutional law chairs, such as: 1789–1790 in America - the first constitutional law course taught by James Wilson; 1797 in Ferrara, Italy; 1834 in Paris, France; 1864 in Romania - the publication by Professor A. Codrescu.

Religious freedom is one of the fundamental human rights guaranteed constitutionally, but which remains insufficiently researched in the Romanian constitutional law literature. Although the Romanian legal doctrine is vast and varied, the analysis of civil rights and freedoms – especially freedom of conscience and religion – is treated secondary to the themes of state organization. Publications in interdisciplinary fields welcome a new approach regarding the importance of this right in a democratic and pluralistic context. This highlights the need for increased research and activity on religious freedom at the constitutional level, not only through the theoretical study of this right, but also through the analysis of its application in practice and in jurisprudence. Such a type of research is not only a key point for the formation of a balanced constitutional doctrine oriented towards the effective protection of citizens' fundamental rights, but is also indispensable

Religious freedom is one of the fundamental human rights guaranteed constitutionally, but it remains insufficiently researched in the Romanian constitutional law literature. Although the Romanian legal

doctrine is vast and varied, the analysis of civil rights and freedoms, especially the freedom of religion, it seems like a secondary theme in the concerns of researchers. In contrast, publications in interdisciplinary fields show a higher concern and appreciation towards this right and thereby reveal its importance in the achievement of a democratic and pluralistic society. This highlights the need for more study of religious freedom from a constitutional angle, but not only in theoretical analysis, but also in exploring its institutional effects and its jurisprudence. This type of research is necessary due to the need for doctrinal balance in constitutional law, but also because a better understanding of this right will lead to its more effective protection.

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PROFILEING IN HATE CRIME

DOI: <https://doi.org/10.53486/dri2025.65>

UDC: 343.971:159.942.5

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Abstract. Hate crimes differ from other types of crimes by the motive of the perpetrator, the presumed vulnerable situation of the injured person, as well as by their relationship to the group of people. Hate crime is the most serious form of discrimination and abuse of fundamental rights. Profiling in hate crimes can include factors such as membership in extremist groups, personal history of discrimination or violence, and the way in which hatred is manifested towards marginalized groups.

Keywords: hate crimes, profiling, discrimination, poverty

UDC 343.9

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1. Introduction

Hate crimes are considered a serious form of discrimination and an abuse of basic human rights. They have the potential to divide societies and create cycles of violence and revenge.

Crimes motivated by intolerance towards certain individuals in society can divide society and, as a result, there will be violence that impacts not only the victim, but also the group with which the victim identifies. Crimes of this type are generically called symbolic crimes.

Hate crimes are differentiated by the motive of the perpetrator who chooses the victim because of a protected characteristic. Consequently, this type of crime must be investigated with great care and because the victim may suffer serious psychological harm and feel more vulnerable because they cannot change this characteristic. Hate crimes should not incite one group against another, protecting one of them.

For criminal investigation bodies, a lot of work is needed to gather evidence regarding the perpetrator's motivation.

From conversations with friends, neighbors, colleagues, acquaintances, search warrants to requests from internet service providers, surveillance to determine whether the perpetrator is a member of or has associations with groups that commit hate crimes, and the application of a higher penalty for a hate crime is the latest step in a long series of events.

Hate crimes are acts of violence or discrimination committed because of prejudice related to the identity of the victims. These acts do not only affect the direct victims but can have a devastating impact on the entire society, amplifying divisions and social instability.

Profiling, in this context, refers to the techniques used by law enforcement authorities to identify and analyze the characteristics of criminals in terms of behavior, motivations and personal characteristics. In this article, we will analyze how profiling can be used to understand and combat hate crimes, as well as the challenges and risks associated with this process.

In the context of hate crimes, profiling can help identify offenders, understand their motivations, and develop effective strategies to combat them. However, the use of profiling raises numerous ethical and legal challenges, especially when it is based on stereotypes or prejudice, even leading to systemic discrimination.

Exploring how profiling can be used to understand offenders and their impact on the community are the goals underlying the current approach.

On 9 December 2021, the European Commission adopted a communication aimed at adopting a decision to extend EU crimes, including hate speech and hate crimes in this category. The European Court of Human Rights has emphasized that, when investigating violent incidents, state authorities must do everything reasonably to gather evidence related to possible discriminatory motives, analysing all facts that could be an indication that the violence was generated by intolerance or discrimination, in other words hate crimes.

The Organization for Security and Cooperation in Europe considers hate crimes as criminal acts committed with a motive based on prejudice.

At the European level, it has been shown that the phrase "hate crime" describes a type of crime rather than a specific crime provided for by a criminal code.

Hatred towards the more fortunate has always existed in society. Poverty is what accentuates this hatred because it is based on fear, mistrust and horror.

The world is collapsing for those who only survive...Poverty is a concept that deepens inequalities between people, limiting access to services, affecting vulnerable groups, those with an unfavourable socio-economic status. People fear poverty and this leads them to hate the rich.

Eurostat says that "poverty is the situation of a person whose income is so low that it is impossible for them to achieve an acceptable standard of living in society, who faces disadvantages."

Poverty is unevenly distributed, affecting vulnerable people who can be pushed by the feelings they develop towards committing crimes.

European Union statistics place Romania in penultimate place. Article 3 of the Treaty on the European Union promotes the well-being of the member states and their action for the sustainable development of Europe.

Basically, Eurostat says that in certain circumstances any person can become poor for a fluctuating period, but there is an increased risk for people whose characteristics make it difficult for them to access levels of well-being offered by society. These are people whose physical, mental, educational, occupational, etc. characteristics make them vulnerable to the phenomenon of poverty.

The extent of the state of poverty and the inability of some people to ensure normal living conditions due to insufficient financial resources, material and social deprivation are factors that aggravate and push towards hatred towards those who have sufficient material conditions for a decent life.

If hatred gives birth to hatred, insecurity gives birth to aggression. An individual hates another, but he hates him because he fears him. Hatred and fear are emotions that are sometimes born involuntarily, and which accumulate frustrations that lead to crimes.

The entire human community has smaller or larger shortcomings, but the problems of poverty have diversified, involving state institutions, national and internal state mechanisms. The wave of immigrants brought with them cheap labour, accentuating the gaps between the native population and them. Regardless of the reason behind the commission of hate crimes, poverty can certainly be a determining cause.

Hate crimes represent an extreme form of violence, where victims are attacked not only for personal reasons, but because of prejudices related to race, religion, sexual orientation, ethnicity or other characteristics perceived as being "different". These acts are not just an individual problem, but a widespread social problem, which can destabilize communities and amplify existing divisions in society.

2. Basic content

Definition of Hate Crimes

Hate crimes are defined as acts of violence or discrimination committed against a person or group of people based on specific characteristics such as race, ethnicity, gender identity, or any other characteristic perceived as different.

These crimes are accompanied by hatred and contempt or intolerance towards people who do not fit into the norms of society or who have something distinct considered otherwise by the offender. They can be physical violence, destruction of property, hate speech or incitement to hatred, crime.

In Romania, the phenomenon of poverty and hate crimes are addressed in several documents, starting with the New Penal Code.

1. Art. 369 C. pen. "Inciting the public, by any means, to hatred or discrimination against a category of persons or against a person on the grounds that he or she is part of a certain category of persons defined on the basis of race, nationality, ethnicity, language, religion, gender, sexual orientation, political opinion or affiliation, wealth, social origin, age, disability, chronic non-contagious disease or HIV/AIDS infection, considered by the perpetrator as causes of the inferiority of a person in relation to others, is punishable by imprisonment from 6 months to 3 years or a fine."

The special legal object of the hate crime is the social relations regarding coexistence based on mutual respect between members of society, which may be affected by discrimination and hatred. Crime has no material object.

The passive subject is a person, the community of which he is a part and even the state.

The material element of the objective side of the crime is the action of incitement. According to art. 317 N. CP the action of incitement and provocation must be addressed to the public, targeting an indefinite number of people. The material element of the crime is the provocation, determination, and incitement of the public to feelings of hostility, violence, discrimination, hatred.

The immediate consequence amplifies the state of danger for protected values. Creating an intimidating, degrading and humiliating atmosphere through strong and dangerous messages can lead to incitement to hatred.

Criminal participation may be possible in the form of co-authorship, instigation or complicity.

Hate crime is typical of vulnerabilities, giving rise to controversies of legal interpretation of the phenomenon of incitement that is addressed to the public or not. As a conclusion, if it is committed in public, it is almost impossible to demonstrate that it is not intended for the public. In this sense, acts that are not the result of prejudice cannot be criteria generating criminal liability.

2. Art. 15 of Government Ordinance no. 137/2000 on the prevention and sanctioning of all forms of discrimination provides the following:

"It constitutes a contravention, according to this ordinance, if the act does not fall under the incidence of criminal law, any behaviour manifested in public, having the character of nationalist chauvinist propaganda, incitement to racial or national hatred, or that behaviour that aims or aims to violate dignity or create an atmosphere of intimidation, hostility, degradation, humiliation or offense, directed against a person, a group of people or a community and related to their membership of a certain race, nationality, ethnicity, religion, social category or a disadvantaged category or to their beliefs, sex or sexual orientation."

Discrimination is a phenomenon of marginalization that must cumulatively meet several conditions.

3. Art. 77 letter h) Criminal Code. The crime of incitement to hatred has as aggravating circumstances the commission of the crime for reasons related to race, nationality, ethnicity, language, religion, gender, sexual orientation, political opinion or affiliation, wealth, social origin, age, etc. or for other circumstances, considered by the perpetrator as causes of the inferiority of a person in relation to others. It is not enough to be the subject of art. 77 letter h), but it must be proven that there is a motivational link between the commission of the act and this affiliation.

The authorities must collect evidence and provide evidence to discover the truth and to pronounce thoroughly motivated, impartial and objective decisions, without omitting suspicious facts, which may indicate acts of violence induced, for example, by racial or religious intolerance or violence motivated by gender discrimination.

4. To discover the motive based on prejudice, we can refer to the Order of the Prosecutor General of the Prosecutor's Office attached to the High Court of Cassation and Justice no. 184/30 October 2020 for the approval of the methodology for investigating hate crimes

The Order recommends that, from the moment of first contact with the victim, after informing him of his rights, measures be taken to guide him to victim protection associations that have expertise in the field. Also, during the criminal investigation, the victim's participation in the proceedings will be encouraged and measures deemed necessary will be taken, within the limits and under the conditions of the criminal procedural law.

The injured person being informed in this regard. The Order includes certain indicators of hate crimes:

- references about the victim
- references about the perpetrator
- circumstances related to the perpetrator's behaviour
- circumstances related to the object of the crime
- circumstances related to the place or time of the act
- the act was perceived to be motivated by prejudice.
- absence of a motive

Hate crimes can be committed for different reasons:

1. the perpetrator may act for reasons such as resentment, the desire to obtain approval for what he is doing.
2. the perpetrator may have hostile thoughts or feelings towards the group to which the victim belongs.
3. the perpetrator may have hostile feelings towards all people outside the group
4. the target may be an idea, towards which the perpetrator has hostile feelings.

Despite the absence of hatred towards the target of the crime, any of these motivations would be sufficient to consider the case as a "hate crime".

Whenever a solution of not prosecuting is ordered, it is substantiated that it is another form of liability and, if appropriate, it is sent for investigation to the National Council for Combating Discrimination.

Causes of Hate Crimes - Prejudice and Stereotypes

Hatred towards minority or marginalized groups is often fuelled by deeply rooted prejudices in the collective mind. These prejudices are perpetuated through stereotypes, propaganda and poor education. For example, stereotypes about different ethnicities, religions or sexual orientations can lead to the perception that a certain category of people represents a threat.

Social and political division

In many societies, political or social conflicts can reinforce the idea that certain groups should be excluded or persecuted. Political leaders or influencers who promote hate speech can contribute to amplifying negative feelings towards certain groups, increasing the risk of violence.

Fear of the "other" and lack of intercultural education

Fear of the unknown can fuel aggressive behaviours. Lack of education and interaction with diversity can lead to an erroneous and distorted understanding of different groups. This ignorance can evolve into hatred, and when added to a context of economic or political instability, it can lead to violence.

Personal problems of the offenders

In some cases, criminals who commit hate crimes have their own traumas or frustrations, which they can project onto others. Often, they may blame marginalized groups for their economic or social difficulties, thus developing a dangerous motivation to retaliate.

The Social Impact of Hate Crimes - Fragmentation of Social Cohesion

Hate crimes do not only affect the direct victims, but also the entire community. They contribute to the division of social groups, amplifying resentments and tensions between different categories. Instead of promoting mutual understanding and acceptance of diversity, these crimes create barriers between groups that could coexist peacefully.

Trauma generated among victims and the community

The impact of a hate crime on a victim is not only physical, but also psychological. Victims can suffer from long-term trauma, such as anxiety, depression, phobias and a loss of sense of safety. This can also affect the communities in which they live, impacting on the mental health of the community and worsening relations between groups.

1. Polarization and extremism

Hate crimes can deepen polarization, leading to the emergence of extremist groups that oppose those considered to be "others". These groups can create a vicious cycle of violence and revenge, contributing to social instability.

2. Impact on law and order

These crimes put additional pressure on the justice system, which must respond quickly and firmly to prevent the spread of hatred. Authorities must also adopt appropriate measures to educate the population and prevent the escalation of violent acts.

Preventing and combating hate crimes

1. Educating and promoting diversity

Education and training in diversity, tolerance and respect for cultural differences are essential. Campaigns that promote integration and understanding of diversity can help combat stereotypes and prejudices.

2. Stronger legislation and regulations

The law plays an important role in preventing hate crimes. In many countries, the law explicitly condemns hate crimes and punishes them severely. However, it is essential that the laws are properly enforced and that the authorities have the necessary resources to combat this phenomenon.

3. Awareness campaigns and support for victims

Non-governmental organizations, together with local authorities, can organize awareness campaigns to educate the public about the dangers and impact of hate crimes. There must also be adequate psychological support for victims, to help them overcome trauma and reintegrate into society.

Profiling: concept and techniques used in crime

Profiling is a tool used by law enforcement authorities to identify and analyse the behaviours of criminals based on behavioural and psychological traits. In hate crimes, profiling can help predict the behaviour of the criminal and prevent acts of violence.

Profiling is a process by which law enforcement authorities analyse the behaviours, psychological traits, and motives of criminals to create a profile of them. In the case of hate crimes, the profile of the criminal may include factors such as membership in extremist groups, personal history of discrimination or violence, and the way hatred towards marginalized groups is manifested. Among the techniques used in profiling is behavioural analysis to understand the motivations behind an attack.

Psychological profile reflects the identification of the psychological traits of the criminal such as phobia towards others or violent tendencies.

Pattern Analysis and the Search for New Common Patterns in Hate Crimes

A hate offender is a person who commits acts of violence, discrimination or intimidation against other people or groups of people because of their prejudices related to characteristics such as race, ethnicity, religion, sexual orientation or other traits perceived as being different from their own norms. The profile of such an offender is not a simple and universal one, but there are common features that can be identified in their behaviours and attitudes.

Psychological Factors and Motives Behind Hate

In this section, we will discuss how profiling can help in identifying offenders who commit hate crimes. Profiling is based on the analysis of behaviour, but also on understanding the psychological and social context of the offenders. We will explore the different types of profiles of offenders who commit such crimes, such as extremists, radicalizations, but also criminals who commit crimes on impulse.

The impact of profiling on victims and the community

While profiling can help identify offenders, it is important to also discuss the impact of this process on victims and the community. Profiling can stigmatize groups or individuals and reinforce prejudice, especially when it is based on racial or ethnic stereotypes. In this section, we will examine how profiling can influence perceptions and relationships between different social groups.

Challenges and Controversies in Using Profiling in Hate Crime

This section will examine the main challenges related to the use of profiling to combat hate crime. Profiling faces many criticisms regarding the risks of abuse, discrimination and miscarriages of justice. We will explore these challenges in detail and discuss possible solutions to make this process fairer and more effective.

3. Conclusions and Recommendations

Finally, we will draw conclusions about the role of profiling in combating hate crimes and provide recommendations for improving this process. While profiling can be a valuable tool, it is essential that authorities apply it in a fair and sensitive manner towards social and cultural diversity.

Hate crimes represent a serious social problem, with a profound impact on communities and individuals. An important conclusion is the need to promote education and awareness among the population, to combat prejudice and encourage empathy and respect for diversity. It is essential that the legal systems of states effectively address these crimes through appropriate legislation and clear sanctions to discourage this type of behaviour.

When sanctioning hate crimes, increased penalties should be provided for, the law should provide for hate crime as a special crime, and the victim should know that there are institutions to which they can turn.

In conclusion, what distinguishes hate crimes from other crimes is the prejudice under which the perpetrator acts, making it necessary to identify and prove through evidence the motivational factor. Hate never spreads through harmony and equality, but on the contrary through the accentuation of inequalities and ignorance most of the time. Knowledge makes you tolerant. Most of those who hate you know nothing about you.

Preventing and combating incitement to hatred, as well as reducing poverty are objectives of the European Union. The standardization of the regulatory framework at the community level leads to an increase in the degree of involvement of state authorities, to the consolidation of the jurisprudence of the European Court of Human Rights.

Poor education, corruption and lack of labour, sporadic and insufficient investments, all lead to poverty. State authorities develop programs related to recovery and social inclusion which will lead, over time, to the reduction of significant inequalities between citizens.

Stopping poverty means assuming risks for any society, and for vulnerable people it is reflected in a reduction in the criminal phenomenon.

Globally, the crime phenomenon that is determined by poverty encompasses a wide scope. Strengthening and addressing the basic needs of all members of society can lead to a real challenge for the return to authentic values and solidarity between social classes, artificially divided by financial power.

In conclusion, hate crimes motivated by poverty require a concentrated effort from communities, authorities and civil society through a holistic approach, so that each person feels safe and respected.

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THE INSTITUTION OF THE CRIME IN THE CRIMINAL LEGISLATION OF THE COUNTRIES IN THE EUROPEAN COMMUNITY: A COMPARATIVE STUDY

DOI: <https://doi.org/10.53486/dri2025.66>

UDC: 343.2:341.176(4)

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Abstract: *The ideas in this article are in the context of analyzing the causes that lead to the commission of crimes in the community space. The analytical deepening of the institution of crime leads us to identify the causes that lead to the violation of legal norms in the community space; the nature, character, and value of legislative behaviors and customs in the community space; the behavior of a person or a community from a legislative point of view. Crime has become more complex and has spread globally in recent times. Crime is facilitated by the internet and continues to develop with the use of mobile devices, despite the efforts made by local, national, and community agencies in the EU. The European Commission is set to propose a new legal status for Europol, which is an important opportunity to further improve democratic accountability in the European community space, and also to enhance Europol's efficiency as an agency for combating crime.*

Key Words: law, crime, European space, criminal, EU.

Introduction

The institution of the crime is one of the fundamental pillars of any system of criminal law, defining the framework within which an act becomes relevant to law enforcement and ultimately to the judicial system. In the countries of the European Union, but also in countries aspiring to integration, such as the Republic of Moldova, the regulation of the concept of "crime" has over time acquired specific variations, adapted to their own legal traditions and changing social requirements. The purpose of this study is to provide a comparative overview of the approach to the institution of crime in the criminal legislation of some EU Member States, as well as in the Republic of Moldova and Romania. The aim is to highlight the common elements and significant differences, the causes that determine the criminal nature of the facts and the doctrinal developments that have gradually led to the harmonization of general principles in the European criminal law. At the same time, the relevance of such an analysis arises in the context in which the Republic of Moldova is intensifying its efforts to approximate to the *acquis communautaire*, and it is expected that its criminal legislation will continue the process of adjustment to the EU standards.

Methodological and doctrinal landmarks on the institution of the crime in the criminal legislation of the countries in the European Community

The discussion of crime, in the broadest sense, refers to the idea of a concrete act, committed with guilt and provided for by the criminal law, which harms protected social values. Although the general concept is common, each Member State has its own conceptual and methodological framework for delimiting what falls within the scope of the crime. There has been much discussion in European criminal law doctrine about the criteria which turn a simple unlawful act into a crime. These criteria include the social danger of the action or omission, the degree of fault, the quality of the subject, the protection of values essential to society (such as life, physical integrity, property, public order and others). From a methodological point of view, the comparative study of crime requires an analysis of the legal texts, doctrine and case law in order to follow not only the formal definition but also the way it is applied and interpreted in practice.

Analysis of approaches regarding the institution of crime in the Republic of Moldova and Romania

The Republic of Moldova and Romania share a common legal tradition, influenced by similar historical sources, which leads to a significant approximation of their criminal legislation. In the Republic of Moldova, Article 14 of the Criminal Code in force (Law No 985 of 18.04.2002) defines a crime as a socially dangerous act, committed with guilt and prohibited by criminal law under threat of punishment. This definition, which is as concise as it is comprehensive, reflects a perspective focused on social danger, which is the crucial element in separating the crime from other forms of unlawful acts.

In Romania, the Criminal Code (Law No 286/2009, which entered into force on February 1, 2014) states in Article 15 that the crime is the act provided for by criminal law, committed with guilt, unjustified and imputable to the person who committed it. This approach emphasizes the form of guilt and the unjustifiability of the act, adding further rigor by referring to imputability, which is directly linked to the criminal responsibility of the perpetrator. We note that both codes emphasize the essential requirement of the typicality of the act, i.e. that it must be expressly covered by the criminal law, the requirement of social danger (more explicit in the Criminal Code of the Republic of Moldova) and the need for the act to be committed with guilt.

The emergence of specific nuances in the two codes is also related to the general conception of crimes with a low degree of social danger, which, in certain situations, the legislation of Moldova could treat as "contraventions" or "less serious crimes", depending on the social value violated and the intensity of the harm. In Romania, the new Criminal Code has largely clarified the distinction between crimes and acts falling under the contraventional legislation, emphasizing also the subjective aspect of the crime in order to outline the scope of guilt.

Methodological guidelines for a comparative study of the institution of crime in the countries of the European Union

The methodology of a comparative study of the crime is aimed not only at comparing the legal definitions, but also at comparing the framework of fundamental principles: the legality of incrimination, the condition of guilt, social risk, justifications and grounds for exemption from criminal liability, as well as the unified interpretation of these elements in the practice of the courts.

In the countries of the European Union, although there is a remarkable diversity of criminal law traditions (Romano-Germanic systems, the common law system in Ireland, Malta and Cyprus, or mixed influences in other countries), there is nevertheless a gradual convergence. The national courts and the Court of Justice of the European Union, in certain specific criminal matters (e.g. money laundering, trafficking in human beings, cybercrime), are attempting to harmonize the basic principles and homogenize the interpretation of European rules.

Therefore, the comparative research focuses on both terminology and substance in the definition of the crime, with an emphasis on the points of divergence and convergence.

The crime in the criminal legislation of European Union countries

The analysis of types of crimes in the criminal legislation of the Republic of Moldova and Romania

In terms of national specificities, Moldova and Romania traditionally have a system that emphasizes the idea of social danger and culpability. In the Republic of Moldova, Articles 14-18 of the Criminal Code define the crime and establish the forms of culpability (direct intention, indirect intention, recklessness and simple negligence). In Romania, Articles 15-19 of the Criminal Code also clarify the conditions and forms of culpability, complemented by provisions on the grounds of justification and non-culpability (Articles 18-31). There is a similar structure of the codes, justified by the approximation of the legal systems and their alignment with European standards.

With regard to the typology of crimes, the Republic of Moldova and Romania have the same basic categories in their criminal codes: crimes against the person, property, state security, public order and

public safety, etc. In procedural terms, most of these crimes are prosecuted *ex officio*, as they are considered serious crimes in terms of the public interest affected. Both in the Republic of Moldova and in Romania, some crimes can be prosecuted on the basis of a prior complaint by the injured party (e.g. assault or other minor violence), but even in this case, the State retains the possibility of intervening to punish conduct which is highly dangerous to society.

The crime in the criminal legislation of the French Republic, Germany, Italy

The French legal system is characterized by its own tradition, derived from the French Criminal Code, which classifies criminal acts into crimes, *délits* and *contraventions*, according to their seriousness. Article 111-1 of the French Criminal Code stipulates that crimes are classified into these three categories, while Article 111-2 states that "the law determines crimes and misdemeanors, and the regulations determine *contraventions*". This way of classifying the crimes in question highlights the hierarchy of crimes and determines the jurisdiction of the courts and the applicable procedure. The general concept of "infractio" is therefore conditioned by the specific classification in one of the three categories, each of which has a different penalty regime.

Germany provides another perspective, through the *Strafgesetzbuch* (StGB), where there is no single article defining the crime as such, but there is a definition of *Verbrechen* and *Vergehen* in § 12 StGB. *Verbrechen* are crimes punishable by imprisonment of at least one year, while *Vergehen* are crimes punishable by imprisonment of less than one year or a fine. Although there is no single "definition of crime" article, the German system clearly emphasizes the principle of legality in § 1 StGB ("*Keine Strafe ohne Gesetz*") and recognizes the necessity of guilt in § 15 StGB (which states that the punishment presupposes intent unless the law provides otherwise). Thus, the elements of typicality, unlawfulness and culpability are essential to identify any act as a crime.

In Italy, the *Codice Penale* (R.D. 19 ottobre 1930, n. 1398) is structured in a way that starts from the principle of *nullum crimen sine lege*, enshrined in Article 1, which states that no one may be punished for an act that is not expressly provided for by law as a crime, nor with penalties that are not established by the law. The Italian criminal justice system divides crimes into *delitti* and *contravvenzioni*, depending on their seriousness and the type of penalties foreseen. The definition of the crime, in a broad sense, is the result of the combined interpretation of several legal texts and of the doctrine, which emphasizes the conditions of typicality, anti-juridicity and culpability. The Italian Criminal Code, therefore, although it does not provide a single article devoted exclusively to the definition of the crime, derives it from systemic reasoning starting from Article 1 and continuing with the principles relating to criminal liability and the classification of prohibited acts.

The crime in the criminal legislation of the Republic of Poland, Croatia, Bulgaria

In Poland, Article 1 of the Criminal Code (*Kodeks karny*, adopted by Act of June 6, 1997) emphasizes that only a person who has committed an act prohibited by law and committed with guilt is criminally liable. This principle of legality is at the core of the Polish concept of crime. The concept of '*czyn zabroniony*' (prohibited act) includes all the elements necessary for conduct to be considered a crime, with an emphasis on guilt and social danger.

Croatia, in its *Kazneni zakon* (adopted in 2011, in force since 2013), defines in its first articles the general principles of criminal law, including the concept that an act constitutes a crime only if expressly provided by law and if the perpetrator acts culpably, except in cases where the law expressly provides for liability for negligence. Even if the text is not condensed in a single article under the heading "definition of the crime", the concept is apparent from the analysis of several provisions enshrining the principle of legality, the classification of acts and the conditions of criminal liability.

In Bulgaria, the Criminal Code adopted in 1968, with many subsequent amendments, provides in Article 9 that an act is considered a crime if it is dangerous to society, committed with guilt and declared by law as a crime. The concept of "danger to society" is expressly maintained, which is in line with the Eastern European tradition and emphasizes the aim of protecting the essential values of the community. Similar to other states in the same region, Bulgaria clearly distinguishes between

crimes and misdemeanors, and the Bulgarian concept of "culpability" includes the forms of intent and negligence, with the legal conditions for liability in each case being specified.

Analysis of the institution of "crime"

The subject of the "crime"

The definition of the subject of the crime, in the general European sense, is based on the idea that the perpetrator of the crime can, as a rule, be any natural person who is of sound mind and has reached the minimum age required by law to be criminally liable. Across the European Union, the age of criminal responsibility varies from 14 to 16 in most countries, with some variations. In Romania, Article 113 of the Criminal Code establishes the criminal liability of minors, and in the Republic of Moldova, Article 21 of the Criminal Code regulates the age at which criminal liability can arise (14 years for serious crimes, 16 years for other crimes). In Germany, the Jugendgerichtsgesetz (Act on Juvenile Courts) provides in § 1 that minors under 14 years of age are not criminally liable. The same criterion of being of sound mind and minimum age for participation in criminal proceedings as a defendant is therefore maintained.

Moreover, in most European countries, the possibility of criminal liability of legal persons exists, which is becoming increasingly relevant in the context of economic globalization. In Romania, for example, Article 135 of the Criminal Code regulates the conditions under which a legal person can be an active subject of the crime. In France, Article 121-2 of the Criminal Code also provides that legal persons may be held criminally liable for crimes committed in their name and in their interest. Such legislative provisions underline the evolution of the concept of "subject of the crime" and the broadening of the scope of criminal liability to discourage systemic unlawful conduct going beyond individual actions.

Discrepancy between the causes influencing the criminal nature of the crimes

The comparative analysis of the institution of crime in these European countries reveals the existence of divergences arising from political and social particularities, historical developments and the dominant values in society. One example is the way the legislators in different countries deal with crimes related to public morality, freedom of expression or protection of personal data. In some countries (e.g. France or Germany), these crimes are specifically incriminated in the Criminal Code, with a rich jurisprudence on the limits of individual freedoms. In other countries, such as Bulgaria or Poland, the regulation may be divided and the interpretation of the facts is conditioned by local legal tradition and cultural factors.

The intensity of sanctions and the rigidity of their legal framing also differ. In Germany, the approach is often more nuanced, with a re-education-oriented penal culture, especially for crimes committed by young people and vulnerable minorities. In Italy, court practice places particular emphasis on the analysis of mitigating circumstances, often combining a repressive and a re-educative perspective. In Romania and the Republic of Moldova, although the criminal codes include punishments that can reach high limits, in recent years the courts have increasingly applied suspended punishments and alternatives to imprisonment to avoid prison overcrowding and to allow the social reintegration of low-danger criminals.

Another aspect influencing the criminal nature is the implementation of European policies to combat cross-border crime. Member States adopt European directives and regulations aimed at harmonizing legislation in areas such as terrorism, drug trafficking, money laundering and corruption. The transposition process may lead to temporary or even permanent differences in the definition of crimes and their constituent elements, but in the long term these rules lead to a greater degree of uniformity in European criminal laws.

Harmonization of criminal legislation of the Republic of Moldova in the context of European integration

The Republic of Moldova is going through a process of alignment with the European Union standards, which is also reflected in criminal legislation. The institution of the crime, regulated in Article 14 of the Criminal Code, is being adapted to meet the requirements of clarity, predictability and respect for fundamental rights, as recognized at European level. One example is the amendments relating to the crimes of corruption, money laundering and organized crime, where European Union directives have been gradually implemented, with the aim of defining these crimes as rigorously as possible and establishing deterrent penalties.

In practice, harmonization involves reassessing the level of social danger that the law of the Republic of Moldova associates with certain acts, in order to balance it with the European vision of crime and the principle of proportionality of penalties. Also, the grounds of justification and non-imputability, such as self-defense, necessity, moral or physical coercion, must be interpreted in the light of European case-law which aims at the consistent protection of human rights and fundamental freedoms.

Although the process of harmonization does not imply the complete unification of legislation, the Republic of Moldova is constantly striving to take over from the Criminal Codes of other Member States those elements considered good practice, from the clear definition of the crime to the methods of punishment aimed at rehabilitation. At the same time, the State preserves certain historical and cultural particularities, so that the mechanical adoption of foreign rules is avoided, preferring careful adaptation, including to ensure respect for internal constitutional principles and the internal coherence of the Moldovan legal system.

Conclusions

The legislative course of criminal crimes in European and Eastern European countries reflects a complex historical and doctrinal evolution, with different emphases, but with a common background provided by the fundamentally accepted principles: legality of incrimination, guilt, social danger and protection of essential values. In Romania and the Republic of Moldova, due to their common legal roots and ongoing efforts for reform, the crime is defined in a convergent manner, with the emphasis on the need for the act to be provided for by criminal law, to be committed with guilt and to present a degree of social danger. States such as France, Germany and Italy, each with its own tradition, emphasize the same principle of legality, but differentiate crimes into categories (crime, délits, contraventions; Verbrechen, Vergehen; delitti, contravvenzioni), stressing the seriousness of the act and imposing penalties adapted to each category.

In Central and Eastern Europe, the examples of Poland, Croatia and Bulgaria reveal the same basic structure, but adapted to the specific cultural and legislative history of each country. In these countries, too, the crime is conceived as an act that jeopardizes fundamental values, requires guilt and is expressly provided for by law, but the way it is classified or the intensity of penalties may vary. These differences can be explained by different doctrinal views and the need to deal with the domestic particularities of each country.

Inevitably, the process of European integration, coupled with technological change and globalization, has generated a harmonization drive. European directives and regulations aim to provide a common framework to fight serious forms of crime, ensure respect for fundamental rights in criminal proceedings and facilitate judicial cooperation between Member States. The Republic of Moldova, as an EU-associated state on an integration-oriented path, has started to adjust its criminal legislation, taking on board elements such as more proportionate sanctions, strengthening the liability of legal persons and a more precise definition of cross-border crimes.

However, harmonization of legislation does not mean total uniformity. Each Member State retains the right to set its own criminal policy priorities and its own methods of punishment, as long as they do not run counter to the general principles enshrined at EU level. In this diversity, the institution of

crime plays, in each individual Member State's legislation, the defining role of protecting social values, guaranteeing the legal order and responding to acts that jeopardize the smooth functioning of society. The comparative analysis in this study demonstrates that, despite the differences in regulation, the substance of the institution remains common and coherent, based on the need for a typical, unlawful and imputable act to be punishable by criminal law in order to protect the fundamental interests and values of each community.

Therefore, the study of the crime in the legislation of the European Union countries, as well as in the Republic of Moldova and Romania, highlights an evolutionary path that tends to strengthen the traditional principles of criminal law, while simultaneously adapting them to the requirements of the modern world. Doctrinal convergence, the mutual recognition of judgments and the intensification of police and judicial cooperation between Member States are the foundations for the future consolidation of the common European criminal law area. In this context, the Republic of Moldova has the opportunity to shape the institution of crime in a way that both protects the values of the Moldovan society and meets the requirements of the European Union, emphasizing the protection of human rights, the effectiveness of sanctions and crime prevention. In this way, the institution of crime remains a fundamental benchmark for public order and social balance, governed by clear principles, verified by practice and case-law, and naturally integrating the diversity of national regulations into an increasingly cohesive European doctrinal framework.

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SECTION 6: POSTDOCTORAL RESEARCH

FOSTERING SMALL BUSINESS DEVELOPMENT IN MOLDOVA THROUGH INNOVATIVE POLICIES

DOI: <https://doi.org/10.53486/dri2025.67>

UDC: 334.012.64:001.895(478)

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Abstract: *This work considers the role of small and medium-sized enterprises (SMEs) within an economy and their capacity for innovation. In particular, attention is focused on the case of the Republic of Moldova, first providing an analysis of the market shares and the profits achieved by SMEs. Subsequently, based on the analyses carried out, it is possible to observe that although in recent years there have been variations in economic indicators, favourable for the increase in the innovation capacity of SMEs, at the same time, there are some conditions that act as a brake on an increase in innovation capabilities. Among these conditions, we can consider the reduced cooperation between the enterprises that form the SMEs, the intense concentration of the SMEs in a single specific space in the territory and the difficult mobilisation of tangible and intangible capital from one place to another. A reduce number of SMEs are involved in innovation activities; as a result, innovation impact on national economy is reduced as well. The overlapping crises from the last years, also hit hard the SMEs slowing down their potential to develop and innovate. Still, it is necessary to consider that Republic of Moldova was officially granted candidate status by the European Union in 2022, setting a target date of 2030 for EU membership. The European path of the country increased considerable developmental policies stimulating the speed and depth of economic and financial reforms. Moreover, some developmental policies concerning the support for SMEs referred to legislative amendments dealing with the economy's digitalisation. Other policies concern the improvement of the legal framework in the competition field. The materialization of these opportunities can create an enormous synergy effect for attracting funds for SMEs development and innovation.*

Key words: *small business; innovation; development; EU accession.*

JEL: G00; G30.

1. Introduction

This work analyses the active role in the economy played by the group of small and medium-sized enterprises (hereafter, SMEs). In particular, attention will mainly focus on the progress of the development of SMEs within the Republic of Moldova. In this regard, we provide a brief descriptive analysis relating to the development of the main activities of SMEs in the Republic of Moldova during the years. Subsequently, a brief discussion of the obtained results is provided, together with some possible recommendations to be adopted to ensure further development of SMEs.

First, it is necessary to consider that across the world, entrepreneurial small and medium sized enterprises contribute greatly to national economies (Khan, 2022). In this regard, the contribution of SMEs to a country's economy would allow not only to create jobs but also create innovation. Although SMEs represent one of the largest groups of companies in several countries capable of contributing to the growth and development of economic activities, some factors may limit the growth of SMEs. Among these factors, the author considers market (e.g., inflation) and regulatory variables (e.g., tax system). Although it is possible to consider the potential presence of such possible limiting factors, SMEs represent most businesses in the Republic of Moldova.

Specifically, the number of SMEs in the Republic of Moldova has grown in quality and quantity over the last 33 years of independence. However, according to the Technical Assistance Report provided by the International Monetary Fund the Republic of Moldova is one of the least competitive European countries. In addition, the Republic of Moldova faces a significant migration of its workforce every year. Therefore, the total number of migrations could justify a reduction in the Moldovan population

in the last decades. Specifically, there has been a reduction in the number of people who make up the Moldovan population starting from the early 1990s. In this regard, Moldova's massive labour migration has pushed more than 30 percent of the labour force into working abroad.

According, to the State of the Country Report (2022), Moldova's economy has been repeatedly impacted by a range of negative shocks, which have fundamentally undermined the dynamics of economic development and the transition to a functioning market economy, based on a sustainable model of economic growth.

However, at the same time, Moldova was officially granted candidate status by the European Union in 2022, setting a target date of 2030 for EU membership. The European path of the country increased considerable developmental policies stimulating the speed and depth of economic and financial reforms. The materialization of these opportunities can create an enormous synergy effect for attracting funds for SMEs development and innovation.

2. Trends in SMEs development in Moldova

This section provides a brief analysis of the development over time of SMEs in the Republic of Moldova, particularly in the last years. First, based on the data of the National Bureau of Statistics from Moldova, in 2023, SMEs represented about 99.2% of the total number of enterprises operating in the Republic of Moldova. Specifically, of the 99.2% the largest share of 87.7% were microenterprises, 9.6% were small enterprises, and only 1.9% were medium-sized enterprises.

In particular, it is necessary to consider that the type of activity characterised by a higher percentage share relates to the wholesale and retail trade. Although a reduction in the time of quotas is observed, the wholesale and retail trade activities quotas are the highest compared to other activities. On the other hand, the type of activity characterised by a lower percentage share is those relating to raw materials (electricity, gas and water). However, SMEs represent the majority of the industries of the Republic of Moldova. Therefore, the data previously analysed allows us to consider that the innovation capacity of SMEs in the Republic of Moldova is relatively low.

Furthermore, these higher observed market shares regarding trade and other activities could be explained by the flexibility that distinguishes SMEs from other types of firms. Specifically, SMEs would perform the function of intermediaries in the market. In addition, SMEs should be profitable to gain and maintain their market share over time.

In order to analyse the profitability of some types of activities carried out by SMEs in the Republic of Moldova, based on the data obtained by the National Bureau of Statistics, we have considered the profits earned before taxation (expressed in million lei) by SMEs in the Republic of Moldova and their trend over time (2016-2023).

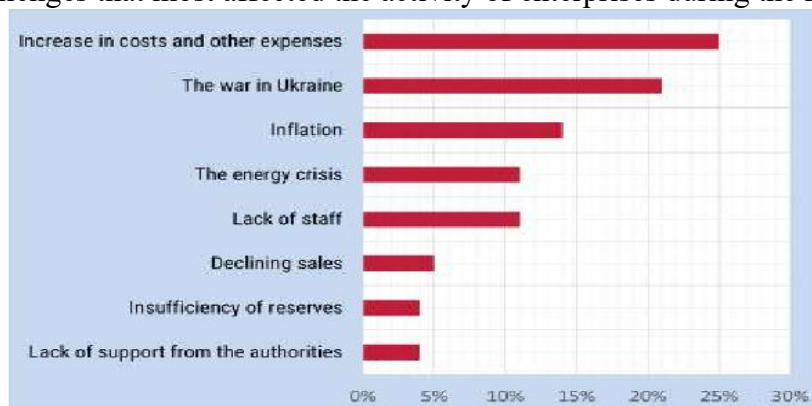
In particular, the activity characterised by a higher profit relates to the wholesale and retail trade activities. Moreover, types of activities relating to agriculture, construction and real estate are also characterised by higher profits than other activities. In this regard, in 2020 the profits from activities relating to the processing industry (+28.94 %), raw materials such as electricity, gas and water (+7225 %), construction (+131.48 %), activities related to the wholesale and retail trade (+114.12 %), transport and storage (+83.21 %), public feeding programs (+537.84 %), communications (+370.58 %), real estate (+24.76 %), scientific and professional activities (+51.27 %) and other types of activities (+53.97 %) have increased compared to 2016.

Furthermore, the types of activities characterised by a lower profit are those relating to raw materials (electricity, gas and water) and the distribution and sanitation of water.

In addition, the reduction of the amount in 2020 (from 12386 million lei to 9050.9 million lei) could be motivated by issues related to the spread of the pandemic and the relative downsizing of the performance of economic activities at a local and global level.

The Covid-19 crisis, followed by Russian war in Ukraine has triggered a major economic and social crisis, which has affected the vast majority of the SMEs from Moldova. Moldovan economy faced an

unprecedented influx of refugees, trade disruptions, major energetic and security crisis (Erhan et al., 2023). One of recent survey applied on a number of 330 SMEs from Moldova, shows that the most significant impact on business activity over the overlapping crises from recent years has been the increase in costs and other expenses (25%) the war in Ukraine (21%) inflation (14%), the energy crisis (11%) and the lack of staff (11%) have also had a strong negative impact on business activity. Figure 1. The challenges that most affected the activity of enterprises during the recent crises, %



Source: Magenta Consulting, Survey of business representatives.

On the other hand, in general, between 2016 and 2023, there was a positive difference in profits between all types of activities considered. Therefore, it is generally possible to consider that an increase in the time of the profits achieved by SMEs is observed in their profitability. In particular, the increase over time in the profits achieved by SMEs operating in primary to tertiary sectors would allow companies to invest their resources in innovation, research and development.

Furthermore, the fact that Moldova was officially granted candidate status by the European Union in 2022 triggered the launch of several supporting and development programmes and increase considerable the inflows of cash in the country for supporting the business environment.

In this regard, we propose, in the next section, a brief discussion on some possible programs that SMEs could implement to increase their innovation capacity, using as a mirror the innovative policies applied in European SMEs.

3. Innovation policies applied in Moldovan SMEs vs Innovative policies applied in European SMEs

In the last years, public-private projects and international financing have been launched in the Republic of Moldova, meant to contribute to increasing SMEs' innovation and competitiveness capacities. Several business incubators have been opened, and the process has been extended to creating a network of business incubators. Industrial parks were opened, and feasibility studies were carried out for their regional expansion. This support infrastructure is extremely important for SMEs as it contributes to their efficient activity, offering those opportunities to launch and expand their business. In addition, one of the main objectives of the SMEs Development Strategy 2030 is to have productive, innovative and competitive enterprises in Moldova. One of the main targets of the Strategy is to intensify foreign direct investments attracted in the free economic zones, the IT Park, the multifunctional industrial platforms.

Still, the current legal framework of Moldova does not stimulate enough innovation activity. There is not any well-established system of direct and indirect financial incentives (for instance tax incentives) aiming to encourage research and development activities of firms and state's low financial capacity to support SMEs. The legal framework does not require more responsibility from enterprises and costs within the enterprise for achieving the objectives in terms of innovative activities. Thus, the introduction in the legislative acts or regulations of product safety, operational and work safety,

environmental protection, and intellectual property right enforcement, provisions on taxes, employment or social affairs led to effects such as stimulating innovation. Most of the supporting measures and policies from Moldova are addressed to the small business sector without pointing out the massive potential of the small business companies that apply innovation.

The development of innovative small business companies involves comprehensive solutions. Small businesses from Moldova also miss new business practices for organizing procedures (supply chain management, business re-engineering, knowledge management, quality management), thus limiting the development of innovative organization enterprises.

A major help for SMEs from Moldova is provided by the European Union through EU4Business programme. The EU is supporting SMEs through more than 30 projects in Moldova. From the best practices of European SMEs, innovative policies may become an effective tool in creating a competitive advantage for SMEs from Moldova.

Within the necessary innovation of European Union policies aimed at Small and Medium-sized Enterprises, it is essential to highlight the obstacles that European SMEs face (Hervás-Oliver et al., 2021) and which are mainly competitiveness and internationalisation due to the small size of SMEs with the consequent lack of financial and human resources which configures a solid barrier to access new markets (Szczepanski, 2017); research and development capacity due to the limited innovation of many companies especially in more traditional sectors such as manufacturing, making the products of SMEs less competitive in foreign markets and the performance of the company compared to large companies obtaining worse results in terms of turnover and added value (Alessandrini, 2019).

Therefore, the external factors most relevant to EU policy are the availability of skilled labour and the difficulty accessing finance and regulations within the administration.

In general, programmes and initiatives to implement EU SME support strategies are channelled through shared management programmes (ESIG), direct management programmes and the European Investment Bank (EIB). In addition, SMEs can benefit from the European Fund for Strategic Investment and Investment (EFSI), a joint initiative of the EIB and the European Commission.

EU support can be financial and non-financial. Financial aid can be grants, loans, guarantees and direct equity investments. Non-financial support consists of improving general business conditions for SMEs. An example would be the Enterprise Europe Network, which offers services to help SMEs find international business, technology or research partners, innovation support services and internationalisation support services.

Therefore, the European Commission's support is provided through direct mechanisms such as the renewed Horizon development support programme, the COSME programme, or thematic programmes such as EaSI. The new Horizon programme should be highlighted as the most ambitious concerning support for innovation, specifically support for SMEs to transfer Research and Development to Innovation. In addition, it is worth highlighting the existence of the ESI Funds, which are implemented through "shared management", whereby the European Commission and the Member States jointly implement the funds in a decentralised manner.

The ESIF comprise five funds that account for more than half of EU funding and channel EU cohesion policy: the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). The ESI Funds focus on R&D, digital technologies, the low-carbon economy, sustainable management of natural resources and support for small businesses. The thematic objective is the one that directly targets the competitiveness of SMEs.

The European Regional Development Funds (ERDF) work on this objective, in addition to the programmes they can access, such as the aforementioned Horizon, access to finance (COSME), environment and energy (LIFE) and support for the European culture sector (Creative Europe).

4. Conclusions

Based on the analyses proposed in the first part of this work, it is possible to observe that the SMEs' activities with a relatively high market share are concentrated in the wholesale and retail trade sectors. Furthermore, these SMEs would not involve real innovation professionals at the management level. However, to increase their competitiveness locally and globally, SMEs and other economic actors should understand the rationale behind innovation and allocate resources for its implementation.

In particular, the concentration of SMEs in the Republic of Moldova is relatively higher near the capital, Chisinau. In this regard, to increase their innovation capacities, SMEs should intensify the collaboration network within the entire territory of the Republic. However, there could be quite a few difficulties in coordinating and mobilising material resources and not, since the activities of SMEs would strongly depend on the resources available locally.

Moreover, it is not that simple to innovate in the Republic of Moldova as most SMEs were hit hard by the overlapping crises from the recent years. Despite this, the various local actors should understand why it is necessary to innovate and increase one's competitive advantage through emerging and implementing new innovative ideas and technologies. Furthermore, it is necessary to involve universities and local economic actors capable of increasing innovation in the entire Republic. In this regard, cooperation between companies and researchers necessary (Stratan et al., 2020).

In recent years, the percentages of cooperation for innovation between SMEs and other actors have been relatively low. Furthermore, SMEs would opt more to innovate independently than by cooperating with other companies. In general, based on the analyses previously reported in the first part of this work the activities carried out by SMEs operating within the Republic of Moldova are not strictly focused on innovation but the production of goods and services following a standard technical approach. In addition, these SMEs would not involve real innovation professionals at the management level. However, to increase their competitiveness locally and globally, SMEs and other economic actors should understand the rationale behind innovation and allocate resources for its implementation.

SMEs from Moldova face a large number of challenges, both on a global and local level. Considerable work remains to be done to promote entrepreneurial learning, including meeting the specific skills requirements of SMEs. A developed SMEs sector can reconfigure the economy of the Republic of Moldova, both through massive employment opportunities and through competitiveness and dynamism. The prospects for encouraging SMEs in Moldova with the best European practices are as follows: development of innovation infrastructure; supporting public-private partnerships in research; adopting the framework on innovation and venture funds. The development of the SMEs in the Republic of Moldova in terms of innovations will increase the competitiveness of the small business and, consequently, will promote the intensification of growth rates, market expansion, export development, increasing sales and thus profit.

Acknowledgments: *The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

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DISABILITY AND ENTREPRENEURSHIP: A BIBLIOMETRIC APPROACH

DOI: <https://doi.org/10.53486/dri2025.68>
UDC: [334.722:316.4.063.3-056.266]:00.891

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Abstract: *Entrepreneurship for people with disabilities is a mechanism for their integration into society. The purpose of this research paper is to adopt a mixed methodology of literature review and bibliometric, network and content analysis based on a number of 173 papers identified on the Web of Science (WoS). The first objective considers the review of the specialized literature on the topic of disability and entrepreneurship, people with disabilities, benefits of entrepreneurship for people with disabilities, and the second objective is focused on bibliometric, network and content analysis on the topic of disability and entrepreneurship. The results obtained are represented by the construction of a research agenda in which all the stages recorded in the appearance in the specialized literature of the concept of entrepreneurship for people with disabilities are recorded, simultaneously with the evolution of the context in which people with disabilities can carry out this activity.*

Key words: *disability, entrepreneurship, benefits, bibliometric analysis*

JEL: M10, M13, M21

1. Introduction

Entrepreneurship represents an opportunity for people with disabilities to use their time in a useful and flexible way. Owning your own business offers possibilities to demonstrate skills and talent, to apply professional experience, and to develop yourself (Lupașcu and Jelescu, 2020).

The key to relating to people with disabilities is always openness to communion, not simple compassion or pity. We are called not to look at the person exclusively through the lens of disability, forgetting that this is only a part of the whole person (Chirilă, 2010). The social representation of people with disabilities can be "expressed", "externalized" through the words used in direct discussions or when they are evoked, but it is very possible that censorship, not necessarily self-imposed, but also external, social, regarding the use of terms perceived as having a pejorative connotation, can positively influence that social representation. More precisely, someone who talks about the disabled is more likely to not value those people, while, if they designate them as people with disabilities/impairments, possibly with special needs, implicitly placing them in the human sphere, what initially can only be external and imposed has a chance to become internalized and gain the status of an element of representation (Botosineanu, 2018).

2. Literature review

Entrepreneurship is a process that consists of identifying and pursuing a business opportunity, with the aim of capitalizing on it. It is a process that takes place in different environments and business units that causes changes in the economic system through innovations carried out by people who capitalize on economic opportunities, creating values for both individuals and society (Lupașcu and Jelescu, 2020). People with disabilities have always existed, regardless of the historical and cultural

period, and the attitude towards this disadvantaged category has changed from marginalization and social exclusion to acceptance and community integration (Pavlencu and Revenco, 2021).

„Disability is growing in all countries. There are more than 1000 million people with disabilities throughout the world, that is, about 15% of the world's population, or one in seven people. Disabled people's entrepreneurial challenges can be financial, personal, or societal.” (Muñoz et al., 2020).

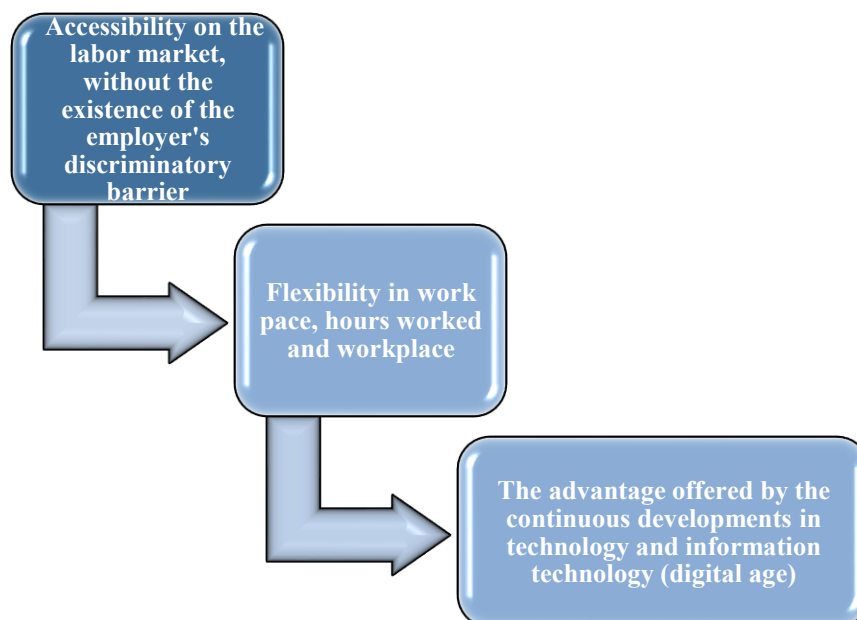


Figure 1. Benefits of entrepreneurship for people with disabilities

Source: own adaptation after Halabisky (2014)

In general, people may be drawn to self-employment for a variety of reasons. While some enter the field of entrepreneurship out of necessity, others, perhaps even the majority, seek to seize an opportunity that presents itself to them in order to gain independence and autonomy, improve their work-life balance, increase their job satisfaction, and seek to obtain higher income and other material benefits (Socoliuc et al., 2019). While these reasons may have a significant influence on entrepreneurs with disabilities, this category of people may also be motivated by other factors. The factors that show the advantages of entrepreneurship for people with disabilities are presented in Figure 1.

The lives of people with disabilities reflect their adaptations to the circumstances created by society; the context for starting a business reflects interconnected factors such as family relationships and economic variables, type and severity of disability, education and professional experience, and personal contacts (Renko et al., 2016).

Entrepreneurship of people with disabilities is an emerging and thriving field with great potential for theory, policy and practice (Klangboonkrong and Baines, 2022).

3. Research methodology

The research strategy was based on a main direction, namely: the direction considers the selection of research papers on the theme of disability and entrepreneurship published on the Web of Science (WoS) between 2005 and May 2025 and the performance of the bibliometric analysis. In order to perform the bibliometric analysis of the selected papers, the cluster method was used, applied with the help of the VOSviewer software version 1.6.20.

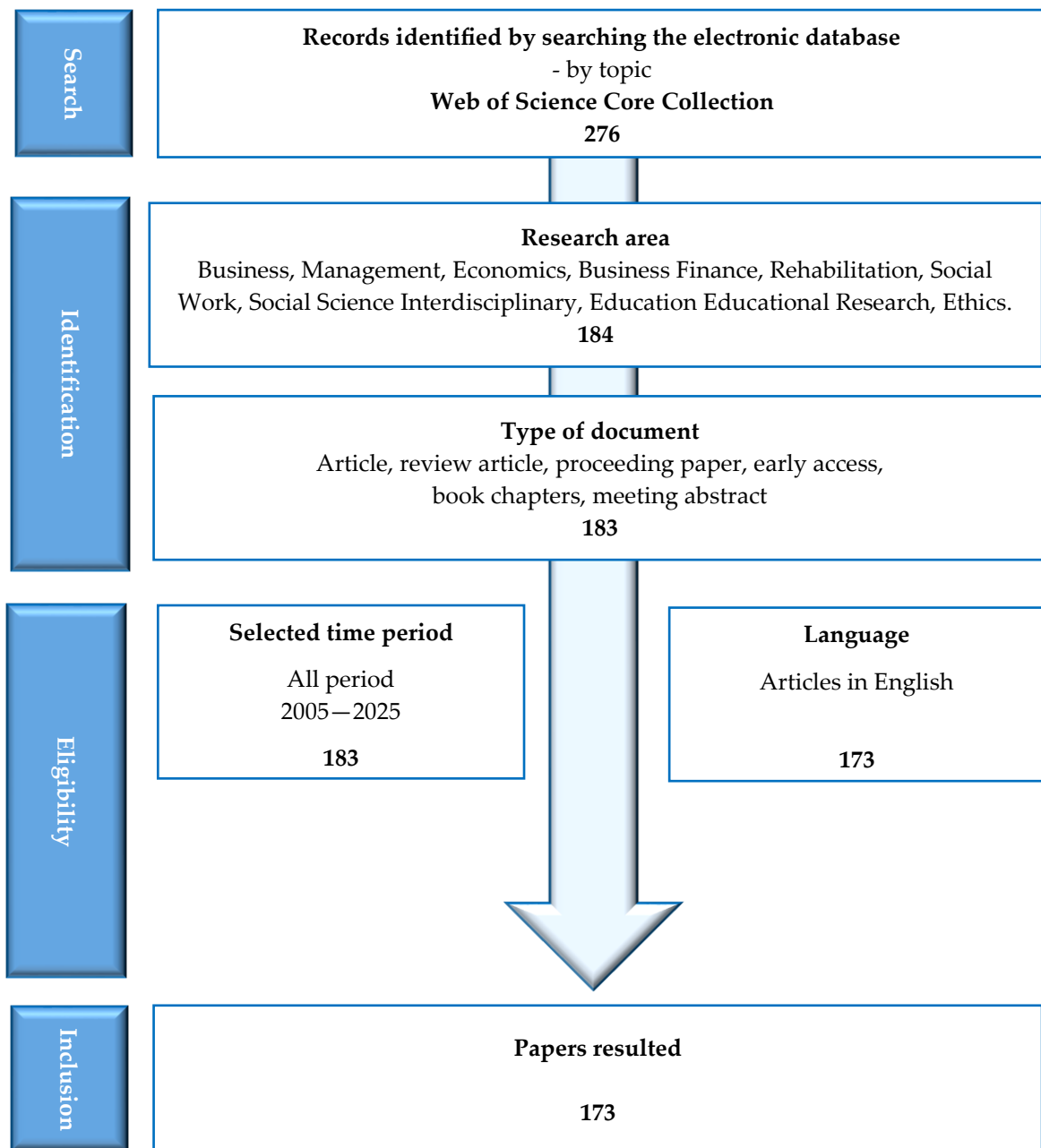


Figure 2. Methodical selection of databases from WoS

Source: authors' own elaboration

The stages of the research methodology can be analyzed in Figure 2, which is presented in a systematic manner. It can be seen that the methodology comprises 4 stages, all of which play an essential role in obtaining the results and the final analysis.

4. Results and discussion

4.1. Exploratory Bibliographic Study

To better understand the trends in academic research over the past two decades, Figure 2 shows annual scientific publications from 2005 to 2025.

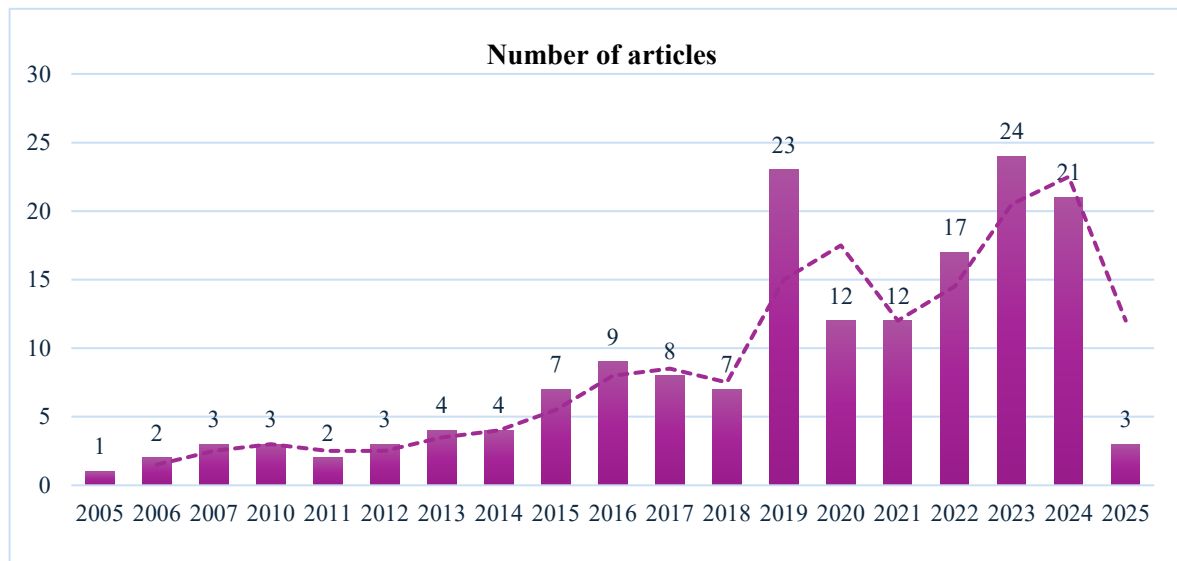


Figure 3. Evolution of papers by year of publication on the topic of disability and entrepreneurship on WoS

Source: own elaboration using the WoS database

In Figure 3, we observe an upward trend in the papers published between 2005 and May 2025, with considerable growth points between 2019-2024 (the highest number of papers was recorded in 2023 – 24), and in 2025 a slight decrease is highlighted (also due to the fact that 2025 is analyzed until May); overall, it demonstrates an increased interest of researchers in this topic during the analyzed period.



Figure 4. Top 10 most productive publication sources on the topic of disability and entrepreneurship on WoS

Source: own elaboration using the WoS database

As can be seen in Figure 4, regarding the publication source on the topic of "disability and entrepreneurship", Suma de Negocios is in first place with 10 articles, and Disability Society is in second place with 9 published articles.

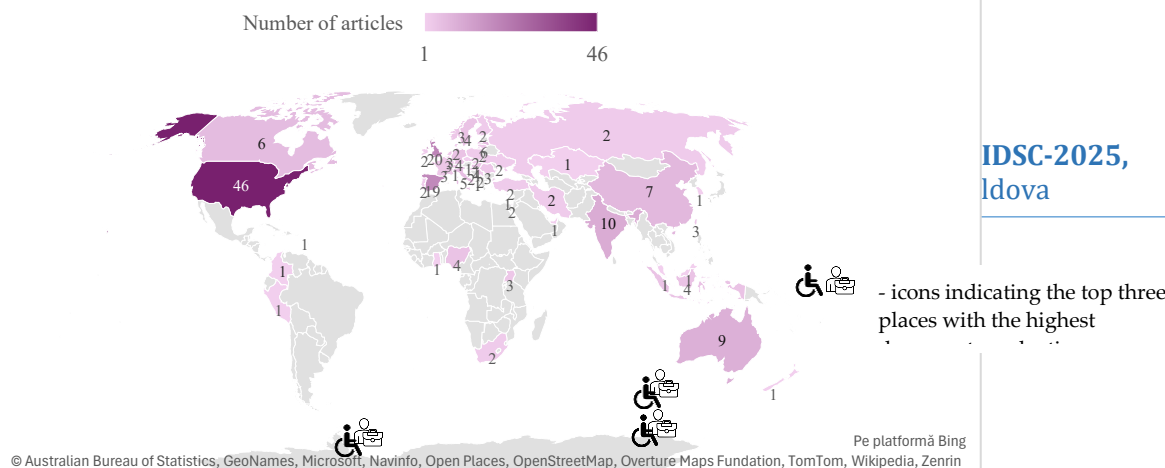


Figure 5. Number of scientific research published globally on the topic of disability and entrepreneurship based on data provided by WoS

Source: authors projection with Microsoft Excel; free icons from [flaticon.com](https://www.flaticon.com) (see [flaticon](https://www.flaticon.com))

Regarding the analysis by country based on the WoS database, it can be seen in Figure 5 that places 1, 2 and 3 are marked in the form of icons characteristic of disability and entrepreneurship and are occupied by the USA with 46 scientific papers, the United Kingdom with 20 papers and Spain with 19 papers. It is worth noting that Romania also appears in 21st place with 3 papers, which demonstrates the fact that our country shows an interest in this topic.

Next, we will analyze the author citation network which involves counting references to identify frequently cited authors and their collaborations. This step helps identify influential researchers and their contributions.

VOSviewer is a software tool for creating and exploring maps based on network data; this software explores co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation links in one of three possible representations: network view, overlay, or density. (Arruda et al., 2022)

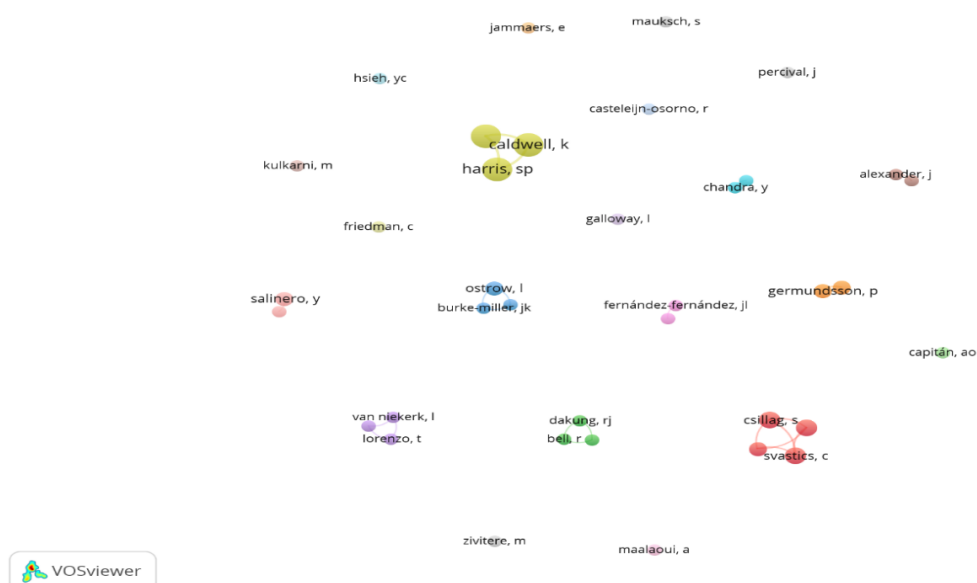


Figure 6. The network of authors on the topic of disability and entrepreneurship on WoS

Source: own elaboration using VOSviewer software

Based on the 173 scientific articles on the WoS platform, a number of 396 different authors emerge, but the network only shows 37 authors, namely only those who meet the established threshold (the number of scientific papers must be at least two per author). The network projected in Figure 6 represents the interconnection of researchers and collaborative efforts.

Table 1. Top 10 worldwide cited authors on the topic of disability and entrepreneurship

First author	Paper	Journal	Year	Total Citations
Haynie JM	Toward a Theory of Discontinuous Career Transition: Investigating Career Transitions Necessitated by Traumatic Life Events	<i>Journal of Applied Psychology</i>	2011	163
Renko M	Entrepreneurial entry by people with disabilities	<i>International Small Business Journal- Researching Entrepreneurship</i>	2018	62
Harris SP	Social entrepreneurship as an employment pathway for people with disabilities: exploring political-economic and socio-cultural factors	<i>Disability & Society</i>	2014	54
Harpur P	Gig Workers with Disabilities: Opportunities, Challenges, and Regulatory Response	<i>Journal of Occupational Rehabilitation</i>	2020	51
Bakker RM	Inclusive entrepreneurship: A call for a shared theoretical conversation about unconventional entrepreneurs	<i>Journal of Business Venturing</i>	2023	46
Vardeman-Winter J	Still a lily-white field of women: The state of workforce diversity in public relations practice and research	<i>Public Relations Review</i>	2017	43
Williams J	New directions for entrepreneurship through a gender and disability lens	<i>International Journal of Entrepreneurial Behavior & Research</i>	2019	41
Pavey B	Human capital, social capital, entrepreneurship and disability: an examination of some current educational trends in the UK	<i>Disability & Society</i>	2006	33
Saxena SS	Gauging underdog entrepreneurship for disabled entrepreneurs	<i>Journal of Enterprising Communities- People and Places in the Global Economy</i>	2018	30
Martin BC	Inclusive Management Research: Persons with Disabilities and Self-Employment Activity as an Exemplar	<i>Journal of Business Ethics</i>	2020	29

Source: own elaboration using the WoS database

To gain more insight, Table 1 identifies the names of the most cited researchers, mentioning the journal in which they published their research. Most of the cited papers were published in journals related to economics, management, and business, reflecting the interdisciplinary nature of disability and entrepreneurship research and indicating a growing interest and research activity.

4.2. Bibliometric analysis of the researched subject

To further explore the topic of disability and entrepreneurship, the keyword co-occurrence visualization, Figure 7, shows a network of interconnected terms. Each node represents a keyword, and the lines connecting them indicate the frequency with which these keywords co-occur in the analyzed documents. The size of the nodes corresponds to the frequency of the keywords, while the thickness of the lines represents the strength of the association between them.

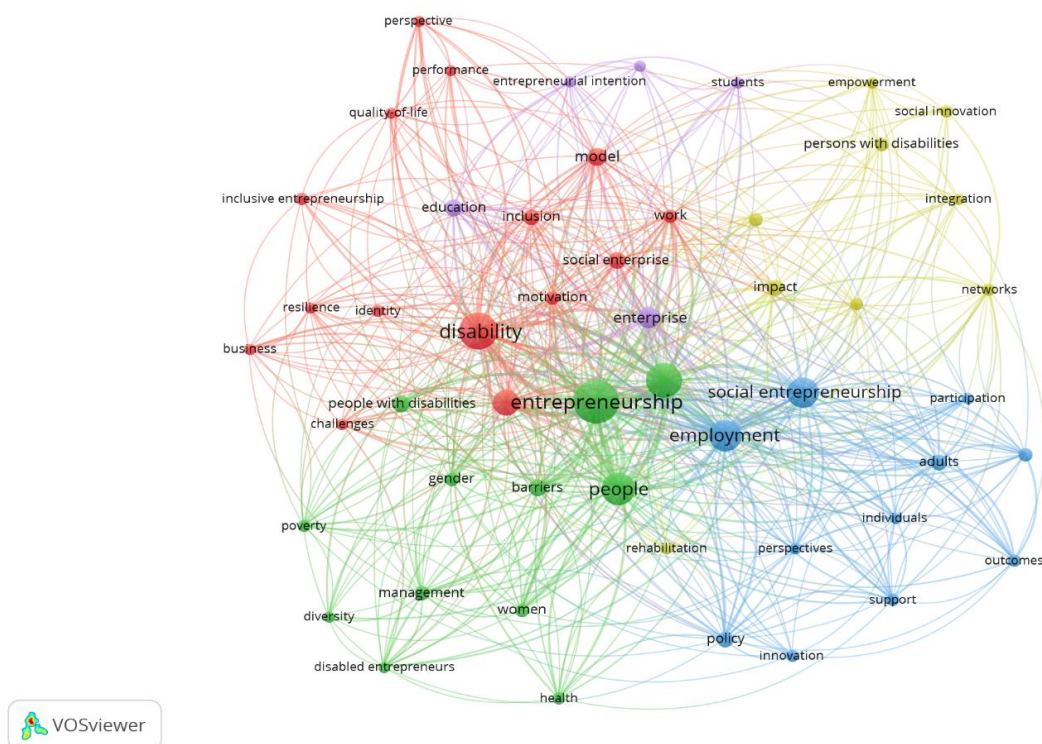


Figure 7. Keyword frequency network for the topic disability and entrepreneurship on WoS (2005 – May 2025)

Source: own elaboration using VOSviewer software

Particular care was taken to set a threshold of five occurrences for each keyword, resulting in 52 relevant terms out of 835. We chose this threshold because we wanted to capture the most relevant terms. As a result, the keywords “entrepreneurship”, “disability”, “people” and “social entrepreneurship” occupy a central position in the network, suggesting their strong association with other terms.

Table 2. Keyword clusters for disability and entrepreneurship in VOSviewer

Clusters	The most relevant key terms	Occurrences	Total Link Strength	Main Topic
Cluster 1 red (15 items)	business	5	24	Disability
	disability	53	178	
	inclusion	10	40	
	motivation	7	40	
	social enterprise	12	39	
Cluster 2 green (12 items)	disabled entrepreneurs	5	30	Entrepreneurship
	entrepreneurship	76	250	
	management	9	35	
	people	42	208	
	people with disabilities	12	35	
Cluster 3 blue (11 items)	employment		170	Social entrepreneurship
	innovation	39	18	
	social entrepreneurship	6	136	
	support	38	38	
		6		
Cluster 4 yellow (9 items)	empowerment	5	20	Persons with disabilities
	impact	10	34	
	integration	5	20	
	rehabilitation	5	19	
Cluster 5 purple (5 items)	education	12	50	Enterprise
	enterprise	18	91	
	entrepreneurial intention	5	23	

Source: authors' own elaboration

The visualization reveals the interconnections between several thematic clusters, as presented in Table 2.

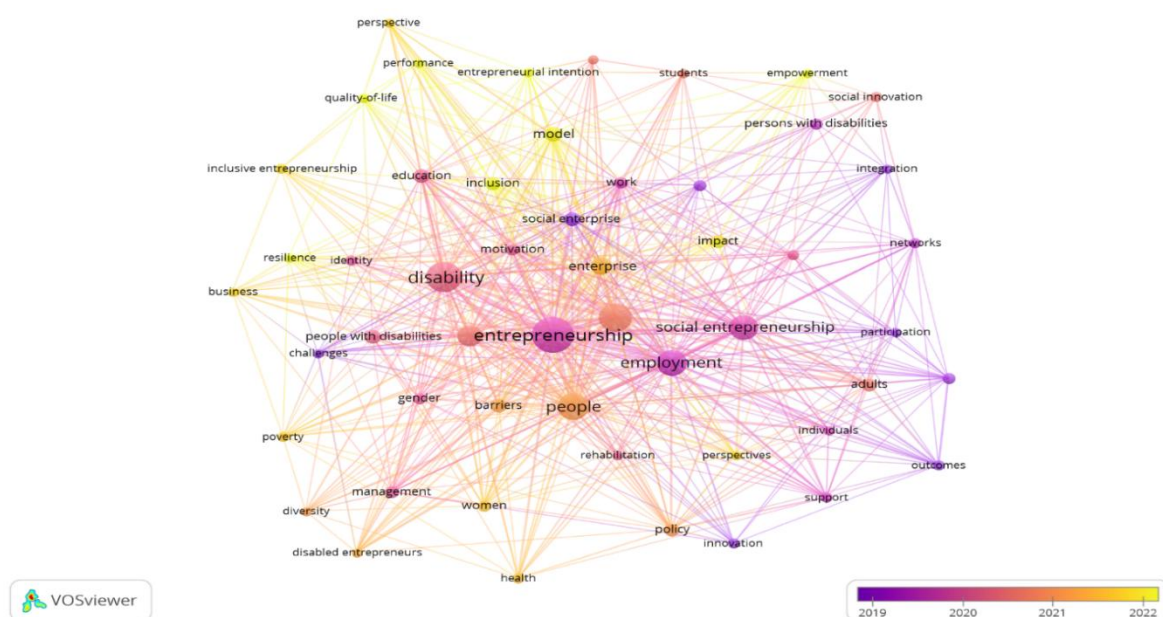


Figure 8. Co-occurrence overlay visualisation of keywords for disability and entrepreneurship

Source: own elaboration using VOSviewer software

To analyze the temporal distribution of articles, the co-occurrence overlay view (Figure 8) shows the design of keywords according to the year in which they were used. The color coding of the nodes and lines indicates the temporal dimension of the co-occurrences: with older occurrences in purple, from 2019, such as "challenges", "innovation", "integration" and "social enterprise"; with pink occurrences between 2020 and 2021, "entrepreneurship", "social entrepreneurship", "management", "disability"; with more recent occurrences in orange, from 2021, "people", "barriers", "diversity", "disabled entrepreneurs"; and with yellow the most recent use of the words, from 2022, "inclusion", "quality-of-life", "resilience", "performance".

5. Conclusions

Disabilities vary greatly from person to person in terms of type, severity, stability, duration and time of onset. These characteristics influence the capabilities and willingness of people with disabilities to become entrepreneurs and to sustain such a status. Self-employment is considered more suitable for many people in this category, as it can offer greater flexibility in terms of workload, working hours and workplace, which can allow for better management of the disability and lifestyle.

Regarding the bibliometric analysis on the topic of disability and entrepreneurship, it can be noted that in 2023 the largest number of papers on the mentioned topic was recorded, and the countries of the USA, the United Kingdom and Spain showed the greatest interest in this topic. Most of the cited papers were published in journals related to economics, management and business, reflecting the interdisciplinary nature of disability and entrepreneurship research and indicating a growing interest and research activity.

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GLOBAL INSTITUTIONS IN SUPPORTING REGIONAL DEVELOPMENT AND RESILIENCE

DOI: <https://doi.org/10.53486/dri2025.69>

UDC: 339.96:332.14(477)

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Abstract: *Problems of post-war recovery and reconstruction of regions and territories affected by war are so complex and profound that they cannot be resolved by the country's efforts alone. Therefore, global institutions will play a key role in supporting development, recovery, and crisis resolution in regions of countries affected by conflicts or disasters. Ukraine serves as a vivid example: following Russia's full-scale invasion in February 2022, the country has suffered significant human losses and economic damage. The purpose of this article is to examine the experience of international institutions that are capable of providing comprehensive support for socio-economic development and regional recovery. The research is based on publicly available sources, such as websites of international organizations, their analytical reports, and briefing notes. The study is focused on the case of Ukraine, which has suffered catastrophic destruction as a result of military aggression. It has been determined that global institutions play an indispensable role in strengthening the capacity of states and regions to absorb, respond to, and recover from large-scale shocks such as armed conflicts, economic disruptions, and environmental disasters. Their contribution goes beyond financial assistance, encompassing strategic policy guidance, institutional reform, technical support, and long-term development planning. In the context of Ukraine, the coordinated involvement of major international actors, including the World Bank, the International Monetary Fund (IMF), the United Nations Development Programme (UNDP), the European Investment Bank (EIB), and a number of multilateral donors demonstrates a comprehensive and integrated approach to regional development and post-conflict resilience.*

Key words: *regional development, resilience, socio-economic development, global institutions, crisis and problem situations, state support.*

JEL: H51; R23

1. Introduction.

Problems of post-war recovery and reconstruction of regions and territories affected by war are so complex and profound that they cannot be resolved by the country's efforts alone. Therefore, global institutions will play a key role in supporting development, recovery, and crisis resolution in regions of countries affected by conflicts or disasters. Ukraine serves as a vivid example: following Russia's full-scale invasion in February 2022, the country has suffered significant human losses and economic damage. This can be illustrated by statistical data: according to the World Bank, the poverty rate increased by 1.8 million people, reaching 9 million since the beginning of 2022. Over the next decade,

the country will need at least 524 billion USD for repair and reconstruction (The World Bank In Ukraine, 2025). The recovery process will require substantial financial resources and expert support, highlighting the importance of involving international institutions. It is also important to recognize that each case of post-war recovery of affected territories is unique - this statement is supported by general scientific consensus. We agree with the opinion of (Shapoval et al., 2024) that financial aid supports, rather than substitutes for, economic recovery. Nevertheless, its importance to the country cannot be overstated. In our opinion, the following factors are critical for successful recovery:

- the amount, type, and focus of external assistance;
- the ability of national institutions in the affected country to manage both external and remaining internal resources effectively;
- transparency in reporting received aid and addressing corruption risks;
- flexibility in planning and implementing assistance measures, as the post-war socio-economic environment can change rapidly;
- the composition and diversity of international institutions involved in reconstruction, as each possesses different areas of expertise and unique experience that can be valuable during recovery;
- reaching a certain consensus on priorities, tools, and reconstruction mechanisms between the national government and international institutions.

2. Basic content.

The list of global institutions already involved in assistance and support processes, as well as those with the potential to participate, is quite extensive. As of 2025, the following global institutions have provided various forms of assistance to Ukraine: the World Bank, the International Monetary Fund, the North Atlantic Treaty Organization (NATO), the European Bank for Reconstruction and Development (EBRD), the United Nations Development Programme (UNDP), the Organisation for Economic Co-operation and Development (OECD), other UN funds and agencies, multilateral initiatives, and international coalitions. We will examine the characteristics of these organizations and the specific features of their involvement in supporting Ukraine.

The World Bank primarily focuses on financing infrastructure and economic recovery projects. According to the latest estimates from World Bank experts within the Rapid Damage and Needs Assessment (RDNA4) project (World Bank Group, 2025), extensive infrastructure damage and significant power supply disruptions have slowed economic growth to 3.2% in 2024 and 2% in 2025. Over the past year, the number of damaged or destroyed assets has increased by 70%, including electricity generation, transmission, distribution infrastructure, and heating systems. Additionally, 13% of the total housing stock has been destroyed or damaged, negatively affecting over 2.5 million households (World Bank Group, 2025).

According to World Bank estimates, the reconstruction and recovery needs for the territories of Ukraine amount to (World Bank Group, 2025):

- housing sector – nearly \$84 billion;
- transport sector – nearly \$78 billion;
- energy and extractive industries – nearly \$68 billion;
- trade and industry – over \$64 billion;
- agriculture – over \$55 billion;
- debris removal and waste management – nearly \$13 billion.

In addition, World Bank experts emphasize that the participation of the private sector is essential for the successful recovery and reconstruction of Ukraine's economy, particularly in its heavily affected regions.

According to preliminary assessments by the International Finance Corporation (IFC), the private sector could potentially cover one-third of the total recovery needs, providing a significant supplement to government investments and international aid (World Bank Group, 2025).

The role of the World Bank in supporting and rebuilding Ukraine lies in its structured project portfolio, based on established oversight practices and extensive reconstruction experience in sectors such as agriculture, energy, infrastructure, transport, and the social sector, as well as in supporting development-oriented reforms. Projects are primarily implemented in cooperation with the IMF and the EU (for reforms), and with the EBRD and EIB (for investments) (Table 1).

Table 1. World Bank projects in Ukraine (as of 2025)

Project	Content	Result
Public Expenditures for Administrative Capacity Enhancement (PEACE)	Help the Government of Ukraine meet urgent needs and support the delivery of public services. Employ additional safeguards and oversight, including audits, to ensure that funding is reaching its intended purpose.	The support reached 15 million Ukrainians, providing salaries for government and school employees, pensions for the elderly, salaries for civil servants, and funding for social programs for vulnerable groups.
International Finance Corporation (IFC)	A member of the World Bank Group, it specializes in financing the private sector in developing countries. In Ukraine, IFC has focused on supporting the private sector since the beginning of the war. It implements long-term financing projects, including capital investments in areas such as food production, telecommunications, technology, construction, and energy. Financing advice on private sector investments.	Since February 2022, IFC has provided \$2.2 billion to support Ukraine's private sector, including \$760 million mobilized under the Economic Resilience Program.
Multilateral Investment Guarantee Agency (MIGA)	A member of the World Bank Group, MIGA has provided six guarantees to Ukraine since the start of the war. MIGA established the SURE Trust Fund to help deploy a two-pronged strategy in the country: (a) to facilitate private investment by providing guarantees – political risk insurance (PRI), trade finance guarantees, and credit enhancements – to investors and lenders; and (b) to ensure that projects are implemented in accordance with global best practices in integrity, environmental, social, and climate standards.	Protection of up to 75% of risk through guarantees to support trade in essential goods, bank lending to enterprises, including small and medium-sized ones, and insurance of projects in the real sector of the economy. After the end of the war, MIGA expects to continue providing guarantees for the real sector of the economy.
Ukraine Relief, Recovery, Reconstruction and Reform Trust Fund	A multi-donor fund to channel grant contributions from donor partners. The goals are to help maintain the country's administrative capacity and service delivery, carry out relief efforts, and support the planning and implementation of Ukraine's recovery, sustainable reconstruction, and reform agenda.	Supports World Bank projects and ensures that Ukrainian authorities can quickly and effectively leverage these critical investments, as well as effectively and at scale leverage multiple sources of financing.

Source: World Bank Group

Table 1 shows that the World Bank projects in Ukraine are quite large-scale and are generally aimed at supporting the government sector, private business, insurance, and adhering to the principles of transparency and accountability. However, the specific amounts of funding spent are not always publicly available. The results of project implementation are also declarative in nature without specific quantitative indicators before the project / after the project.

The International Monetary Fund (IMF) has provided Ukraine with significant financial assistance to ensure macroeconomic stability and finance critical budgetary needs resulting from the war, beginning in 2022 (IMF, 2025). The total financial support from the IMF to Ukraine since February 2022 amounts to approximately \$12.4 billion, which includes both emergency financing and long-term support programs.

However, this institution provides financial aid based on clearly defined criteria. For Ukraine, the key conditions for receiving IMF assistance include (Singh, 2025):

- Economic necessity and debt sustainability: based on an assessment of Ukraine's ability to service its public debt in the medium term. For instance, in March 2023, the IMF concluded that Ukraine's debt was sustainable with international donor support, which enabled the approval of the Extended Fund Facility (EFF) program.
- Necessity of economic reforms: to achieve economic stability, the country is required to implement structural reforms, including tax reform, increasing transparency in public finances, implementing anti-corruption measures, reducing the budget deficit, and strengthening the independence of the National Bank of Ukraine.
- Adherence to reform monitoring: under the EFF program, regular reviews are conducted to assess compliance with the established indicators. If the conditions are not met, further disbursements can be postponed or adjusted. For example, in March 2025, the seventh review of the EFF program was completed, and Ukraine received \$400 million for meeting key reform and fiscal performance indicators (Singh, 2025).

Ukraine met all key Quantitative Performance Criteria (QPCs) set by the IMF. However, there was a deviation in the indicator "Ceiling on the primary balance of the state budget (excluding defense spending and external budget support grants), net of budget support grants", where the actual deficit exceeded the planned limit. Since this criterion was revised and adapted to the new conditions, Ukraine received a "met" status from the IMF.

Actual budget revenues exceeded the minimum threshold (indicator: "Ceiling on tax revenue"), which is a positive signal for macroeconomic stability. Similarly, the actual level of borrowing was significantly lower than the ceiling, indicating a responsible debt policy. The level of international reserves exceeded the minimum requirement, reflecting financial resilience and adequate foreign currency reserves.

The limit on new external payment arrears also showed that Ukraine did not resort to monetary financing through the National Bank of Ukraine (NBU), which is a key IMF condition to control inflation and maintain macroeconomic stability.

Thus, fiscal deficit, public debt, and international reserves remained within the program's framework. Within the framework of the forecast and risks developed by the IMF for Ukraine for 2025, the following key points can be highlighted (IMF. European Dept, 2025).

1. The overall expected economic growth in 2025 will be closer to the lower limit of the 2-3% range, due to such adverse events as a decrease in steel exports and an increase in coal imports due to the closure of the Pokrovskaya mine due to the war. An increase in gas imports due to large-scale attacks by the Russian Federation on gas infrastructure will also have a negative impact.
2. The expected inflation rate at the end of 2025 will be 9% in annual terms, due to the impact of negative household expectations and the general unfavorable socio-economic situation. If the 2025 harvest is at least at the level of 2024, this, together with a balanced monetary policy, may slow down inflation.

3. The trade balance is likely to deteriorate due to increased gas and services imports (as part of the liberalization reform). However, the outlook for agricultural exports remains positive.

4. The baseline fiscal projections remain tied to the 2025 budget. The prospects for an improvement in the economic situation are linked to policy adjustments, expectations of post-war recovery, and normalization of spending in key categories after the war. By the end of 2026, inflation is expected to be 7% year-on-year.

The Organization for Economic Co-operation and Development (OECD) is working with the Government of Ukraine under the four-year OECD-Ukraine Programme, which began in June 2023. The aim of the programme is to support Ukraine's reforms, recovery and reconstruction and to help it advance its ambitions to join the EU and the OECD (OECD, 2025). The programme consists of 21 policies and 10 capacity-building projects. It provides for Ukraine's participation in 24 OECD bodies and its compliance with 76 OECD legal instruments for four years. The program covers six policy areas:

- economic recovery and infrastructure resilience;
- environmental sustainability and energy;
- taxation and financial management;
- good governance and transparency;
- competitiveness and regulatory efficiency;
- human capital, social and cultural development.

Thus, the cooperation between the OECD and Ukraine is multi-vector and covers such key areas as the economy, governance, competition, education and literacy of the population, and the implementation of the principles of competitive energy markets. This cooperation involves attracting financial support from international partners (EU, Poland, Lithuania, private foundations), which allows ensuring the duration and effectiveness of projects. Legal mechanisms for cooperation are based on OECD programs (SIGMA, PISA, SOURCE), which are adapted to Ukrainian realities. In general, the goal of cooperation with the OECD after the outbreak of the war in 2022 has been transformed towards supporting Ukraine's recovery and integration into European institutions through the application of OECD standards and approaches. The United Nations Development Programme (UNDP) envisages the following areas of work in Ukraine.

1. UNDP Recovery Framework for Ukraine (UNDP, 2025). It was developed in March 2022 in close cooperation with the Government of Ukraine, development partners and UN agencies and launched in April 2022. The aim of the programme is to play a key role in supporting the country's resilience and recovery. It helps communities to clear debris and demine, reconstruct housing, energy and social infrastructure, provide basic services and psychiatric and psychosocial care, as well as support livelihoods and employment. The main areas of funding for the programme are presented below (Table 2).

The Framework Programme is aimed at strengthening Ukraine's capacity to respond to the unprecedented challenges caused by the war. Support is organized into areas that include damage assessment, coordination of recovery and reconstruction, and restoration efforts.

UNDP supports the Government of Ukraine in fulfilling its core functions, coordinating aid, conducting damage and needs assessments, and building the capacity of national and local authorities to develop recovery plans.

UNDP also supports the government's reform agenda, focusing on economic strengthening, innovation development, and protection of vulnerable populations.

2. Green Energy Recovery Programme (Green energy recovery programme, 2025). This programme aims to address urgent needs caused by recent damage through mobilizing efforts to repair and restore critical energy infrastructure.

It is part of a multi-year, multi-donor initiative (funded by the governments of Japan, Norway, Sweden, Denmark, the Republic of Korea, Belgium, Germany, and Iceland).

The programme expands UNDP's involvement in supporting reconstruction and recovery of Ukraine's energy system, building on partnerships, results, and lessons learned from the 2023–2024 Winterization Project (Green energy recovery programme, 2025).

Expected outcomes include supporting the implementation of the national energy strategy and decentralization of the energy system to ensure reliable and uninterrupted electricity supply in Ukraine.

Table 2. Areas of support for Ukraine under the Recovery Framework Program

Pillar	Content	Financing, million USD
Response to the crisis	Government capacity to coordinate crisis Recovery planning and aid effectiveness Providing evidence base	29.1
Provision of public services	Digital transformation Administrative and social services Physical and mental health needs Human rights and access to justice	34.3
Reconstruction for recovery and return	Debris removal, mine action, community security Remediation of critical environmental threats Restoration of essential utilities Infrastructure and housing rehabilitation Energy sector support Making local authorities 'reconstruction ready' De-risking investments	517.7
Inclusive economic growth	Livelihoods, jobs, SME support Market opportunities and business support infrastructure Innovative finance Establishing conditions for private sector growth	21.3
Social cohesion and inclusion	Preservation of social fabric Reintegration of war veterans Women's empowerment Disability inclusion and rehabilitation	57,9

Source: NSI (Times New Roman, 10 pt., italic)

3. Ukraine Early Recovery Programme (Ukraine early recovery programme, 2025). Under this programme, the European Investment Bank (EIB), in cooperation with the Government of Ukraine, has provided financing for the first multi-sectoral framework loan, aimed at investing in the early recovery of critical infrastructure in conflict-affected regions and addressing basic needs to ensure decent living conditions for displaced persons and host communities.

Ukraine's public and private infrastructure - including water and electricity systems, as well as education and healthcare facilities - already suffered from decades of underinvestment, neglect, and inadequate maintenance, and has been further damaged by war, particularly in the Donetsk and Luhansk regions.

The €200 million framework loan is intended to support multi-sectoral investment schemes in municipal and social infrastructure sectors to address the consequences of conflict in eastern Ukraine and the flow of IDPs to other regions.

Due to the complexity of planning and implementation, the EIB requested technical assistance from the International Renaissance Foundation (for community development) and UNDP (for capacity building and project cycle support, including monitoring).

UNDP's role is to serve as a competent resource for decentralized technical assistance units, enabling effective management of the programme at the regional level and supporting the preparation and implementation of sub-projects at the local government level.

3. Conclusions.

Global institutions play an indispensable role in strengthening the capacity of states and regions to absorb, respond to, and recover from large-scale shocks such as armed conflicts, economic disruptions, and environmental catastrophes. Their contributions go beyond financial aid, encompassing strategic policy guidance, institutional reform, technical assistance, and long-term development planning.

In the context of Ukraine, the coordinated involvement of major international actors, including the World Bank, the International Monetary Fund (IMF), the United Nations Development Program (UNDP), the European Investment Bank (EIB), and a range of multilateral donors, demonstrates a comprehensive and integrated approach to regional development and post-conflict resilience. These efforts reflect a multidimensional response that addresses infrastructure rehabilitation, macroeconomic stabilization, governance reform, and social protection.

The work of the World Bank, for instance, illustrates the critical role of damage assessments and targeted investments in guiding resilient reconstruction. Similarly, the IMF's framework of conditional financial support underscores the importance of fiscal discipline, transparency, and structural reform as prerequisites for sustainable external assistance.

UNDP's initiatives (particularly in green energy recovery and early reconstruction) highlight the relevance of decentralization, inclusive development, and sustainability in post-crisis settings. This is particularly evident in frontline and border regions such as Kharkiv, where local resilience is directly tied to national security and stability.

The effectiveness of such efforts is contingent upon robust coordination between global institutions and local governance structures. This collaboration ensures that recovery measures are appropriately contextualized, responsive to community-specific needs, and capable of fostering social cohesion and economic revitalization.

Ultimately, global institutions serve not only as emergency responders but as long-term development partners. Their sustained engagement is essential for promoting equitable growth, enhancing resilience, and advancing the goals of sustainable development, particularly in regions that are most vulnerable to external shocks.

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SOCIAL RESPONSIBILITY IN MANAGEMENT

DOI: <https://doi.org/10.53486/dri2025.70>

UDC: 005.35(477)

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Abstract: *The article examines the features and principles of social responsibility of organizations that contribute to the effective development of society, demonstrate respect for their employees, care for the environment, and assess the impact of the results of their activities on the development of the country as a whole.*

Key words: *social responsibility, trust, greening, social aspects, corporate governance, organizational culture.*

JEL: G30, M14

1. Introduction.

Social responsibility of enterprises in any conditions is an important component of their activities. Socially responsible organizations contribute to the development of society, demonstrate respect for their staff, care about the environment and assess the impact of the results of their activities on the development of the country as a whole. A high level of social responsibility of enterprises, organizations and institutions of any sphere contributes to increasing their financial results, since such organizations form a significant image both in Ukraine and in the world, which contributes to further successful business, increasing competitiveness and efficiency due to the formation and retention of a significant customer base and respect from partners, partners and even competitors; implementation of effective management and proper control.

2. Basic content.

The majority of Ukrainian business companies today understand and realize the essence and importance of social responsibility very well and therefore direct their activities in this direction. Social responsibility is the responsibility of organizations for the results of their activities for society and the environment, which is manifested through its behaviour and contributes to sustainable development, health and well-being of the population, society and the state.

In modern conditions, the priority task of social responsibility of business is to survive the shocks caused by the war in Ukraine with the least losses: to save jobs, ensure safe working conditions, be responsible in their activities to society through the provision of quality services or the production of quality products, carrying out certain volunteer work and providing charitable assistance to those who need it; before the state due to compliance with the law and timely payment of taxes.

Social responsibility is no longer an option, not the prerogative of big businesses, and not a way to improve reputation. This is an integral part of the company, which is the guarantor of the future of Ukraine.

In today's conditions, society requires companies to constantly support Ukraine, as evidenced by the results research industry division of Google and research company Kantar. The study showed that more than 40% of respondents consider the transfer of funds for humanitarian aid, support for participation in volunteer activities to be extremely important components of the company's activities [1].

Commercial structures take on quite a variety of obligations to society and communities, from helping low-income segments of society and improving the social situation of territorial communities, to the implementation of significant environmental, medical, educational, cultural, artistic and other social projects.

In the conditions of war, it is not entirely correct to require the owners and management of a company that implements significant volunteer activities to participate in other social programs.

The social responsibility of business in wartime should be aimed at the sustainable development of society. After all, enterprises are interested in their activities to continue in Ukraine in peacetime, and products to be sold both in the domestic and foreign markets.

Therefore, big business has not only not curtailed social programs, but also aims to reach a new level – the introduction of ESG principles. This acronym stands for “Ecology, Social Policy and Corporate Governance”. That is, it is the sustainable development of commercial activity, which is based on the principles of responsible attitude to the environment (E – environment); responsibility to society (S – social); efficiency of corporate governance (G – governance) [2].

3. Conclusions.

A number of companies believe that in modern conditions, the main task of social responsibility should be the gradual restoration of such social programs and projects that contribute to the development of society and the state as a whole. During the war, and especially in the post-war period, one of the main areas of social responsibility of business should be the investment activity of those companies that are able to provide it.

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CIRCULAR MODELS OF RESOURCE CYCLES: ESSENCE AND FEATURES

DOI: <https://doi.org/10.53486/dri2025.71>

UDC: 005.936.5:504.06

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Abstract: *Ensuring sustainable development of economic systems requires the introduction of organizational and management and environmentally safe technologies, circular models of resource cycles aimed at reducing the negative impact on the environment. This corresponds to the concepts of sustainable development, circular economy, green economy, etc. This is also confirmed by advanced world experience, which shows that increasing the level of environmental safety of the national economy can be achieved by introducing conceptually new management tools based on integrated (combination of systemic, process, situational, functional) approaches, concepts of "lean" production, closed-loop economy, sustainable development. As a result of the study, it was established that the key goal of the transition to a circular economy is to change the paradigm of development of society and the economy (production, consumption, energy-efficient, marketing, etc.), rethinking value-added chains and developing circular models of resource cycles that must meet modern requirements and challenges in the global world.*

In view of this, the article reveals the relationship between the concepts of "circular model" and "resource cycle" based on bibliometric analysis using VosViewer software. The essence of the term "resource cycle" is clarified. The features of the circular model of resource cycles are determined. It is proved that at present it is necessary to look for innovative tools and implement fundamentally new approaches to the organization of economic activity. Circular economy is recognized as an effective way of doing business and a key mechanism for the development and implementation of circular models of resource cycles and business strategies in the context of global transformations.

Key words: *circular economy, linear economic model, circular model, resource cycle, circularity of resources, anthropogenic impact on the environment, sustainable development.*

JEL: A20, Q20, Q28

1. Introduction.

At the current stage of human development, the economy is becoming a factor of direct impact on the natural environment. This situation arose as a result of economic development focused on meeting the needs of humanity while ignoring the need to ensure environmental neutrality of production and consumption, which, given the inconsistency of natural and economic resource cycles and the limited availability of natural resources, determines significant negative qualitative and structural changes in the environment (Kyzym et al., 2023a). It is worth noting that large-scale climate change, limited availability or shortage of many natural resources for doing business in the global world, and their irrational use over time have led to the need to restructure economic models (Kyzym et al., 2023b). That is, modern economic conditions require an accelerated transition to a new model – a closed-loop economy (Dzwigol, Kwilinski et al., 2021a, 2021b; Ganea et al., 2022; Kyzym et al., 2024). Today, this model of economic development has received recognition and support in many countries of the world through political decisions, plans and practical actions. The circular economy is based on the

example of a closed cycle of substances in nature and aims to maximize the value of raw materials and products until the end of their use. The transition to such a system will have not only environmental, but also economic and social benefits due to job creation, cost savings and prevention of environmental pollution.

According to the study by the international consulting company KPMG "Future State 2030", climate change and the shortage of natural resources are recognized as global megatrends of the near future. And among the seventeen UN Sustainable Development Goals, seven are aimed at overcoming environmental problems.

Therefore, in the conditions of the Fourth Industrial Revolution, in order to ensure sustainable development of the world, the paradigm of the production model is changing: from linear to cyclical. From the point of view of R. Bradley et al. (2018), a linear economy, which is focused only on consumption, leaves behind economic, environmental and social problems. The circular economy, a new economic structure, can be combined with elements of sustainable production based on the 6Rs to alleviate these problems by establishing a closed flow of materials. By implementing the prospects of the circular economy, the recycling of resource flows is maximized, which provides economic and environmental benefits by minimizing waste (Solis et al., 2021).

According to experts, the abandonment of traditional production and consumption systems based on the principle of "use resources – produce products – dispose of waste" will allow to obtain a potential economic benefit of 4.5 trillion US dollars by 2030.

According to T. Shevchenko (2019), in the context of a circular economy, the development of resource cycles takes on a new meaning - preserving the gradually created value of the material, product and its parts. The development of the structure of resource cycles occurs through the reconstruction of existing cycles, as well as the formation of new ones. Resource cycle segmentation could become an effective tool for measuring progress in approaching a circular economy through the study of structural changes in the resource cycles of the territory caused by the closure and slowdown of material loops.

However, as studies show, 61% of companies did not have sufficient training and awareness of employees regarding the efficient use of resources (Hernandes de Paula e Silva et al., 2024).

Thus, the outlined topic of this study is relevant and requires further thorough scientific development. Therefore, the purpose of this article is to identify the relationship between the concepts of "circular model" and "resource cycle" based on bibliometric analysis using VosViewer software, as well as to clarify the essence of the term "resource cycle" and define the features of the circular model of resource cycles.

2. Basic content.

In the last decade, the concept of a circular economy or a closed-loop economy has been actively discussed by government officials, scientists, educators, experts, entrepreneurs, and representatives of public organizations. According to supporters of this concept, circular growth will help overcome the climate crisis and promote the development of an inclusive green economy. The very definition of this type of economy was formulated in their study in 2019 by experts from the University of Oxford (Haney et al., 2019), based on a series of interviews conducted with participants of the Platform for Accelerating the Circular Economy (PACE). The interviewed experts mostly agreed that the closed-loop economy is a regenerative type of economy that aims to preserve as much value as possible from products, their components, and materials, whose growth is not stimulated and does not depend on the use of limited resources. In essence, this type of economy is considered as a new trajectory of society's development towards sustainability and resilience (Khaustova & Reshetnyak, 2023).

As the analysis shows, there are many interpretations of the concept of "circular economy" in the literature. It is worth noting that there are significant differences between different views on the circular

economy. Thus, researchers have identified 114 different definitions (Kirchherr et al., 2017) and 38 different options for preserving value, such as reduction, reduction, recycling (Reike et al., 2018).

Therefore, based on the generalization of existing scientific approaches to defining the circular economy, they are conventionally systematized into the following groups: section of the economy; paradigm; strategy; model; system; environmental opportunity; recycling technology; tool of the "green" economy; type of economic activity (Trushkina, 2021; Trushkina & Prokopyshyn, 2021). Under the circular economy, it is proposed to consider the modern paradigm of the development of economic systems; the strategic direction of sustainable development; an economic model based on circular models of resource cycles and technologies for processing industrial waste in order to achieve sustainable functioning of the national economy. At the same time, the circular economy should be considered as a promising model that will become the basis of the next link in the chain of economic evolution (Kyzym et al., 2023a). It should be noted that the theory of resource cycles is included in the circle of scientific interests of scientists and specialists (Bradley et al., 2018; De Angelis & Feola, 2020; Hernandez de Paula e Silva et al., 2024; Schwarz et al., 2024; Solis et al., 2021; Tian et al., 2022; van Stijn A. et al., 2021). And as P. Shyshchenko & O. Havrylenko (2020) note, the theory of resource cycles serves to find ways of coordinated, harmonious development of natural and technological processes.

The relevance of the topic, which is associated with the development of the concept of a circular economy and the formation of circular models of resource cycles, is confirmed by the results of the bibliometric analysis. According to the title of the article, abstract, keywords "Circular model" or "Circular Models" and "Resource Cycle", which are placed in the international database Scopus, 628 documents were obtained for 1995-2025. When forming the sample, restrictions were made: only published scientific articles were taken.

A quantitative analysis of the formed sample of 628 scientific articles showed that by 2015 the level of publication activity was quite low. On average, the growth rate of the number of publications was 40.4% for 2015-2024. At the same time, it can be assumed that by the end of 2025 there will also be a trend of increasing the number of publications on the specified topic compared to previous years. According to preliminary estimates, the annual growth rate of the number of publications for 2015-2025 will be 27.7%.

As the analysis shows, the main organizations involved in solving the selected problem are Ministry of Education of the People's Republic of China (14 documents), CNRS Centre National de la Recherche Scientifique (12), Technical University of Denmark (9), Chinese Academy of Sciences (9), Parthenope University of Naples (9), Norges Teknisk-Naturvitenskapelige Universitet (8), Tsinghua University (8), ETH Zürich (8), Alma Mater Studiorum Università di Bologna (8), Lunds Universitet (8 documents). При цьому здебільшого такі роботи публікують науковці з China (105 documents), Italy (86), United Kingdom (67), Spain (59), Germany (58), United States (55), Netherlands (42), Sweden (29), France (26), Australia (25 documents). In Ukraine, 7 scientific articles were found using the specified search criteria.

The following keywords are mostly used in the publications: Circular Economy (398 documents), Life Cycle (219), Sustainable Development (172), Recycling (159), Life Cycle Assessment (135), Environmental Impact (135), Life Cycle Analysis (121), Sustainability (119), Waste Management (90), Economic Aspect (63), Environmental Economics (57), Life Cycle Assessment (LCA) (53), Decision Making (51), Climate Change (50), Environmental Management (44), Greenhouse Gases (36), Material Flow Analysis (34), Carbon Footprint (33), Business Models (33), Environmental Sustainability (28), Environmental Protection (27), Innovation (26), Carbon Emission (25), Energy Efficiency (24), Resource Efficiencies (22), Energy Utilization (22), Resource Use (19), Industrial Economics (19), Resource Management (18), Resource Recovery (17), Circular Business Models (16), Renewable Energy Resources (12), Natural Resource (12), Sustainable Production (11), Energy

The resource cycle can be divided into two main segments: 1) "transformation of a mineral into a material" (mining – processing – enrichment); 2) "transformation of a material into a product" (production – use – production").

According to T. Shevchenko (2019), the resource cycle is a set of transformations and spatial movements of a certain substance or group of substances that occur at all stages of its use by humans. Resource cycles bring materials and energy to the human economy. After extraction, processing and consumption, resources undergo various recovery cycles, such as repair, reuse, recycling, etc. (Antikainen et al., 2018; Ghisellini et al., 2016). After the end of their useful life, resources return to nature through incineration and dispersion in the atmosphere, through landfilling, or through release into the environment (Krausmann et al., 2018; Martinez-Alier, 2021a; Rammelt, 2020).

Considering all of the above, the global economy currently sustainably uses only about 8% of the total resource volume (Haas et al., 2020; Haigh et al., 2021), so humanity may face critical resource shortages and exceed key ecosystem limits in the coming decades (Bihouix, 2014; Herrington, 2021; Turner, 2014).

In his thesis, M. Calisto Friant (2022) follows the value preservation options (also called R-hierarchy, R-imperatives or simply R) established by D. Reike, W. Vermeulen & S. Witjes (2018), namely: R0 rejection, R1 reduction, R2 reuse/resale, R3 repair, R4 recovery, R5 recycling, R6 reuse, R7 material recycling, R8 energy recovery, R9 mineral re-extraction.

The concept of a circular economy involves the involvement of natural resources in the economic resource cycle in an amount sufficient to ensure the growth of scale and environmental neutrality of economic activity by increasing the rational use of natural resources, creating closed resource cycles in the spheres of production and consumption, and creating a waste disposal industry. Therefore. Creating an environmentally neutral economic model requires structural changes in certain resource cycles, increasing the rationality and efficiency of resource use, which will also lead to changes in the defining features of the economic model (Kyzym et al., 2023a).

The scientific work (Kyzym et al., 2023a) considers three types of economic resource cycles, which are distinguished depending on the specifics of different economic models, namely: open (typical of pre-industrial economies); open with elements of closed (industrial economy); closed (circular, cyclical or closed-loop economy).

As noted by scientists P. Shyshchenko & O. Havrylenko (2020), resource cycles are somewhat similar to natural ones, since they are part of a single natural resource cycle that occurs in different environments: natural and socio-economic. However, a distinctive feature of the resource cycle is its open nature, that is, the formation of a mass of waste at all stages – from extraction to the final use of a natural substance. It is estimated that from each ton of extracted resource, on average, only 5 to 15% reaches the finished product, the rest goes to waste.

Scientists interpret the resource cycle as a set of transformations and spatial movements of a certain substance or group of substances at all stages of their use by humans within the social link of the global circulation of these substances. Typically, the resource cycle includes the following phases: discovery of natural resources; preparation of natural resources for exploitation; extraction of natural resources from the natural environment; processing of natural resources; consumption of natural resources by humans; return of waste to nature (Shyshchenko & Havrylenko, 2020).

Based on the generalization of existing theoretical approaches to the essence of resource cycles, the following definition can be given: a resource cycle is a chain of sectoral transformations of resources, the analogue of which is the chain of creation of added value.

As a result of the study, it was established that the systemic features of circularity are: a closed resource cycle; climate neutrality of the resource cycle. The criteria for assessing the key characteristics of the degree of achievement of the circular economy include: compliance of the resource cycle model of a certain sector with the requirements of the circular approach; compliance

of the physicochemical properties of the remainder of the transformed basic resource with the possibilities of their accumulation in the environment.

3. Conclusions.

Currently, the issues of reducing waste, increasing resource efficiency and product sustainability are recognized as extremely urgent worldwide. This can be achieved by implementing circular resource cycle models. Recycling materials and products for use in a circular mode will contribute to the innovative development of various sectors of the economy. The transition to a more circular economy can increase competitiveness, stimulate innovation, accelerate economic growth and create jobs (700 thousand jobs in the EU alone by 2030). To this end, the European Union aims to build a circular and climate-neutral economy by 2050 (European Parliament, 2023).

From a macroeconomic perspective, a circular economy investment strategy could lead to a 10% reduction in the cost of raw materials and a 7% increase in GDP in the European Union by 2030 compared to a business-as-usual model (Ellen MacArthur Foundation, 2017). However, such a leap in development undoubtedly requires strategies that are focused on the specific potential of the economy, as well as the appropriate infrastructure and administrative capacity. An important long-term opportunity for the circular economy is the reduction of direct and indirect environmental costs. Direct costs are associated with waste management. However, indirect costs of natural resource use are also relevant. On a global scale, according to estimates by the International Group of Experts on Resources within the framework of the United Nations Environment Programme, these costs amount to up to 2.4 trillion US dollars (Trushkina, 2021). In addition, it should be emphasized that the development of the circular economy contributes to the social effect by creating jobs. According to a study by the European Commission (European Commission, 2018), depending on how waste is processed, different numbers of jobs can be created: for 10 thousand 1 tonne of used products can create one job from incineration, six from landfill, 36 from recycling and up to 296 from recovery and reuse.

Research published by the International Resources Group shows that using the world's natural resources wisely and efficiently today means that the next generation will receive annual economic benefits of 2 trillion dollars by 2050, while offsetting the costs of ambitious climate action (UNEP, 2017).

The world's population is expected to grow by 28% and is projected to use 71% more resources per capita by 2050. Without urgent efficiency measures, global annual use of metals, biomass, minerals such as sand and other materials will increase from 85 billion tonnes to 186 billion tonnes by 2050. That is, the report suggests that while investments in ambitious climate action would lead to a 3.7 percent drop in global GDP per capita by 2050, these costs to the economy could be offset by more efficient resource use (UNEP, 2017).

In addition to the economic benefits, the analysis also shows that resource efficiency and climate action would reduce global resource use by about 28 percent in 2050 compared to current trends. For the G7 countries, resource efficiency combined with ambitious climate action would increase gross domestic product by 600 billion dollars in 2050 (600 dollars per person, or 1 percent) (Ekins et al., 2017).

A potential avenue for further research is to develop a theoretical framework for the circular economy approach.

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ANALYSIS OF THE RELATIONSHIP BETWEEN THE CONCEPTS OF "INFRASTRUCTURE THREATS" AND "RESILIENCE OF THE POPULATION'S QUALITY OF LIFE"

DOI: <https://doi.org/10.53486/dri2025.72>

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Abstract: *In recent years, structural infrastructural changes have significantly affected the resilience of the quality of life of the population of Ukraine. This is due to the fact that the quality of life is a complex indicator that reflects the level of satisfaction with the environment (assessment of the state of infrastructure, the quality of services provided in various sectors of the economy, and living conditions created for the population) and the personal comfort of residents.*

As a result of the study, it was found that today there is no single scientific position on the definition of the concept of "infrastructure". This is due, firstly, to the fact that researchers are representatives of different scientific schools with their own approaches and characteristics. Secondly, to the ambiguity and multifaceted nature of the term "infrastructure". Researchers mostly understand the term "infrastructure" as a system, a systemic economic category, a complex of types of economic activity, a part of the national economy, appropriate conditions, a resource, a mechanism, a critically important component of the environment, etc. At the same time, the vast majority of authors consider infrastructure as a "growth point" of the national economy, relying on the theories of location, economic growth and innovative development. Based on the generalization of theoretical approaches to the definition of the concept of "infrastructure", the author's interpretation of this concept is given. It is proposed to consider under it a set of various institutions (institutions, organizations), institutions (rules, norms), types of economic activity necessary for the effective functioning and management of the national economy in the context of achieving sustainable development and ensuring the resilience of the quality of life of the population.

It should be emphasized that military actions as a result of Russia's full-scale invasion of the territory of Ukraine pose serious infrastructure threats and risks that negatively affect the development of the national economy and the quality of life of the population. Therefore, the purpose of this article is to identify the relationship between the concepts of "infrastructure threats", "population's quality of life", and "resilience" by characterizing the evolution of key patterns of scientific publications on this problem. To achieve the goal, a relevant sample of scientific articles was formed based on identifying periods of publication activity and bibliometric analysis of keyword coincidences to identify promising areas of research in this area. Bibliometric analysis and visualization of its results were carried out using the VosViewer software product. Based on visualization maps, three clusters were identified and characterized by the content coincidence of keywords in publications and five stages of evolutionary development. The results of the analysis can be used in further research to determine the dominants of the infrastructural structure formation of the resilience of the quality of life of the population of Ukraine in conditions of external threats.

Key words: *national economy, structural changes, infrastructure changes, infrastructure threats, challenges, population's quality of life, resilience, bibliometric analysis.*

JEL: D40, H54, I31

1. Introduction.

In recent years, the economic system of Ukraine has been undergoing a transformation in the context of global instability, geopolitical challenges, hybrid threats to national security (Khaustova & Trushkina, 2024), military risks, external and internal structural changes.

One of the challenges, overcoming which requires systemic management decisions and a strategic approach, is infrastructural changes that negatively affect the quality of life of the population of Ukraine. And first of all, this is due to the full-scale armed aggression of Russia against Ukraine, which caused serious damage and destruction of infrastructure facilities (Kyzym, Khaustova & Trushkina, 2022) (housing, social, production, energy, transport, logistics, warehouse).

According to estimates by experts from the World Bank and the European Commission using the World Bank's Rapid Damage and Needs Assessments (RDNA2) methodology, the amount of damage caused by the war in Ukraine for the period from February 24, 2022 to February 24, 2023 amounted to 134.7 billion dollars. At the same time, the cost of damaged housing infrastructure amounted to 50.4 billion dollars, transport infrastructure – 35.7, energy infrastructure – 10.6, and critical infrastructure facilities in the water supply and water treatment sector – 2.2 billion dollars.

It should be noted that the needs for the restoration of the housing stock amount to 68.6 billion dollars (this is 36.1% more compared to the damage to housing), and infrastructure sectors – 156.4 billion dollars (this is almost 3 times more compared to the damage to strategically important infrastructure facilities) (World Bank, 2023).

However, it is worth noting that even in the pre-war period, Ukraine had problems with insufficiently effective infrastructure development. This became an obstacle to obtaining quality services and led to a deterioration in the living conditions of different segments of the population.

According to the results of a survey by the International Institute of Sociology commissioned by the Office of the President (Kochmar-Tymoshenko, 2020), 65% of respondents believe that the infrastructure of their locality does not generally or fully meet the needs of all categories of the population. And 26% believe that this infrastructure generally or fully meets the needs of everyone. At the same time, 58% of the population notes that in the period 2017-2020 no changes in infrastructure issues occurred. 18% of respondents saw an improvement in infrastructure development, and 12% saw a deterioration in the situation.

The monograph "Quality of Life of the Population of Ukraine and the First Consequences of the War" (Cherenko et al., 2023), prepared by a team of scientists from the M. V. Ptukha Institute of Demography and Social Research of the NAS of Ukraine (now the M. Ptukha Institute of Demography and Quality of Life Research of the NAS of Ukraine), shows the share of households that suffered from infrastructural restrictions for the period 2007-2021. Thus, the following are included in the key signs of infrastructural deprivation (author's: from the Latin *deprivatio* – loss, deprivation) meaning a social process of reducing or depriving households of opportunities to satisfy basic life needs (Lyubyva, 2007)): 1) absence of a medical institution or pharmacy near the home – 12.4% of households in 2021 (in 2007 – 18.4%); 2) lack of timely emergency medical services in the settlement – 13.1% (in 2007 – 22.9%); 3) lack of preschool institutions near the home – 1.6% (in 2007 – 4.7%); 4) lack of regular daily transport connections to a settlement with a more developed infrastructure – 9.3% of households (in 2007 – 12.6%) (Cherenko et al., 2023).

Therefore, from the point of view of the authors of this monographic publication (Cherenko et al., 2023), over the period 2007-2021 there was an accumulation of unresolved problems of the standard of living, namely: consistently low purchasing power of income and limited consumer opportunities; extremely low availability of improving housing conditions; slow development of infrastructure and, accordingly, narrowed access to quality services, especially in small settlements.

It should be emphasized that the full-scale Russian invasion of Ukraine has caused an even greater deterioration in the quality of life of the population due to infrastructural threats and risks. The crisis caused by the Russian-Ukrainian war has become the fourth most significant economic shock in

Ukraine, leading to significant losses in the production sector and infrastructure, a decrease in the quality of life of the population and social losses (Khaustova & Reshetnyak, 2023). In 2022, more than 7 million people worsened their material situation, and the poverty level reached 24% of the population. As a result of the war, the number of jobs and incomes decreased significantly, purchasing power and the volume of available assets decreased (Khaustova & Reshetnyak, 2023).

This is confirmed by the results of a survey of 2,018 respondents in the macro-regions of Ukraine, conducted by the Ilko Kucheriv Democratic Initiatives Foundation together with the sociological service of the Razumkov Center with the support of the MATRA program from December 13 to 21, 2022. Thus, 52.4% of respondents noted that they suffered from power, water, and heating outages as a direct result of the war. 20.8% of respondents experienced a significant decrease in income, which negatively affected their quality of life (Ilko Kucheriv Democratic Initiatives Foundation, 2022).

The study "18 Months Later: Assessment of Mental Health and Psychosocial Needs in Ukraine", conducted by HIAS Ukraine and the NGO "Girls" from June to August 2023 (Ukrinform, 2023), found that 35% of the population of Ukraine has a level of well-being and quality of life below average or low.

According to the results of a comprehensive survey of 1,000 respondents conducted on March 19, 2022 by the sociological group "Rating" as part of the "Ukraine in War" project, among Ukrainians who had a job before the war, half (53%) are not working today. 22% work in the usual mode, and 21% work remotely or partially. Only 2% of respondents found a new job during the war. The economic situation as a result of the war did not change for only 18% of citizens; for 52% it significantly worsened, and for 28% it most likely worsened (Rating, 2022).

If we consider the infrastructural changes caused by the armed conflict, it is worth noting the following. 51% of respondents believe that 5 years will be enough to rebuild Ukraine's infrastructure and national economy, and 13% – about a year (Rating, 2022). Among those surveyed, 61% are ready to join the economic and infrastructural restoration of Ukraine by working in construction, and 33% would like to, but do not have the opportunity. And only 5% note that the restoration of infrastructure is the sole responsibility of the authorities. At the same time, 90% of those surveyed claim that Russia should compensate for Ukraine's economic and infrastructural losses during the war; 21% – European countries; 17% – international organizations; 12% – the USA; 10% – Ukraine (Rating, 2022).

Therefore, the purpose of this article is to identify the relationship between the concepts of "Infrastructure Threats or Infrastructural Threats", "Population's Quality of Life", "Resilience" by characterizing the evolution of key patterns of scientific publications on this issue.

2. Basic content.

The study selected bibliometric analysis as a method that reveals the relationship between infrastructure threats, quality of life, and resilience of the population's quality of life. This type of analysis is based on mathematical graph theory, clustering methods, and scientific visualization, which makes it widely applicable in various fields of science (Kwilinski, 2023).

Based on the structuring of a large volume of metadata of scientific publications, bibliometric analysis allows us to identify the essence of the subject area and its conceptual foundations and to substantiate the evolution of the research area (Kwilinski, 2023). The research methodology includes such main stages as data collection and analysis, selection of a visualization tool, graphical representation of the identified relationships, and interpretation of the results obtained.

This was implemented using the VOSviewer v.1.6.19 software product. The functionality of this program includes the creation of keyword visualization maps based on compatibility data, author or country maps based on the number of citations, etc. (Khaustova, Kyzym, et al., 2024). In addition, network visualization maps in VOSviewer are displayed in several ways (for example, by content criterion, by publication period) (Kwilinski, 2023).

An important stage of bibliometric analysis, which ensures its quality, is the selection of the data source and the formation of a relevant sample of publications. The Scopus database was chosen as a data source due to the breadth of its coverage of such subject areas as computer science; engineering; social sciences; environmental sciences; Earth and planetary sciences; agricultural and biological sciences; energy; business, management and accounting; decision sciences; economics, econometrics and finance; multidisciplinary sciences, etc. The formation of the sample of publications on the selected topic was carried out in 4 stages:

- 1) selection of publications by search query "Infrastructure Threats" or "Infrastructural Threats" – 23718 documents were found for the years 1974-2025;
- 2) the sample was limited by the type and stage of publication, that is, only published works were taken – 10510 publications were found for the years 1974-2025;
- 3) selection of works by search query "Infrastructure Threats" or "Infrastructural Threats" and "Population's Quality of Life". The key categories for the selection of scientific publications were the title, abstract and keywords for them. And only the final scientific articles were taken. As a result of such a query, 84 scientific articles were found for the years 1994-2025;
- 4) a selection of works by the search query "Infrastructure Threats" or "Infrastructural Threats" and "Resilience" and "Population's Quality of Life". At this stage, restrictions were applied only by the stage of publication, that is, only published works were taken (scientific articles, review articles, books, chapters of books or monographic publications, works of an approbatory nature). Thus, the studied sample of publications included 44 works that met the above criteria, published in the period 2009-2025 and indexed by the Scopus database.

Let us consider each of the stages of the study in detail.

A quantitative analysis of the formed sample of 10,510 scientific works showed an exponential growth of research devoted to infrastructure threats during the period 1990-2025 (*Figure 1*). It is worth noting that before 1990, publication activity was quite low. Therefore, we analyzed the level of publication activity starting from 1990. On average, the growth rate of the number of publications was 19.4% for 1990-2024. At the same time, it can be assumed that by the end of 2025 there will also be a trend of significant growth in the number of publications on the specified topic compared to previous years. According to preliminary estimates, the annual growth rate of the number of publications for 1990-2025 will be 16.4%.

As the analysis shows, the main organizations involved in solving the selected problem are: Chinese Academy of Sciences (150 documents), Ministry of Education of the People's Republic of China (95), King Saud University (73), CNRS Centre National de la Recherche Scientifique (70), University of Chinese Academy of Sciences (65), University of Florida (57), Texas A&M University (53), University of Oxford (51), Consiglio Nazionale delle Ricerche (49), ETH Zürich (48), Delft University of Technology (47), University of Melbourne (47 documents).

At the same time, most of the works on the impact of infrastructure threats on the socio-economic development of the state are published by scientists from United States (2339 documents), China (1289), India (1068), United Kingdom (1012), Australia (524), Italy (466), Germany (461), Canada (398), Saudi Arabia (328), Spain (328), South Korea (307), Poland (275 documents). In Ukraine, 153 documents were found using the established search criteria.

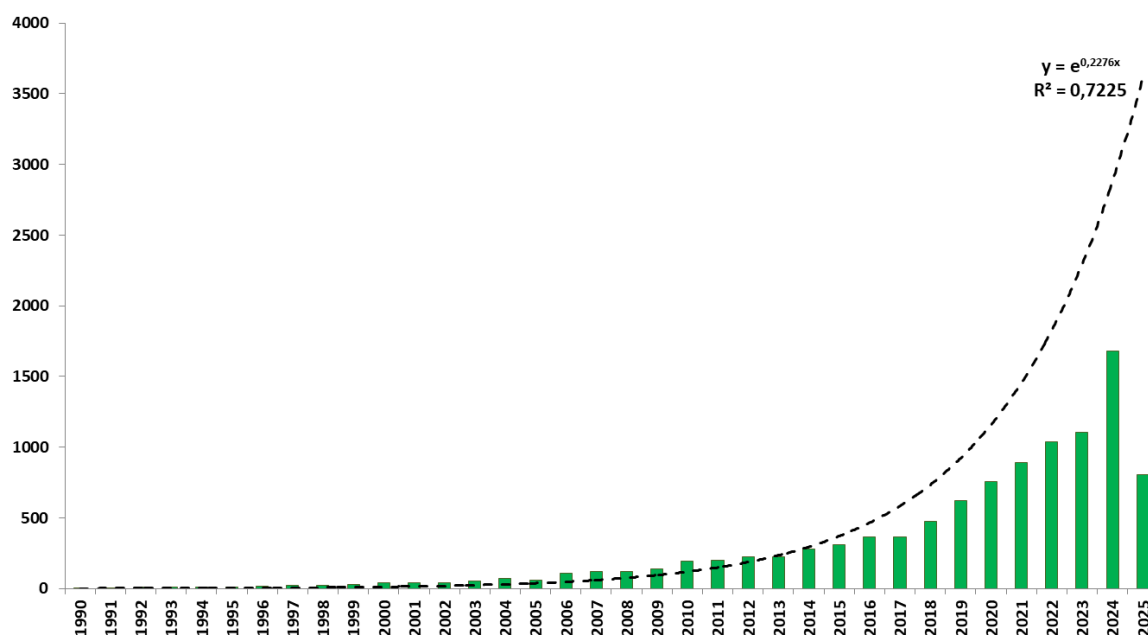


Figure 1. Dynamics of publications on infrastructure threats for 1990-2025

Source: based on the international scientometric database Scopus.

The main sponsors that finance scientific publications dedicated to infrastructure threats in various spheres of life and the national economy include the following: National Natural Science Foundation of China (514 documents), European Commission (452), Ministry of Science and Technology of the People's Republic of China (370), National Science Foundation (290), Horizon 2020 Framework Programme (250), UK Research and Innovation (180), National Key Research and Development Program of China (139), Fundamental Research Funds for the Central Universities (90), Engineering and Physical Sciences Research Council (83), Ministry of Education of the People's Republic of China (78), Government of Canada (68), U.S. Department of Defense (67), Australian Research Council (66 documents).

By relevance (the measure or degree of correspondence of the search results to the task set in the search query), the publications of the authors listed in *Table 1* should be indicated.

At the next stage of the search and research work, we searched for documents dedicated to identifying the impact of infrastructure threats on the quality of life of the population. Thus, by the title of the article, abstract, keywords "Infrastructure Threats" or "Infrastructural Threats" and "Population's Quality of Life" 84 documents were obtained for the years 1994-2025. The following keywords are mostly used in the publications: Human (17 documents), Quality Of Life (14), Climate Change (11), Sustainability (7), Environmental Protection (6), Environmental Impact (6), Urbanization (5), Population Statistics (5), Economic Aspect (5), Sustainable Development (4), Smart City (4), Risk Assessment (4), Population Growth (4 documents) etc.

This is also confirmed by the analysis of the "relevance of publications" indicator. It has been found that researchers (J. Padgett et al., 2009; G. Young et al., 2014; A. Veenapani & S. Chandra, 2024) pay much attention to consider various threats to sustainable infrastructure. Scientists emphasize that critical infrastructure systems provide the basis for socio-economic stability, sustainable development, national security and quality of life.

Next, we searched for the title of the article, abstract, keywords "Infrastructure Threats" or "Infrastructural Threats" and "Resilience" and "Population's Quality of Life" and received 44 scientific papers. It is worth noting that the issue of the relationship between infrastructure threats and the resilience of the quality of life of the population has not yet been sufficiently studied. Therefore, they require further scientific research and development.

Table 1. Relevance of publications devoted to the study of the impact of infrastructure threats on the socio-economic development of the country

Keywords	Scientists						
	M. Gross et al. (2024)	H. Liu (2021)	A. Van Os et al. (2015)	G. Moraitis et al. (2020)	A. Langenohl (2024)	S. Thakur (2021)	S. Fedulova et al. (2020)
Conflict	+	+					
Economic crisis	+						
Threat factors	+						
Identity threat			+				
Risk assessment			+	+			
Project management			+				
Consequences				+			
Cyber-physical attacks				+			
Risk management				+			
Financial infrastructures					+		
Global financial crisis					+		
Security-finance nexus					+		
Climate change						+	
Resilience						+	
Development							+
Infrastructure							+
Sustainability							+

Source: compiled based on the international scientometric database Scopus.

The first publication appeared only in 2009. And until 2024, a fairly low level of publication activity was observed: as a rule, from 1 to 3 papers were published each year. Only in 2017, 5 publications were published, and in 2024 – 11. The publications contain such keywords as Climate Change, Resilience, Disasters, Sustainable Development, Quality Of Life, Information Management, Sustainability, Life Cycle, Failure Recovery Mechanism, Environmental Impact, Economic and Social Effects, Decision Making, Cyber Security, Critical Infrastructures, Urban Resilience, System of Systems, Structural Resistance, Risk Assessment, Planning and Design etc.

In addition, it is advisable to study the geographical structure of scientific works on the issues of resilience of the quality of life of the population, taking into account infrastructure threats and risks. According to the geographical structure, the leaders are such countries as United States (12 documents), United Kingdom (8), India (6), Egypt (3), Canada (2), China (2), Czech Republic (2), Germany (2), Poland (2), Romania (2 documents) etc.

In our opinion, it is important to determine the most cited works devoted to the study of the impact of infrastructure threats on the resilience of the quality of life (*Table 2*). According to the data in *Table 2*, the work by A. Costello et al., published in 2009, has the largest number of citations. And to date, this work has 2159 citations. This work is devoted to the study of the impact of climate change on the health of the population. This can lead to changes in the nature of diseases, lack of water and food security, vulnerability of housing in settlements, extreme climatic events, an increase in the volume of migration flows, etc. The second place is taken by the publication of the authors K. Sinha et al. (2017), which considers the challenges, threats and opportunities of transport asset management, which directly affects the development of the national economy and the level and quality of life of the population.

In third place is the publication by K. Gopalakrishnan & S. Peeta (2010), which was cited 53 times. The authors of this article pay attention to sustainable critical infrastructure systems as a new paradigm in the era of resource depletion against the background of natural and man-made threats. The formation of these systems, in turn, ensures a sustainable and high standard of living with optimized resources, taking into account social, economic, societal and environmental considerations.

Table 2. Ranking of scientific papers by number of citations

Title	Authors	Year	Source	Number of citations
Managing the health effects of climate change	A. Costello et al.	2009	The Lancet	2159
Transportation infrastructure asset management in the new millennium: continuing issues, and emerging challenges and opportunities	K. Sinha et al.	2017	Transportmetrica A: Transport Science	55
Sustainable and Resilient Critical Infrastructure Systems: Simulation, Modelling, and Intelligent Engineering	K. Gopalakrishnan S. Peeta	2010	New York: Springer [Book]	53
ChameleonSoft: A moving target defense system	M. Azab et al.	2011	Proceedings of the International Conference	39
Evidence for improved urban flood resilience by sustainable drainage retrofit	J. Lamond et al.	2015	Proceedings of the Institution of Civil Engineers: Urban Design and Planning	36

Source: compiled based on the international scientometric database Scopus.

Table 3 shows the Top 5 journals with the largest number of publications on infrastructure threats and resilience of the quality of life of the population, indexed in the international scientometric database Scopus. The largest number of articles was published in the journal "Lecture Notes in Networks and Systems". These publications were analyzed according to such indicators as: 1) CiteScore (characterizes the average number of citations received by each document published in a periodical); 2) SCImago Journal Rank (estimates the weighted number of citations received by a series of publications; the weighted citation score depends on the field of knowledge and the prestige of the cited periodical); 3) SNIP (source-normalized citation rate of an article, which characterizes the number of citations actually received relative to the expected number for the field of knowledge of the series of publications).

Table 3. Top-5 journals with the largest number of publications on the selected research topic, indexed in the international scientometric database Scopus

Journal Title	Indexing Period	Publisher	Field of Knowledge	Cite Score 2023	SJR 2023	SNIP 2023	Number of Articles
Lecture Notes in Networks and Systems	from 2016 to 2025	Springer Nature	Computer Science, Engineering	0.9	0.171	0.282	2
Advances in Natural and Technological Hazards Research	2005, 2007, from 2009 to 2011, from 2013 to 2019, from 2023 to 2024	Springer Nature	Environmental Science, Social Sciences, Earth and Planetary Sciences	0.1	0.124 (2018)	0.000 (2018)	1
Biometeorology	2021, 2024	Springer Nature	Environmental Science, Social Sciences, Earth and Planetary Sciences	-	-	-	1
Chemical Engineering Transactions	from 2009 to 2025	Italian Association of Chemical Engineering – AIDIC	Chemical Engineering	1.4	0.258	0.420	1
Construction and Building Materials	from 1987 to 2025	Elsevier	Engineering, Materials Science	13.8	1.999	2.110	1

Source: compiled based on the international scientometric database Scopus.

Among universities, scientific institutions and think tanks whose researchers have studied the impact of infrastructure threats on the resilience of the quality of life, the leading position is occupied by University Politehnica of Bucharest, The University of Hong Kong, Purdue University, University College London, Virginia Polytechnic Institute and State University, National Center for Research on Earthquake Engineering Taiwan, The Bartlett Faculty of the Built Environment, Virginia Tech College of Engineering, Cascadia Consulting Group, Quinault Management Center. Based on the results of the analysis of the coincidences and closeness of the relationship between the keywords of the selected sample of publications (84 documents), network visualization maps were constructed (*Figure 2* and *Figure 3*), and 3 clusters on the studied topic were identified and characterized (*Figure 2*).

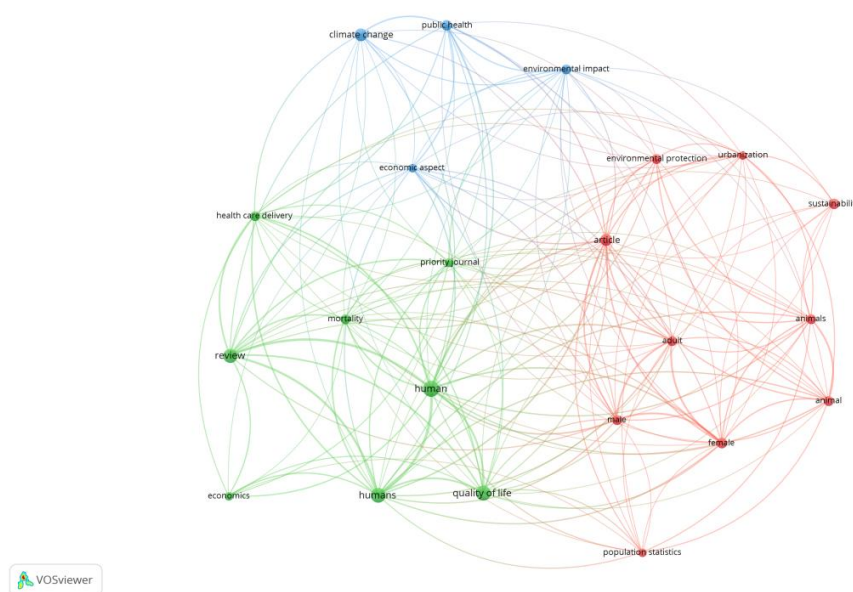


Figure 2. Map visualization of bibliometric analysis of publications devoted to issues of population's quality of life and infrastructure threats (content aspect)

Source: built on the basis of data from the Scopus scientometrics database using the VOSviewer program.

The first cluster (red colour) contains the largest number of terms (namely 10 items), among which the following can be mentioned: sustainability, environmental protection, population statistics, urbanization. Separately, it is worth noting the keyword "Sustainability", the frequency of joint use of which in the studied sample is 7, and the strength of the connection is 11.

The second cluster (8 concepts, green colour) combines such terms as economics, human, quality of life. In this cluster, the keyword "Quality of Life" has the highest frequency – the ratio is 14, while the strength of the association is 44.

The third cluster (4 elements, blue colour) describes the relationship between infrastructure threats and quality of life with the following terms: climate change, economic aspect, environmental impact. The main keyword in this cluster is "Climate Change", the frequency of its co-use in the studied sample of scientific publications is 11, and the strength of the association is 20.

Thus, based on the constructed terminological map of categories and the highlighted most significant keywords related to the issues of ensuring the quality of life of the population under the influence of infrastructure threats, it can be stated about the multidimensionality and cross-dependence of the studied areas, since there are numerous connections between the terms, as well as their high prevalence in research.

According to the results of bibliometric analysis in the evolutionary and temporal dimension, it can be stated that in the development of scientific research on the outlined topic, 5 most significant stages can be distinguished (*Figure 3*).

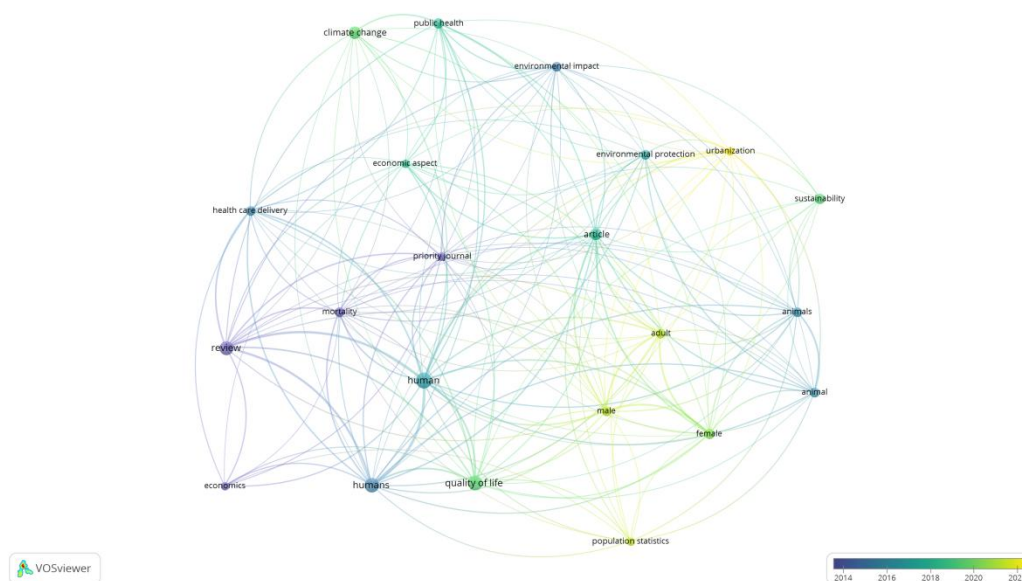


Figure 3. Map visualization of bibliometric analysis of publications that trace the relationship between infrastructure threats and the quality of life of the population (evolutionary and temporal aspects)

Source: built on the basis of data from the Scopus scientometrics database using the VOSviewer program.

The first stage of development was observed until 2014, when most publications considered economic and environmental issues. At the second stage, which lasted from 2014 to 2016, the focus of scientists' research shifted to various aspects of the development of society.

From 2016 to 2018, that is, at the third of the selected stage, the dominant key terms were “public health”, “economic aspect”, “environmental protection”. The fourth stage (from 2018 to 2020) is characterized by the predominance of the terms – quality of life, sustainability.

The last, fifth stage began from 2020 to 2022. According to the results of its analysis, it can be stated that the main areas of research are devoted to the current issues of urbanization and its impact on the quality of life of different segments of the population.

Thus, summing up the above, we can trace a change in emphasis in scientific publications, caused by the socio-economic development of society, prevalent in the first – third stages, to the sustainable development of the national economy of the countries of the world and the formation of sustainable infrastructure systems in the fourth – fifth stages.

3. Conclusions.

Based on the purpose and results of the study, we can conclude that there is a high level of closeness of the relationship between the concepts of “Infrastructure Threats” or “Infrastructural Threats” and “Resilience” and “Population’s Quality of Life”. This article carries out a bibliometric analysis of scientific publications indexed in the international scientometric database Scopus, which highlight various aspects of ensuring the resilience of the quality of life of the population in conditions of infrastructure threats. This analysis made it possible to identify current trends in publication activity on the selected research topic. Using the VOSviewer software, network visualization maps of key word matches of publications indexed by the international scientometric database Scopus from 1994 to 2025 were created.

According to the content correspondence of the keywords of the studied sample, three clusters were identified and described, and the presence of five most significant stages of the development of

scientific research dedicated to identifying the relationship between infrastructure threats and the resilience of the quality of life of the population was established.

This, in turn, provides an opportunity to expand theoretical knowledge on the infrastructural structure of resilience of the quality of life of the population as an object of economic research. In addition, it also gives impetus to the development of a modern methodology for the formation and implementation of a sustainable development strategy.

In addition, it is worth noting that despite the challenges and threats, the Ukrainian economy has a strong potential for qualitative growth and ensuring resilience of the quality of life of the population as a result of the reconstruction and modernization of strategically important infrastructure facilities, as well as their adaptation to new operating conditions.

As noted in the study "Assessment of the Impact of War on People", prepared by UNDP in Ukraine (2023), IMPACT Initiatives and the Center for Sustainable Peace and Democratic Development, it is advisable to adapt recovery measures focused on changes in the needs of the remaining population and the population returning to their places of residence. It will be important to take into account the new needs of the population and determine priorities for innovative solutions and alternative service delivery models that can improve the ability of the infrastructure to meet these need (UNDP Ukraine, 2023).

According to scientists from the M. Ptukha Institute of Demography and Quality of Life Research of the NAS of Ukraine (Cherenko et al., 2023), the sustainable growth of population incomes and their purchasing power can become the basis for the formation of a fundamentally new model, the key elements of which are better housing conditions and accessibility; developed infrastructure of settlements (primarily social, transport, information and communication), etc.

At the same time, for the post-war restoration and modernization of infrastructure, it is necessary to attract investment resources and form various models of partnership with international donor and financial organizations. According to the Ministry of Infrastructure of Ukraine, by 2030 the volume of investments in infrastructure development will amount to 20-25 billion dollars. And half of the investment volume should come from private investors (Tymoshenko, 2021).

In this regard, it is advisable to further develop public-private partnership. As shown by the results of the survey to determine the status and assess the needs in the field of public investment at all levels of government, conducted from October 11 to 27, 2023 by the NGO "Civil Society Institute" within the framework of the project "Support for the formation of effective regional policy in the context of Ukraine's European integration and military challenges" (Fedyuk, 2023), the following are among the most important problematic issues that require immediate response:

- the distribution of investments in infrastructure is carried out mostly manually, that is, there is no openness, transparency, justification, selection criteria; this, in turn, leads to manifestations of corruption and bribery;
- the use of the public-private partnership instrument is not used due to the war.

However, it should also be noted about the positive aspects and attempts to intensify the process of investing in infrastructure development during the war period. Thus, according to the results of the annual industry survey "Infrastructure Index 2024", conducted by the European Business Association together with the law firms "Arzinger" and "Sayenko Kharenko", it was found that in 2024, 59% of transport companies invested in infrastructure development. The vast majority of investments were directed at the modernization of existing facilities (59% of companies), new capacities and infrastructure (44%), and the acquisition of ready-made facilities (16%).

At the same time, in 2024, companies mostly raised their own funds (79% of companies) and debt financing (30%). Only 9% of companies attracted grant financing for investments. Among the sources of financing, foreign investments accounted for 39%, Ukrainian ones – 61%.

A significant part of businesses (53% of companies) reported direct losses as a result of hostilities. At the same time, almost half of them assessed these losses as significant. However, 41% of companies have already restored damaged infrastructure facilities, and 25% plan to deal with

restoration issues in the near future or after the war (this is 28%). Only 6% note that restoration is impossible or impractical (European Business Association, 2024).

According to business, the state should focus on providing affordable risk insurance for investors, implementing the PPP mechanism, adopting a draft law on railway transport, as well as on targeted support for the restoration of damaged terminals and infrastructure.

In addition, the survey revealed that in 2025, 67% of transport companies plan to invest in business development and infrastructure facilities. That is, there is a positive trend for further development (European Business Association, 2024).

Therefore, active work to attract the necessary amount of investment will contribute to accelerating the country's economic growth, rebuilding infrastructure facilities in strategic sectors, and ensuring the resilience of the quality of life of the population. In further research, it is planned to identify infrastructure threats to ensure the resilience of the quality of life of the population in Ukraine.

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FOSTERING CREATIVITY IN ACADEMIC ENVIRONMENT THROUGH STRATEGIES AND IMPLICATIONS FOR THE REPUBLIC OF MOLDOVA

DOI: <https://doi.org/10.53486/dri2025.73>

UDC: 159.954.4:378.147(478)

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Abstract. *In the world where the rapid innovation and complex global challenges become more and more important every day, the ability to think creatively, to think critically is an imperative relevant need. This article explores the crucial role that academic institutions play in nurturing creativity among students and examines the context of the Republic of Moldova, where traditional educational practices still have an important role and can limit innovative thinking, meanwhile fostering creativity within academic environments becomes essential for preparing students to face life and jobs markets' challenges.*

By defining the concept of creativity within the academic frame, the article identifies the barriers in the Moldovan academic system, such as rigid curricula and traditional teaching methods, that very often may postpone the development of the innovations. The article then presents strategies and approaches designed to foster a more creative educational environment. These include implementing interdisciplinary courses, promoting project-based and collaborative learning, integrating technology to enhance creative concepts and initiatives, and reforming assessment methods to value originality and critical thinking. The article highlights the importance of cultivating the principles and paradigm that empowers students and provides faculties with the necessary training to support creative drive through creative component in the frame of the policies in the sector. It concludes by urging policy makers, institutions and educators to adopt these strategies to cultivate creative innovative thinkers prepared to address the demands of the future.

Keywords: *creativity, academia, innovation, interdisciplinary courses, educational reform*

1. Introduction

Creativity enhances problem-solving capabilities and drives innovation, fosters adaptability, making it crucial for personal and professional success. In the realm of academia, nurturing creativity is not just beneficial but necessary to prepare students for the complexities of the modern world.

Traditionally, educational systems around the world, including the one in the Republic of Moldova, have emphasized rote learning, standardized testing, and rigid curricula. This focus often stifles creative thinking, as students are encouraged to prioritize memorization and reporting over innovation. In Moldova, the legacy of such educational practices poses a challenge to fostering an environment where creativity can flourish.

Globally, there is a significant shift toward recognizing and integrating creativity in educational frameworks and reforms. By incorporating creativity component, aligned with the international trends through learning, critical thinking, and collaboration, Moldova initiates development and implementation of reforms in this context.

By fostering creativity, the academic institutions can better prepare students for diverse career paths, encouraging and considering strategic means to ensure the skills needed to navigate and lead in a dynamic world, as the job market changes and demands consider a more substantial necessity for creative thinkers who can adapt to new challenges increases. For this, the reforms targeted by the Moldova government, especially the ministries of economy and culture, under which the responsibility for creativity drives are nowadays, will continue to facilitate the prioritization of creativity in teaching and learning. By doing so, academic institutions will create a generation of innovative leaders that will be able to face the future changes and challenges.

The framework of the paper introduces a novel significant approach, the support of creative intent through the purposeful integration of technology, considering that even highly experienced teachers require sustained support in implementing creativity assessment and embedding technology-driven

creative practices within the constraints of regular curricular structures. Furthermore, the research states the relevance and the need to assist educators in achieving more advanced levels of technological integration, ensuring that creative potential is not only nurtured but meaningfully realized across diverse educational contexts. [18, 4].

2. Literature Review

The significance of creativity in education has increasingly gained scholarly attention, particularly within the context of digital transformation and evolving pedagogical practices. Creativity is now widely recognized not only as a desirable educational outcome but also as a strategic pedagogical tool that nurtures students' innovative thinking and encourages the expression of imaginative ideas [10]

Empirical studies have demonstrated the multifaceted benefits of fostering creativity in students. Zhang et al. (2024) highlight its role in enhancing motivation, promoting professional skills, facilitating higher-order thinking, encouraging collaborative problem-solving, and managing cognitive load. [17] Niclòs et al. (2024) emphasize the growing need for educators to develop their own creative capacities to effectively inspire students. [13] This aligns with findings from Tong (2024), who underscores creativity's dual function as both an instructional strategy and a key educational goal. [15]

International frameworks such as OECD Education 2030 and the United Nations Agenda 2030 further emphasize the relevance of creativity. These frameworks advocate for the integration of creative competencies alongside critical thinking and problem-solving to prepare learners for the challenges of the 21st century. [10]

Recent developments in generative artificial intelligence (GenAI), such as ChatGPT and Midjourney, are beginning to influence educational practices. Chiu (2024) notes that while GenAI shows promise in supporting teacher professional development, by offering innovative teaching ideas and instructional feedback, it currently falls short in adapting real-time teaching strategies. Nevertheless, the integration of AI into teaching, learning, assessment, and administration is reshaping educational practices and warrants further exploration. [7]

Complementing these findings, the systematic review by Samaniego et al. (2024) identifies originality, fluency, flexibility, and elaboration as core creative skills in art and design education. Their research highlights practical methodologies such as project-based learning, STEAM integration, and interdisciplinary approaches as particularly effective in fostering a participatory learning environment. These methods encourage collaboration, critical thinking, and hands-on experimentation, aligning with the broader educational goal of equipping learners with 21st-century competencies. [14]

Further support for interdisciplinary and artistic approaches comes from Bizoi & Bizoi (2024), who explored the intersection of creativity and economics education. Their study found that creative drawing exercises not only deepened students' engagement with economic concepts but also enhanced their confidence and innovative thinking. These results underscore the value of integrating artistic methods into traditionally analytical disciplines. [5]

From a policy perspective, institutional and governmental support for creative education is gaining traction. As reviewed by Astri & Farida (2024), various national and international initiatives, such as Indonesia's "Merdeka Belajar – Kampus Merdeka" (MBKM) curriculum and the European University Association's Creativity in Higher Education Project, underscore the global recognition of creativity as a core educational objective. These programs aim to provide student-centered, experiential learning environments that better prepare students for an unpredictable and innovation-driven labor market. [2]

Moreover, the rising demand for creativity in the job market, as highlighted by IBM (2010), PwC (2017), LinkedIn (Petrone, 2018), and the World Economic Forum (2020), further reinforces the importance of embedding creative thinking into higher education outcomes. Universities are

increasingly expected to produce graduates who are not only knowledgeable but also adaptable, innovative, and capable of addressing complex societal and economic challenges. [2]

Lecturers play a critical role in this ecosystem. Their ability to foster creative learning environments and meaningfully engage students directly influences the development of creative competencies. However, as noted in the article by Astri & Farida (2024), the conceptualization of creativity among educators remains diverse, indicating a need for more unified theoretical and methodological frameworks to guide future research and practice. [2]

Another significant dimension in the development of creative competencies in education is the integration of sustainability and innovation, as demonstrated by Kurt and Aschauer (2024) in their exploration of the Innovative FOCUS program. This initiative merges education for sustainable development (ESD) with creativity, problem-solving, and critical thinking. By embedding competencies such as systems thinking, anticipatory thinking, strategic action, and cooperation into educational contexts, the program enables students to become proactive agents of change. Its emphasis on divergent thinking, metacognition, team collaboration, and the use of creativity tools reflects a holistic approach that resonates with broader 21st-century educational goals. [11]

At the national policy level, Moldova's "Creative Moldova" program (Government Decision No. 187, 2024) exemplifies a strategic commitment to fostering creativity within institutional frameworks. One of its primary educational objectives is the enhancement of creative and entrepreneurial skills through curriculum reform, STEAM integration, and the establishment of centers of excellence. This illustrates a broader recognition of the creative industries' contribution to both educational reform and socio-economic development. The program underscores the importance of infrastructure, investment, and digital transformation as catalysts for systemic creativity. [17]

Creativity is also increasingly acknowledged as a cornerstone of entrepreneurship education. Muhammad, Rao, and Akram (2024) emphasize that perceived entrepreneurial thinking, rooted in creativity, opportunity recognition, risk-taking, and ambiguity tolerance, is essential for cultivating entrepreneurial intent. Their findings highlight the necessity of creating supportive environments in higher education that empower faculty and students alike to develop innovative capacities. However, institutional constraints can hinder these ambitions, underlining the need for a more enabling entrepreneurial ecosystem within academic settings. [12]

In parallel, the role of generative artificial intelligence (AI) in fostering creativity is rapidly evolving. AlAli and Wardat (2024) provide a comprehensive overview of the dual potential and challenges of AI integration in education. While tools like ChatGPT can personalize learning and enhance creative thinking, their use also raises concerns around ethics, privacy, and bias. The authors advocate for inclusive, human-centered design principles and sustained professional development for educators. As emphasized by Halaweh (2023), responsible AI implementation involves equipping students with critical digital literacy skills, such as evaluating AI outputs, conducting reverse searches, and generating original ideas in conjunction with AI assistance. These practices can foster deeper understanding and creative reflection, while also aligning with broader educational integrity standards. [1, 8]

Technology-enhanced creativity is further examined in Bereczki and Kárpáti's (2021) case study, which reveals that expert teachers' epistemic beliefs about creativity significantly shape their classroom practices. Their research emphasizes the importance of professional support for teachers in both creativity assessment and effective technology integration. The proposed classroom-grounded framework for fostering digital creativity provides practical guidance for bridging theory and instructional practice. Importantly, the study also points to the need for systemic change that accommodates creativity within standard curricula and assessment timelines. [4]

Lastly, the connection between mindfulness and creativity has emerged as an important area of inquiry. Henriksen, Richardson, and Shack (2020) argue that mindfulness practices—such as deliberate mind-wandering and reflective awareness—can foster cognitive conditions conducive to creativity. Their review identifies mindfulness as a potentially powerful educational tool that supports

not only creative thinking but also student wellbeing and emotional regulation. Purposeful inclusion of mindfulness in educational settings may thus serve as a complementary strategy for nurturing creativity across disciplines. [9]

3. Methodology

The methodology of the present article provides the approach to analyzing educational practices on the component of the creativity for the academic institutions for Moldova case. The qualitative data collection and analysis considerations targets the article's aims to the insights that can impact strategies and implications for fostering creativity in the Moldovan academic environment. The conclusions and recommendations will contribute to a deeper understanding of the eventual reforms in the sphere of promoting creativity advantages through creative and critical thinking skills.

4. Challenges in Moldova's Academic System Concerning Encouraging Creativity

The academic system in Moldova faces diverse challenges that limits the promotin and encouraging of creativity in the academic environment. These challenges have deep roots in educational practices, cultural and socio-economic factors.

Among the significant challenges is the rigid nature of the national curriculum, which often prioritizes rote learning and memorization over critical thinking and creative abilities of the pupils and students. Traditional teaching methods influence the ability of the students and the flexibility of the academic institutions to adapt instructions to the diverse learning needs of students. This approach not only discourages creative thinking but also diminishes students' motivation to engage deeply with the material. [3]

Moldova's academic institutions often compartmentalize subjects, resulting in a lack of interdisciplinary learning opportunities. This segmentation restricts students from drawing connections between different fields of study, which is essential for fostering creative thinking. Interdisciplinary projects can spark innovative ideas by encouraging students to approach problems from various perspectives and integrate knowledge across disciplines. The absence of such collaborative learning opportunities within Moldova's educational framework limits the development of holistic and creative thinkers. [3]

Educators in Moldova frequently lack access to ongoing professional development and training focused on creative pedagogical techniques. Many teachers are not equipped with the skills necessary to cultivate creativity in the classroom or to implement new teaching methodologies effectively. Without proper training and support, educators may feel discouraged or unable to experiment with innovative practices, further perpetuating a cycle of traditional teaching methods.

Socio-economic factors also play a crucial role in shaping the academic environment. Limited funding for educational institutions restricts resources for materials, technology, and extracurricular activities that promote creativity. Schools often struggle to provide modern tools and environments conducive to innovative learning. Additionally, students from disadvantaged backgrounds may face obstacles that hinder their engagement in creative learning experiences, such as a lack of access to enriching programs outside regular school hours. [6]

The research and innovation system in the Republic of Moldova faces a number of persistent and systemic challenges that hinder its development and international competitiveness. Low salaries and talent retention: remuneration in the research sector remains significantly below the national average and even lower than salaries in higher education teaching positions. This lack of financial attractiveness discourages researchers, particularly experienced professionals, from pursuing or continuing careers in Moldovan research institutions.

Outdated infrastructure and limited equipment: many research institutions are burdened with outdated infrastructure and lack access to the necessary equipment for conducting high-quality, performance-driven research. This creates a substantial barrier to experimental research and limits the scope of potential scientific inquiry.

Perception of research as execution, not creation: there persists a traditional view of research as an activity of execution, often carried out in response to a "state order," rather than as a creative and autonomous endeavor. Researchers are frequently perceived as implementers rather than innovators. In contrast, within OECD countries, creativity is a fundamental component of research, and the freedom of scientific inquiry is enshrined as a core academic right (Article 13 of the Charter of Fundamental Rights of the European Union). [19]

Limited institutionalization of research in undergraduate and master's education. Research activities are not fully integrated into the first and second cycles of higher education. They typically emerge only during thesis development, limiting the continuity and depth of student engagement in research. Insufficient public funding: the level of public investment in research and innovation remains critically low, just 0.23% of GDP, thereby constraining the system's capacity for growth and modernization. Restricted access to competitive grants, as researchers face limited access to funding for investigator-initiated projects. This restriction not only hampers academic freedom but also reduces the system's appeal to highly creative researchers who thrive on autonomy and intellectual exploration. [18]

Inability to invest in research infrastructure. In some fields, the infrastructure is so underdeveloped that entire directions of experimental research become unattainable. This deters participation from broad segments of the scientific community and reduces Moldova's overall research potential. [18]

Demographic decline and high emigration rates: Moldova is experiencing a demographic contraction, compounded by high levels of emigration, particularly among young people. These trends have resulted in a noticeable decline in student enrollment across the higher education sector. [18]

Lack of reliable data on private sector research: the private research sector remains underdeveloped and insufficiently documented. No official statistics or reliable data are available, despite the strategic necessity of positioning the private sector as a principal actor in innovation. [18]

Absence from international statistical frameworks: Moldova is largely absent from key international statistical databases and rankings, including those relating to triadic patent families (OECD), global university rankings, and the European Innovation Scoreboard. This is often due to non-quantifiable outputs or the failure to report data to relevant international bodies. [18]

Limited administrative capacity for policy implementation: institutions responsible for the development and implementation of research and innovation policy often face staffing shortages and lack the financial resources necessary to expand their administrative capacity or to outsource technical functions. [18]

5. Proposed Strategies for Enhancing Creativity for Academia

To foster creativity effectively for the academia in Moldova, several strategic approaches can be implemented. These strategies draw upon contemporary educational practices that emphasize interdisciplinary collaboration, project-based and experiential learning, technology integration, and comprehensive educator training and development. Each of these elements will contribute with cultivating a culture of creativity and innovation among students.

Interdisciplinary collaboration involves integrating knowledge and skills from various subject areas to address complex problems or projects. This strategy is essential for promoting creativity, as it encourages students to think beyond the confines of traditional subjects and develop a holistic understanding of issues.

The integration of the technology into the curriculum provides new avenues for creativity. Digital tools and platforms enable students to collaborate, create, and innovate in ways that were previously unattainable. By utilizing technology, educators can enhance the learning experience and encourage creative expression.

To effectively foster creativity in the classroom, educators themselves must be equipped with the knowledge, skills, and strategies necessary to implement innovative teaching practices. Ongoing

professional development is crucial in ensuring that teachers can cultivate a creative learning environment. Educators play a vital role in modeling creative thinking and providing opportunities for students to engage in creative endeavors. However, many teachers may not have received training in innovative pedagogies, which can limit their effectiveness in fostering creativity. [17, 18]

Professional development programs should focus on equipping educators with tools and techniques for promoting creativity, such as interdisciplinary teaching methods, project-based learning strategies, and the effective use of technology. Workshops, mentorship programs, and collaborative learning communities can support educators in continually developing their practice and sharing best practices. [17, 18]

8. Discussion

This chapter delves into the interpretation of findings related to the strategies for fostering creativity in Moldova's academic environment. By analyzing the data and documents, we can better understand the implications of these strategies, the challenges they might face, and how they can be approached. A strong consensus among stakeholders, including educators, students, and policymakers, on the importance of fostering creativity within the academic setting was considered. The key aspects are to be highlighted:

- Interdisciplinary collaboration towards a widespread recognition of the value of interdisciplinary approaches in promoting creativity. Projects that integrate multiple subjects not only engage students but also encourage them to apply knowledge in inventive ways.
- Project-based and experiential learning significantly enhances student engagement and retention of knowledge. Improved problem-solving skills and creativity when tasked with real-world projects are to be emphasized.
- The focus on incorporating technology into the curriculum appears to resonate positively with both educators and students, as digital tools facilitate collaboration and creativity, making learning more accessible and dynamic. However, there are concerns about the readiness of both institutions and teachers to effectively implement these technologies.
- The need for continuous professional development and capacity building for educators.

9. Conclusions

In conclusion, the existing literature underscores the importance of creativity in academia, identifies barriers to its cultivation, and provides valuable strategies for promoting creative thinking among students. As educational institutions increasingly recognize the necessity of creativity for the future workforce, there is a growing imperative to implement strategies that effectively foster this essential skill.

The reviewed literature also converges on the notion that creativity is indispensable in contemporary education and academia life. Whether through digital tools, psychological theories, interdisciplinary methodologies, or supportive policy environments, fostering creativity is essential for preparing learners to thrive in a dynamic, complex, and increasingly creative economy.

The current challenges in Moldova's academic system present significant barriers to fostering creativity among students. Addressing these issues requires a comprehensive approach that includes revising curricula, promoting interdisciplinary learning, providing professional development for educators, and enhancing collaboration with industry. By recognizing and tackling these challenges, Moldova can create an academic environment that nurtures innovative thinkers capable of contributing meaningfully to society and the global economy.

Implementing these strategies, interdisciplinary collaboration, project-based and experiential learning, technology integration, and educator training, can significantly enhance creativity within the academic environment in Moldova. By fostering a culture that encourages innovative thinking and problem-solving, educational institutions can prepare students to thrive in an increasingly complex and dynamic world. [17, 18]

The discussion highlights the significance of fostering creativity within Moldova's academic environment while acknowledging the challenges inherent in this process. By interpreting the findings through the lens of stakeholder perspectives, it becomes clear that while there is a robust desire for change, careful attention must be paid to potential obstacles. Addressing these challenges through strategic planning, resource allocation, and cultural transformation will be crucial in successfully cultivating a more innovative and creative academic landscape in Moldova. [17, 18]

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THE BALANCE BETWEEN PUBLIC INTERESTS AND THE AUTONOMY OF THE INSTITUTION OF INTERNATIONAL COMMERCIAL ARBITRATION

DOI: <https://doi.org/10.53486/dri2025.74>

UDC: 341.63+347.918(478)

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Abstract: *The international commercial arbitration system has evolved to offer a flexible, neutral, and efficient method of resolving cross-border commercial disputes. However, the increasing autonomy of arbitration institutions has raised concerns about balancing this autonomy with the preservation of public interest. This paper analyzes the role of state supervision, and the tension between private and public interests in international legal relations. The research draws on comparative legal analysis of European and international practices, case studies from civil and common law jurisdictions, and doctrinal developments from both East and West. Findings show that international arbitration promotes efficiency and neutrality, it also challenges traditional legal safeguards. The paper proposes a balanced model where institutional autonomy coexists with core public interest protections.*

Key words: *arbitration, public interest, international law, autonomy, lex mercatoria.*

JEL: K10, K20

1. Introduction

International commercial arbitration (ICA) has gained a central role in resolving international business disputes due to its flexibility, confidentiality, and enforceability. However, the increased autonomy of arbitral tribunals, particularly under the concept of delocalization, has sparked a debate regarding the limits of this autonomy when confronted with imperatives of public interest, such as legality, transparency, and enforceability. The purpose of this article is to assess how states, arbitral institutions, and international instruments manage the tension between arbitral independence and societal expectations⁴.

2. Basic content

2.1 Theoretical foundations of arbitral autonomy and delocalization

The doctrine of delocalization, primarily developed in France and supported by scholars like Berthold Goldman and Emmanuel Gaillard, posits that arbitration should be viewed as an autonomous legal order, disconnected from national systems. Goldman observed that, "the arbitration system increasingly seeks to function beyond the confines of the territorial legal orders, toward a supranational community governed by transnational norms."⁵ Gaillard emphasized that arbitral autonomy stems not from national endorsement, but from the mutual consent of parties bound by commercial custom and procedural neutrality.

This theory encourages the application of transnational principles such as *lex mercatoria*. The principle is reflected in the UNCITRAL Model Law and supported by arbitral rules of ICC, LCIA, and SIAC. Delocalization enhances neutrality and global accessibility, yet limits judicial control.

⁴ Gaillard, E. (2010). *Legal Theory of International Arbitration*. Leiden: Martinus Nijhoff.

⁵ Astakhova, D.O., 2019. *Tendentsiya delokalizatsii mezhdunarodnogo kommercheskogo arbitrazha*. MGIMO, p. 28.

2.2 Public interest and the role of the state

Despite the private nature of arbitration, states retain an interest in overseeing proceedings to ensure compliance with fundamental legal norms, particularly in regard to due process, public policy, and access to justice. National courts often assert this interest during the annulment or enforcement of arbitral awards. In jurisdictions such as France and Switzerland, courts have shown a restrained approach, promoting arbitral freedom. For example, in the landmark case of *Putrabali v. Rena*, the French Cour de Cassation refused to annul an arbitral award solely based on foreign procedural irregularities, emphasizing the "autonomous character" of the arbitral award.⁶

Conversely, in jurisdictions like Russia, courts often refuse enforcement based on broad interpretations of public policy. Astakhova (2019) noted that "such national resistance constitutes a barrier to the modernization and acceptance of the autonomous arbitration paradigm."⁷

2.3 Comparative analysis of arbitration regimes

The legislation of civil law countries such as France (Code of Civil Procedure) and Switzerland (PILA) accommodates delocalization, allowing foreign elements to be present without forfeiting enforceability. In Switzerland, PILA Article 176 provides that an arbitral tribunal can operate independently from Swiss procedural norms when parties have foreign domicile. Similarly, in France, Article 1504 CCP grants tribunals the discretion to bypass French law if parties opt for international arbitration.

Common law systems like England, Singapore, and Hong Kong also support arbitration, though they emphasize procedural fairness. The Singapore High Court in **Malini Ventura v. Knight Capital** upheld the use of emergency arbitrators, reinforcing flexibility within the rule of law. Hong Kong's legal framework expressly adopts the 2006 UNCITRAL amendments, recognizing the enforceability of interim measures granted by arbitral tribunals.⁸

2.4 Institutional mechanisms and soft law

Arbitral institutions have developed internal safeguards to align with public interest. ICC, SIAC, and LCIA offer scrutiny mechanisms, rules on transparency, and emergency measures. The emergence of "soft law" instruments such as the IBA Guidelines on Conflicts of Interest and the Prague Rules also demonstrate efforts to self-regulate without undermining autonomy. These mechanisms build legitimacy and foster predictability.

2.5 Moldovan context and challenges

In Moldova, international arbitration is governed by the Law on International Commercial Arbitration (No. 23-XVI of 2008), closely aligned with the UNCITRAL Model Law. However, practical application is limited. Court enforcement of arbitral awards remains inconsistent, and there is no effective mechanism for interim measures, such as emergency arbitration.

Moreover, Moldova lacks a strong domestic arbitral institution with international reach. While the Chamber of Commerce maintains an arbitration center, it lacks the procedural flexibility and neutrality required by modern commerce.

Judicial training and legislative refinement are essential. Moldovan lawmakers should consider explicitly recognizing interim measures by arbitral tribunals and clarify the narrow application of public order exceptions, similar to reforms adopted in Singapore and France.

⁶ Cour de Cassation, 29 June 2007, case no. 05-18.053, *Putrabali v. Rena*

⁷ Astakhova, D.O., 2019. *Tendentsiya delokalizatsii mezhdunarodnogo kommercheskogo arbitrazha*. MGIMO, p. 105

⁸ UNCITRAL Model Law (2006), Article 17H

3. Conclusions

International commercial arbitration must navigate between two poles: complete autonomy and public accountability. Delocalization offers efficiency and neutrality but cannot completely override state interests. The future lies in a hybrid model—one that ensures arbitration remains a viable tool for international commerce while safeguarding fundamental values such as fairness, transparency, and access to justice.

The Moldovan legal system can enhance its attractiveness to international business by adopting best practices from France, Singapore, and Switzerland. Institutional reforms and legal certainty will support arbitration's function as a modern dispute resolution method and position Moldova competitively in regional arbitration markets.

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THEORETICAL AND PRACTICAL PERSPECTIVE OF THE DELOCALIZATION OF INTERNATIONAL COMMERCIAL ARBITRATION IN THE LEGISLATION OF SOME STATES

DOI: <https://doi.org/10.53486/dri2025.75>

UDC: 341.63(100)

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Abstract: *The concept of delocalization in international commercial arbitration refers to the reduction or elimination of the connection between arbitration and national legal systems, particularly the law of the seat. It allows the arbitral process to function more independently, supported by international conventions and the principle of party autonomy. This article explores the theoretical foundations and historical development of delocalization, with a comparative legal analysis of its application in the legal systems of France, Switzerland, England, Singapore, Hong Kong, and Russia. Drawing from doctrinal sources, case law, and academic critique, the paper examines both the advantages and limitations of delocalization and evaluates its practical implementation in different jurisdictions. The study contributes to the understanding of how different legal systems respond to the tension between autonomy and control in international arbitration.*

Key words: *arbitration, delocalization, international law, party autonomy, lex arbitri, state intervention, e-arbitration.*

JEL: K10, K20

1. Introduction

In the evolving framework of global commerce, international commercial arbitration has emerged as a central dispute resolution mechanism due to its flexibility, confidentiality, enforceability of awards, and the neutrality of forum. Arbitration offers businesses the advantage of selecting the applicable substantive and procedural laws, the venue, language, and even the arbitrators—enhancing predictability and control over dispute resolution processes.

Historically, arbitration was viewed through a territorial lens, governed primarily by the procedural law of the seat (*lex arbitri*). This model—often called the localization thesis—grants the state of the seat supervisory jurisdiction over various procedural elements of the arbitral process, including annulment and enforcement. However, with the increasing internationalization of trade, the suitability of strict territorial oversight has been questioned. The rise of multinational contracts, e-commerce, and decentralized digital platforms has necessitated a rethinking of arbitration as a transnational institution detached from the state-centric order.

The theory of delocalization, rooted in the jurisprudential ideas of Berthold Goldman, Jan Paulsson, and Emmanuel Gaillard, challenges the traditional notion that arbitration must be tethered to a legal seat. Instead, it proposes that arbitration can function as an autonomous legal order governed by international norms and party autonomy. This decoupling allows arbitration to remain adaptable in complex, cross-border contexts, where national procedural frameworks may conflict or introduce unwanted interference.

Yet, delocalization remains controversial. Critics argue that removing the anchor of national law may weaken legal certainty and reduce procedural safeguards. Courts may hesitate to enforce awards that appear detached from any recognized procedural framework. Despite these concerns, numerous jurisdictions—France and Switzerland foremost among them—have embraced variations of delocalization. Others, like Russia or even Moldova, remain skeptical, often citing public policy or the need for state oversight.

This paper addresses the theoretical underpinnings of delocalization and investigates how various legal systems have responded to its development. It analyzes the interaction between party autonomy and state sovereignty, explores the implications for e-arbitration and virtual tribunals, and surveys the principal doctrines, legislative texts, and jurisprudence shaping the global delocalization landscape. This paper addresses the theoretical underpinnings of delocalization and investigates how various legal systems have responded to its development. The analysis draws from both doctrinal perspectives and case studies from leading arbitration jurisdictions.

2. Basic content

2.1 Origins and Conceptual Developments

The delocalization theory was first systematically formulated in the 20th century by scholars such as Berthold Goldman, Jan Paulsson, and Emmanuel Gaillard. Paulsson's pluralist theory emphasized the legal independence of arbitral awards from the country of the seat. [6] Gaillard further advocated for a transnational legal order in arbitration, grounded in the autonomy of the parties.[4]

2.2 International Conventions and Model Law Support

The UNCITRAL Model Law and the New York Convention (1958) provide substantive ground for delocalization. Article 19(1) of the Model Law affirms the procedural autonomy of the parties,[8] allowing them to agree on rules independent from the domestic law of the seat. This is particularly crucial in contexts involving multiple jurisdictions or when the parties prefer institutional rules such as those of the ICC, LCIA, or SIAC.

The Model Law further reflects a global consensus on minimizing court intervention, as seen in Articles 5 and 34. Article 5 restricts court involvement to instances explicitly provided in the law, while Article 34 limits the grounds on which an award may be set aside, promoting finality and autonomy.

The New York Convention, a cornerstone of international arbitration, also supports delocalization. Article V(1)(d) permits recognition and enforcement of awards even when the arbitral procedure deviates from the procedural law of the seat, provided it conforms to the agreement of the parties. This provision enables arbitral proceedings to occur without strict adherence to *lex arbitri*, further reinforcing the delocalized character of the arbitral process [9].

Additionally, Article VII allows enforcement under more favorable national laws, opening the door to delocalized enforcement frameworks. Jurisdictions like France and the Netherlands have made use of this clause to enforce awards annulled at the seat.

Soft law instruments such as the UNCITRAL Notes on Organizing Arbitral Proceedings and the IBA Rules on the Taking of Evidence in International Arbitration complement this framework by offering transnational procedural standards that operate independently from national procedural law. These tools enhance predictability while respecting party autonomy.

Together, these international and soft law instruments form the normative backbone of delocalized arbitration, anchoring its legitimacy in the consensus of the international legal and business community.

3. Comparative Perspectives on National Practice

3.1 Western Jurisdictions: France and Switzerland

France and Switzerland are often considered pioneering jurisdictions in the evolution of delocalized arbitration. France, in particular, has embraced a robust form of delocalization since the 1980s. The French Code of Civil Procedure (Articles 1504–1527) explicitly distinguishes between domestic and international arbitration and supports the autonomy of international arbitration from the procedural law of the seat. In the landmark *Putrabali v. Rena* case, the French Court of Cassation upheld the enforcement of an award even though it had been set aside at the seat (Indonesia), reaffirming France's commitment to the international character of arbitral awards.[10]

This French approach is rooted in the belief that the international arbitral award is not a product of any particular legal order but an autonomous decision derived from the agreement between the parties. French courts have consistently maintained a non-interventionist stance and have shown deference to arbitral autonomy unless fundamental principles of international public order are violated. Switzerland also represents a pro-arbitration environment through its Private International Law Act (PILA), especially Article 176, which limits judicial review and allows foreign parties to opt out of Swiss procedural rules. Swiss jurisprudence supports the minimal intervention doctrine and emphasizes party autonomy and finality of awards. The Swiss Federal Tribunal has rarely annulled international arbitral awards, thus reinforcing Switzerland's status as a preferred seat for arbitration [11].

3.2 Asian Common Law Hybrids: Singapore and Hong Kong

Singapore and Hong Kong have developed reputations as arbitration hubs by combining the procedural rigour of common law with pro-arbitration policy frameworks. Singapore's International Arbitration Act (Cap. 143A) incorporates the UNCITRAL Model Law and allows extensive party control over the arbitration process. Courts in Singapore have generally respected the independence of tribunals. In *Malini Ventura v. Knight Capital*, the High Court upheld the tribunal's authority to grant emergency relief, emphasizing that procedural autonomy is central to party expectations in international arbitration.

Hong Kong's Arbitration Ordinance (Cap. 609) also implements the UNCITRAL Model Law. Its jurisprudence demonstrates a clear policy of non-intervention, with courts refusing to re-examine the merits of arbitral awards. The case of *X v. Jemmy Chien* (2013) exemplifies how Hong Kong courts defer to the procedural integrity of international arbitration even when awards conflict with domestic expectations.

Both jurisdictions have adopted liberal approaches toward interim measures and enforcement mechanisms, reflecting a practical and flexible attitude conducive to delocalized arbitration. They have also advanced frameworks for online and virtual hearings, recognizing the changing nature of transnational dispute resolution.

3.3 Resistance Models: Russia and Moldova

Unlike the jurisdictions above, Russia and Moldova reflect resistance to delocalization, primarily by upholding a strong connection between arbitration and state legal authority. As outlined in Astakhova's study (2019), Russian courts often annul or refuse enforcement of arbitral awards rendered abroad by invoking broad interpretations of public policy. The 2015 reform of Russian arbitration law re-centralized control under authorized arbitral institutions and discouraged party-driven models not pre-registered with state authorities.

In Moldova, Law No. 23-XVI (2008) reflects formal adoption of the UNCITRAL Model Law, but in practice, courts continue to rely on local procedural standards. For instance, enforcement of foreign awards has been hindered by judicial interpretations that equate Moldovan public order with procedural conformity. There is also limited domestic experience with institutional arbitration that operates independently of the judiciary.

Moreover, the Moldovan legal framework does not yet accommodate innovations such as emergency

arbitration or remote hearings. To promote delocalization, Moldova would need to adopt reforms similar to those of Singapore or Switzerland, including court training, clearer legislative guidance, and support for institutional independence.

3.2 Asian Common Law Hybrids: Singapore and Hong Kong

Singapore and Hong Kong are among the most arbitration-friendly jurisdictions. Singapore's Arbitration Act (Cap. 143A) embraces the UNCITRAL Model Law, permitting delocalized procedures subject to minimal court oversight. Hong Kong's Arbitration Ordinance (Cap. 609) echoes this principle, granting enforceability and support for party-chosen rules.[13]

3.3 Resistance Models: Russia and Moldova

In contrast, Russia and Moldova maintain stricter judicial scrutiny. As noted by Astakhova (2019), Russian courts often rely on public policy grounds to refuse enforcement of awards lacking a local procedural anchor.[1] Moldova's Law No. 23-XVI (2008) regarding arbitration aligns formally with UNCITRAL but courts remain interventionist.[15]

4. E-Arbitration and the Evolution of Seatless Arbitration

The development of e-arbitration has accelerated interest in seatless and virtual arbitral proceedings. As Ceil (2020) highlights, electronic arbitration defies traditional territorial constructs, allowing the entire proceeding to occur online without a defined physical seat.[3] This evolution is deeply connected with technological innovation, the rise of blockchain-based dispute resolution systems, and the increased use of decentralized platforms such as Modria, Kleros, and Aragon Court.

These platforms use smart contracts and distributed ledgers to initiate and administer arbitration, relying on algorithmically guided procedures and crowdsourced juror pools. The absence of a traditional seat raises substantial questions concerning applicable law, recognition of awards, and procedural fairness. Critics warn that without a physical or virtual legal anchor, such arbitral processes may face enforceability challenges, especially in jurisdictions requiring clear legal oversight mechanisms.

Nevertheless, the hybrid concept of "functional localization" proposed by Ceil seeks to resolve this tension. It recommends assigning a nominal legal seat—often based on the server location or institutional affiliation—for the sole purpose of fulfilling recognition requirements under the New York Convention.

In 2022, the IBA and UNCITRAL jointly launched initiatives exploring the regulatory challenges and benefits of e-arbitration, focusing on data security, cross-border enforceability, and procedural legitimacy. Reports from the ICC Commission on Arbitration and ADR further support the standardization of e-arbitration practices, including uniform guidelines on electronic filing, digital evidence, and secure communications.

In practice, institutions such as SIAC and the LCIA have adapted rapidly by revising their rules to explicitly allow for online hearings and remote deliberations. The COVID-19 pandemic further catalyzed this shift, solidifying the legitimacy of fully virtual proceedings. Arbitral awards issued in these settings have already been upheld by courts in jurisdictions like Singapore, the UK, and the Netherlands, provided that fundamental due process standards were met.

Thus, e-arbitration represents not only a procedural innovation but a structural realignment of arbitration's foundations. While full delocalization in cyberspace may not yet be universally accepted, the emergence of digitally native dispute resolution systems signals a transformation that challenges the supremacy of the territorial seat in international arbitration.

5. Jurisprudential Insights: Case Studies

5.1 *Mobil Cerro Negro v. PDVSA* (ICSID, 2008): The annulment proceedings exemplify challenges in public international arbitration when seat doctrine clashes with investor expectations.

5.2 *Essar Oilfields v. Norscot* (England, 2016): The English court upheld a tribunal's decision on third-party funding costs, despite absence of seat-based limitations—reflecting deference to institutional rules over domestic procedural principles.

5.3 *Econet v. Vee Networks* (Nigeria/UK, 2006): A tribunal seated in London issued an award despite Nigerian courts asserting jurisdiction, highlighting the tensions of seat-based oversight versus party autonomy.

6. Doctrinal Criticism and Practical Limits

Delocalization has been criticized for weakening procedural safeguards. According to Rodriguez Pulido (2025), delocalization without cooperation from national courts risks legal uncertainty in areas such as interim relief and award enforcement.[7] Saghir and Nyombi (2016) argue for a middle path, suggesting the creation of a transnational arbitral appellate body to standardize review without national court involvement.[5]

7. Recommendations and Conclusion

Delocalization represents an evolution toward a more autonomous and party-driven system of international arbitration. However, its full realization requires coherent policy responses from legislators, arbitral institutions, and the judiciary. To mitigate the risks of legal fragmentation and enforcement uncertainty, the following policy recommendations are proposed:

- **Codify functional seat frameworks:** Legislative reforms should recognize functional or nominal seats to bridge the gap between virtual arbitral practice and territorial legal requirements. This is particularly important in the context of e-arbitration, where blockchain-based or fully online procedures may lack traditional anchors.
- **Harmonize institutional rules:** Leading arbitral institutions should adopt harmonized model clauses and procedural templates that accommodate delocalized proceedings. For example, the ICC, SIAC, and LCIA could standardize rules that support optional seat designations, cross-border enforceability, and remote hearings.
- **Train national judiciaries:** Judges must be equipped to interpret and enforce awards arising from delocalized or virtual proceedings. This includes understanding the relevance of international conventions, soft law instruments, and the limits of public policy exceptions.
- **Promote multilateral cooperation:** The international legal community should encourage convergence through diplomatic and institutional cooperation. Instruments similar to the Hague Judgments Convention or the Singapore Convention on Mediation may inspire frameworks for recognition of delocalized awards.
- **Introduce appellate review mechanisms:** To address concerns over procedural legitimacy and coherence, the arbitration community should debate the merits of an optional transnational appellate arbitral body. This would provide a safeguard for parties and strengthen the rule of law in a seatless environment.

In conclusion, the trajectory of delocalization reflects the growing global trust in arbitration as an autonomous system that operates parallel to national legal orders. While complete detachment from the seat remains contentious, hybrid models—combining autonomy with limited, deferential judicial oversight—offer a promising way forward.

The long-term viability of delocalization depends not only on doctrinal acceptance, but also on practical enforceability, user confidence, and regulatory adaptability. As international arbitration continues to modernize, delocalization—if properly institutionalized—can become a cornerstone of transnational legal governance.

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Bun de tipar 17.06.2025
Coli de autor 50,60. Coli editoriale 50,70. Coli de tipar 75,50.
Comanda nr. 28.

Serviciul Editorial-Poligrafic
al Academiei de Studii Economice din Moldova
Chişinău, MD-2005, str. Bănulescu-Bodoni 59.
Tel.: 022-402-910