



VIII. International Applied Social Sciences Congress 2024 **FULL PAPER** **PROCEEDINGS BOOK**



L-Università
ta' Malta

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KENT KONSEYİ



SVEUČILIŠTE U RIJEČI UNIVERSITY OF RIJEKA
FAKULTET ZA MENADŽMENT U TURIZMU I UGOSTITELJSTVU
FACULTY OF TOURISM AND HOSPITALITY MANAGEMENT
ČIPATUA, HRIVATSKA CROATIA

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**VIII. INTERNATIONAL
APPLIED SOCIAL SCIENCES CONGRESS (C-IASOS 2024)
PROCEEDINGS BOOK**

02nd-05th October 2024

“Applicable Knowledge for a Sustainable Future”

Editor in Chief

Dr.Ercan ÖZEN

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Dr. Simon GRIMA

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VIII. International Applied Social Sciences Congress - (C-IASOS – 2024)
Peja –Kosovo, 02-05 October 2024

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FOREWORD

Dear participants, scholars and researchers

It is with immense pride and great enthusiasm that I welcome you to the 8th International Applied Social Sciences Congress (C-IASOS 2024), hosted by Haxhi Zeka University in the beautiful city of Peja, Kosovo. This prestigious congress is a testament to the collective efforts of scholars and researchers from around the world, united in their pursuit of advancing knowledge and fostering collaboration across disciplines.

The theme of this year's congress, "Managing Risks towards a Sustainable Future," is both timely and significant. It challenges us to explore innovative solutions to the pressing issues of our time, emphasizing the critical role of applied social sciences in addressing global risks and ensuring a sustainable future for all. Haxhi Zeka University is honored to serve as a platform for such vital discourse, bringing together minds that shape the future of our societies.

As the Rector of Haxhi Zeka University, I am delighted that this congress embodies the spirit of interdisciplinary collaboration and international partnership. Our partners—the University of Malta-FEMA, the University of Rijeka-Faculty of Tourism and Hospitality Management, and the Academy of Economic Studies of Moldova—exemplify the strength of academic networks in overcoming boundaries and enriching the scope of scientific exploration.

I extend my heartfelt gratitude to all authors, participants, and organizers who have contributed to this event. The diversity of perspectives, with contributions from over 40 countries, reflects the truly global nature of this congress. It is my hope that the discussions and insights shared here will not only contribute to the academic community but will also inspire tangible solutions to real-world challenges.

Let this Book stand as a record of the ideas, efforts, and aspirations that make C-IASOS 2024 a cornerstone for the advancement of applied social sciences. I wish you all fruitful discussions, enriching collaborations, and an unforgettable experience in Peja.

With warm regards,

Prof. Dr. Armand Krasniqi
Rector, Haxhi Zeka University

SUMMARY FOR CIASOS CONGRESS 2024

CiasoS Congress 2024 was held in Peja- Kosovo, at the Haxhi Zeka University as hybrid form during 02-05 October 2024 by CiasoS Science Platform which includes Malta University (Malta), Academy of Economic Studies of Moldova (ASEM) (Moldova), University of Rijeka - Faculty of Tourism and Hospitality Management (Croatia) and Haxhi Zeka University, Business Faculty (Kosovo), host University of CiasoS Congress 2024.

There are participants from 41 different countries at the congress as follows: Albania, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, China, Croatia, England, Georgia, Germany, Hungary, India, Indonesia, Iran, Italy, Kazakhstan, Kyrgyzstan, Kosovo, Latvia, Lithuania, Malaysia, Malta, Moldova, North Macedonia, Nigeria, Oman, Pakistan, Philippines, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, South Africa Republic, Spain, Switzerland, Türkiye, TRNC, Ukraine and USA.

37 of 158 papers were presented onsite form at the Haxhi Zeka University, Business Faculty while others were presented virtually. From 41 different countries about 250 authors contributed the CiasoS 2024. As we see detailed program of 2024 event, 28,48% of the all papers were presented by Turkish participants. 18,13% of the papers comes from India, 10,11% from Kosovo, 6,19% from Romania, 5,27% from Moldova, 3,70% from North Macedonia and other 28,02% of the papers were from other 35 countries.

The special topic of the CiasoS 2024 was “Managing Risks towards a Sustainable Future” thus there were two keynote speakers on the preliminary session on the line with the Congress topic. Session started by the welcome speech of Prof.Dr. Armand Krasniqi who is the rector of Haxhi Zeka University. Vice rector Prof.Ass.Dr Alma Shehu Lokaj and Prof.Dr. Halit Shabani who the dean of the Faculty of Business delivered speech on Haxhi Zeka University and Peja city.

First keynote speaker Prof.Dr.Ercan Özen talked on “*Sustainable Development in Turkish Insurance Sector.*” And, another keynote speaker Prof. Dr.Eleftherios Thalassinos presented his study titled “*Exploring the Relationship between Corporate Governance, Corporate Social Responsibility and Financial and Non-financial Reporting: A Study of Large Companies in Greece*”

The Congress committee held in 4 October 2024 Friday in Business Faculty for technical meeting. Finally the event ended by the social trip on Saturday, 05 October 2024.

CIASOS CONGRESS 2024 AWARDS

Award Name:VIII. C-iasoS Congress Science Award

Paper Title : On the influence of survival risk on forest valuation

Author/s : Dr. Thomas Burkhardt

Award Name:CiasoS Congress Thematic Award - Managing Risks
towards a Sustainable Future

Paper Title : The Economic Challenges of Natural Disaster Risk
Management: a Bibliometric Analysis

Author/s :Dr. LoredanaMirra & Dr. InnaRomānova

Award Name: Online Presentation Award- First Paper

Paper Title : ExploringtheDynamics of Export Quality,
EconomicGrowth, andCarbonEmissionsin Türkiye: An Advanced
CausalityandWaveletAnalysis

Author/s : Aslı Özen Atabey, Mustafa Karakuş& Sevilay Ece
GümüşÖzuyar

Award Name: Online Presentation Award- Scond Best Paper

Paper Title : Evaluation of the use and importance of green
logistics: implementation of eco-friendly solutions among green
warehouses in Poland -a practical dimension

Author/s : Robert Stanisławski

Award Name: Online Presentation Award- Third Best Paper

Paper Title :Evaluating Risks and Sustainability in the
Technological Transfer of Biofuel Optimization Software

Author/s : Ştefan-AlfredMariş, EvelynePop, Adriana Secoşan&
SiminaMaris

CIASOS Congress 2024 Full Program

02.10.2024 Wednesday

Welcome meeting: Business Faculty

03.10.2024 Thursday

PRELIMINARY SESSION

09:00- 10:00: Registration: **Amphitheater 1 (Faculty of Law)**

10:00-10:30: Welcome Note: **Prof..Dr. Armand Krasniqi** - Rector

Prof.Ass.Dr Alma Shehu Lokaj - Vice Rector for Teaching and Scientific Research

Prof.Dr. Halit Shabani - Dean of the Faculty of Business

10:30-12:00: Keynote Address **Prof..Dr. Ercan Özen**

Sustainable Development in Turkish Insurance Sector.

Prof Dr.Eleftherios Thalassinos

Exploring the Relationship between Corporate Governance, Corporate Social Responsibility and Financial and Non-financial Reporting: A Study of Large Companies in Greece

12:00-13:00: Lunch

13:00-17:30: Parallel Sessions- Face to Face- **Business Faculty** / Online – meet.google links

04 October 2024 Friday

09:00-12:45: Parallel Sessions- Face to Face- **Business Faculty** / Online – meet.google links

12:45-13:15: Technical Committee Meeting

13:15-14:00: Lunch

14:00-18:00: Local Trip (Guide: Prof.Asoc.Dr. Alberta Tahiri): City Museum, Istog-(School of Mehmet Akif Ersoi), Mountains of Rugova, the river of white wood.

20:00-23:00: Gala Dinner- **Hotel Dukagjini**

05 October 2024 Saturday

09:00-17:30: Full Day Trip, Starts in Peja, Stops in Prishtina.

PLENARIES

03 October 2024 Thursday 13:00 - 14:30

Hall A 5: Session Chair: Dr. Fisnik Morina- Kosovo

24-023- Loredana Mirra, Inna Romānova- Italy, Latvia

The Economic Challenges of Natural Disaster Risk Management: a Bibliometric Analysis

24-024-Thomas Burkhardt - Germany

On the influence of survival risk on forest valuation

24-075-Ibish Mazreku, Fitore Gashi, Simon Grima- Kosovo, Kosovo, Malta

The Influence of Risk Management on the Strategic Stability of the Insurance Industry in Kosovo: Navigating Market Fluctuations, Interest Rate Variability, and Economic Conditions

24-069 - Ali Erdogan, Ahmet Atakişi, Erdem Oncu, Onur Ustaoglu- Türkiye, Türkiye, Türkiye

Assessing TRNC Banks' Financial Strength and Risk Profiles: Insights from the Bankometer Method

Blue hall: Session Chair: Dr.Margarita Dunska- Latvia

24-008- Milian Neگوئیو – Romania

The Correlation between Education and the Objective Dimensions of the Quality of Life

24-037-Melike Gül, Bilge Villi – Türkiye, Türkiye

Determining University Students' Awareness Levels Regarding Ecological Literacy: Balıkesir University Example

24-145 - Fethi Kayalar, Filiz Kayalar - Türkiye, Türkiye

The Importance of Individual Differences in Language Learning

24-050-Viktorija Piščalkienė, Lijana Navickienė, Evelina Lamsodienė- Lithuania, Lithuania Lithuania

Expectations of teaching among neurotypical students and students with Attention Deficit Hyperactivity Disorder (ADHD), and Autism Spectrum Disorders (ASS): a comparative analysis

24-161- Driton Sylqa, Ylber Januzaj- Kosovo, Kosovo

Enhancing Organizational Performance Through Quality Information Systems

Hall A6: Session Chair: Dr. Sertaç Güngör - Türkiye

24-004-Sertaç Güngör- Türkiye

Investigation of Physical Activity and Social Interaction Behaviours in Elderly Individuals in the Case of Bosna Hersek Neighbourhood Parks

24-005-Sertaç Güngör- Türkiye

Investigation of Social Interaction Behaviours of Young Individuals Who Come to Parks to Use Bicycle and Skateboard: The Case of Konya Ihlamur Park

24-007-İsmail Fatih Ceyhan, Özden Karapolat- Türkiye, Türkiye

How Did The Pandemic Affect The Major Airline Companies? Comparing Two MCDM Methods

24-062-Elif Habip , Zehra Binnur Avunduk, Türkiye

The Place of Innovation in Blue Entrepreneurship

03 October 2024 Thursday 14:45 - 16:15

Hall A 5: Session Chair: Dr.Ibish Mazreku - Kosovo

24-150- Fisnik Morina, Arizona Mulaj, Besfort Ahmeti –Kosovo, Kosovo, Kosovo

The Impact of Corporate Social Reporting on the Company's Reputation in the Context of the Economy of Kosovo

24-059 -H. Gonca Diler, Münevvere Yıldız, Serap Vurur, Letife Özdemir- Türkiye, Türkiye, Türkiye, Türkiye

The Impact of Financial and Green Innovation on Green Economic Growth: An Empirical Study on OECD Countries

24-036-Valdrin Misiri, Liridona Nikqi, Leutrim Nikqi – Kosovo, Kosovo, Kosovo

The Impact of Inflation Expectations on Economic Behavior in Central European Countries: An Econometric Analysis (2012-2022)

24-122- Kadë Morina, Fisnik Morina- Kosovo, Kosovo

The impact of financial development on economic growth: Empirical analysis of European countries in transition

Blue hall: Session Chair: Dr. Thomas Burkhardt - Germany

24-127- Popa Marina, Plămădeală Olivia- Moldova, Austria

Risk Management of Talent' Migration and Diaspora Inclusion in the Republic of Moldova and Bosnia and Herzegovina

24-047- Zahir Arifovic, Hajrija Skrijelj – Kosovo, Kosovo

Legal regulations for the operation of national restaurants in the region and Kosovo

24-153- Arbër Krasniqi, Valdrin Misiri- North Macedonia, Kosovo

Military expenditure and its effect on economic growth in OECD countries: A panel data analysis

24-151- Arbër Çavdarbasha, Vjosa Hajdari- Kosovo, Kosovo

Digital Marketing: A Key Strategy for the Growth of Financial Institutions

Hall A 6: Session Chair: Dr. Macide Berna Çağlar, Türkiye

24-015 - Reyhan Can- Türkiye

The Effects of Loans Received from EBRD on the Financial Performance of Firms in Turkey

24-018-Reyhan Can, Saliha Tuncel Yada, Doğan Ali Koç – Türkiye, Türkiye, Türkiye

Research Trends in Decentralized Finance: Results of a Bibliometric Analysis

24-076- Gizem Esra Kızıl , Ufuk Selen- Türkiye, Türkiye

From Theory to Practice: The Role of Functional Public Expenditures in Realizing Capabilities in Türkiye

24-101- Kasım Kiracı, Mehmet Yaşar, Ahmet Zelka, Cemile Angay- Türkiye, Türkiye, Türkiye, Türkiye

Analysis of the Causality Relationship Between the Airline Index and the Dollar Index and Oil Prices

04 October 2024 Friday 09:30 - 11:00

Hall A 5: Session Chair: Dr.Inna Romanova- Latvia

24-116-- Margarita Dunska - Latvia

Foreign Trade Flows under Single Market Conditions

24-045 -Duresa Kilaj, Argjent Berisha, Fisnik Morina- Kosovo, Kosovo, Kosovo

Correlation Between Public Debt, Economic Growth and Private Consumption: An Econometric Analysis for Countries in Transition

24-108- Safete Hadergjonaj, Duresa Kilaj – Kosovo, Kosovo

The Economic Consequence of the Conflict in Ukraine for the Western Balkan Countries

24-146 -Arbër Krasniqi, Arta Krasniqi Markaj – North Macedonia, North Macedonia

Impact of Government Consumption on Economic Growth

Blue hall: Session Chair: Dr. Loredana Mirra- Italy

24-063- Zehra Binnur Avunduk, Elif Habip- Türkiye, Türkiye

The Mediating Role of Environmental Values in The Impact of Producer Reliability on a Sustainable Environment

24-126-Liridona Nikqi, Leutrim Nikqi , Fisnik Morina – Kosovo, Kosovo, Kosovo

The Impact of International Trade Agreements on Financial Flows and the Development of the Banking Sector

24-034-İbrahim Halil Efendioğlu- Türkiye

Artificial Intelligence and Consumer Behavior: The Future of Marketing

24-035-A.Selcuk Köylüoğlu – Türkiye

Theoretical Research on the Effect of Dopamine and Serotonin Hormones on Marketing

Hall A 6: Session Chair: Dr. Reyhan Can- Türkiye

24-031-Macide Berna Çağlar- Türkiye

The Impact of Leadership on the Practices of Supply Chain Management in Logistics Service Providers

24-032- Burak Kırca, Hakan Dilek, Tuğrul Tekin Tunalılar – Türkiye, Türkiye, Türkiye

The Effect of Organizational Climate Created by Democratic Leadership on Social Loafing

24-106- Jiyan Kılıç, Esat Saçkes, Fulya Güngör- Türkiye, Türkiye, Türkiye

Relationship Between Globalization And Tourism In Selected Countries: Panel ARDL Model

24-124- Fulya Güngör, Esat Saçkes, Jiyan Kılıç- Türkiye, Türkiye, Türkiye

Digital Women Entrepreneurship and Tourism Examples from Turkey

ONLINE SESSIONS

03 October 2024 Thursday 13:00 - 14:00

WEBINAR 1 -Session Chair : Dr.Esra N. Kılıcı – Türkiye
-Moderator : Dr. Suada A. Dzogovic- Kosovo

24-001 - Fitim Deari, Mara Madaleno, Nicoleta Barbuta-Misu, Florina Oana Virlanuta- North Macedonia, Portugal, Romania, Romania

The relationship between working capital management and profitability: Evidence from EU firms

24-003-Esra N. Kılıcı - Türkiye

Analysis of the Relationship Between Real Sector Confidence Index, Electricity Consumption, Manufacturing Industry Capacity Utilization Rate and Industrial Production Index in Türkiye

24-030 -Kanika Thapliyal, Chandan Gupta, Jyoti Kumari, Praveen Singh- India, India, India, India

Impact of Green Financing and Green Banking Practices on Banks' Environmental Performance

24-049-Luan Vardari, Kushtrim Gashi –Kosovo, Kosovo

Technological Innovations in Risk Management for a Sustainable Future

WEBINAR 2 -Session Chair : Dr. Luminita Diaconu – Moldova
-Moderator : Dr. Dr.Vlora Berisha- Kosovo

24-002 -Luminita Diaconu - Moldova

Environmental Control and The Human Settlements Protection Regime

24-033 -Veaceslav Zaporozjan - Moldova

Protecting human rights by managing economic and climate risks in the European Union

24-055- Nazim Muzaffarli (Imanov), Rasmiyya Abdullayeva- Azerbaijan, Azerbaijan

Assessment and management of risks in the labor market of Azerbaijan: Based on the results of a sociological survey

24-064-Sachin Chaudhary, Prasenjit Chatterjee – India, India

Psychological States of Indians During the Second Wave of Covid19

WEBINAR 3 -Session Chair :Dr. Bogdan Patrut– Romania
-Moderator :Dr. Elvis Elezaj- Kosovo

24-006 - Sanjay Taneja, Neha Saini- India, India

Exploratory Analysis of ICT, Knowledge Acquisition, Agripreneurial Innovation, and Sustainable Development

24-009-Mia Poledica – Croatia

Innovative approach: sustainability aspects in safety risks assessment in construction

24-010 - Bogdan Patrut, Monica Patrut, Simona-Elena Varlan – Romania, Romani, Romania

PRINFO: An Advanced Educational Platform for Effective Programming Instruction, with AI elements

24-020-Ştefan-Alfred Mariş, Evelyne Pop, Adriana Secoşan, Simina Maris- Romania, Romani, Romania, Romania

Evaluating Risks and Sustainability in the Technological Transfer of Biofuel Optimization Software

WEBINAR 4 -Session Chair : **Dr. Suna Korkmaz – Türkiye**
-Moderator : **Msc.Besfort Ahmeti- Kosovo**

24-013- Kenan İlarıslan- Türkiye

Examining the Effects of Inflation and Interest Rates on Stock Market Index Using Threshold Regression Method

24-042 - Hatice Kübra Özyurt, İbrahim Halil Ekşi, Samet Günay – Türkiye, Türkiye, Hungary
Covid-19 Pandemic and its Financial Contagion Effects on Stock Exchange Indices of Developing Countries (E7 Countries)

24-048 - Suna Korkmaz, Oya Korkmaz- Türkiye, Türkiye

The Relationship between Debit and Credit Card Expenditure and Inflation in the Turkish Economy

24-100- Bade Ekim Kocaman – Türkiye

The Impact of Non-Performing Loans on Bank Cost Structure: An Analysis of OECD Banks

03 October 2024 Thursday 14:10 - 15:10

WEBINAR 1 -Session Chair :**Dr.Paolo D’Anselmi– England**
-Moderator :**Dr. Suada A. Dzogovic- Kosovo**

24-016- Paolo D’Anselmi- England

The Social Responsibility of Public Administration Cases, Models Nuances

24-025- Petya Petrova- Bulgaria

Sustainability Accounting: A Risk-based Approach

24-027-Liudmila Lapiřkaia – Moldova

Application of cloud technologies in accounting

24-028- Yeřim řendur-Türkiye

The Impacts of Deepfake Technologies on Global Financial Markets

WEBINAR 2 -Session Chair :**Dr.Tulin Ural– Türkiye**
-Moderator :**Dr.Vlora Berisha- Kosovo**

24-017-Timotej Jagriř, Aljař Skaza- Slovenia, Slovenia

Does Strong ESG Performance Create Company Value for Investors? Evidence from Publicly Traded Companies

24-019- Mia Poledica, Mladen Božić- Croatia, Serbia

Implementation of Sustainable Logistics Practices in Retail: Analysis of the Current State and Proposals for Improvement

24-043 -Larisa Savga, Ghenadie Savga-Moldova/Romania-Moldova

Strategic Areas of the Consumer Cooperatives Sustainable Development in the Republic of Moldova

24-046 -Elyesa Eyiņ, Tulin Ural – Türkiye, Türkiye

The Impact of blockchain technology on brand loyalty in the context of sustainability in the fashion industry

WEBINAR 3 **-Session Chair** **:Dr. Alberta Tahiri – Kosovo**
-Moderator **:Dr. Elvis Elezaj - Kosovo**

24-021 -Simina Maris, Doina Darvasi, Titus Slavici – Romania, Romania, Romania

Artificial Intelligence for Risk Assessment and Sustainability Analysis in the Financial Sector

24-022- Mirela Goje, Mircea Cricovean, Ştefan-Alfred Mariş, Mircea Untaru – Romania, Romania, Romania

Risk Management and Sustainability in Marketing and Finance of Companies from the DKMT Euroregion

24-026-Marica Mazurek- Slovakia

Austria and Switzerland as the Examples of the successful Application of Tourism Business Models focused on Sustainability and Innovation

24-029 -Alberta Tahiri, Idriz Kovaçi, Jehona Rama –Kosovo, Kosovo, Kosovo

Identification of natural tourism potentials in Kosovo - Case study Dukagjin Region - Peja and Bjeshket e Nemuna

WEBINAR 4 **-Session Chair** **: Dr. Gonca Diler – Türkiye**
-Moderator **: Msc.Besfort Ahmeti - Kosovo**

24-014- Özge Elmas Günaydin, Sevtap Ünal – Türkiye, Türkiye

What Can I Buy to Be Perfect? The Impact of Social Media on Compulsive Consumption

24-038 -Eylem Dana Usta- Türkiye

Migration and National Identity: Exploring Banal Nationalism in Cinema

24-041 -Kadir Deligöz- Türkiye

The Mediating Role of Perceived Brand Warmth in the Effect of Brand Anthropomorphism on Brand Trust

24-083 Nihal Kantar, Esra Benli Özdemir- Türkiye, Türkiye

An Analysis of Middle School Students' Attitudes Towards Stem and Problem-Solving Skills from Various Perspectives

03 October 2024 Thursday 15:20 - 16:20

WEBINAR 1 **-Session Chair** **:Dr. Sevtap Ünal– Türkiye**
-Moderator **:Dr. Suada A. Dzogovic- Kosovo**

24-071-Ms. Angelina- India

Challenges in Implementing Artificial Intelligence towards Health Care Sustainability

24-070 -Durga Sankar Panda- India

Sustainability of Micro and Cottage Industries in Indian Rural Sectors during COVID-19 Pandemics

24-061-Aygül Arslan, Sevtap Ünal- Türkiye, Türkiye

Do We Buy Second-Hand Products with Sustainable Consciousness?

24-074- Anmol Middha –India

The Future Development - A Sustainable Path

WEBINAR 2 -Session Chair :**Dr. Aamir Aijaz Syed– India**
 -Moderator :**Dr.Vlora Berisha- Kosovo**

24-052-Silky Sharma, Sunil Kumar Sharma- India, India

Navigating the Intersection of Sustainable Development Goals, Quality Education, and Artificial Intelligence in the Era of Industry 5.0: An Analytical Scrutiny

24-053-Rahul Wadghane , Madan Jagtap Alejandra Calleros Islas – India, India, Spain

Framework for Sustainable Tourism: Balancing Local Economy, Governance, and Tourist Experience

24-057- Sunday Bako, Bori Ige, Nuhu Mba Gora, Muhammed Bello Umar-Nigeria, Nigeria, Nigeria

The Hydrogen Internal Combustion Engine: A Tool for Managing and Combating Carbon Emissions

24-060-Rajeev Ranjan, Sonu Rajak, Prasenjit Chatterjee- India, India, India

Optimization in Sustainable Energy: A Bibliometric Analysis

WEBINAR 3 -Session Chair :**Dr.Prasenjit Chatterjee– India**
 -Moderator :**Dr. Elvis Elezaj- Kosovo**

24-051-Seema Ghangale, Madan Jagtap, Prasenjit Chatterjee- India, India, India

Identifying Discriminatory Factors in Workplace with m-Polar Fuzzy ELECTRE-I Method

24-066-Anwesa Das- India

Prioritizing the Risk in Medical Cyber Physical System using an Integrated AHP-VIKOR model

24-072-Valentina Murati, Theranda Beqiri – Kosovo, Kosovo

Impact of stress in decision making in management

24-078-Prasenjit Chatterjee- India

An Integrated Fuzzy Decision-Making Model for Evaluating Carbon Footprint Reduction Strategies

WEBINAR 4 -Session Chair :**Dr.Andrea Imperia – Italy**
 -Moderator :**Msc.Besfort Ahmeti - Kosovo**

24-039-Suada A. Dzogovic, Adelisa Kolenovic – Kosovo, Kosovo

Global Economic Policies and Geopolitical Influences: Economic Warfare As a Means of Shaping Global Power

24-044-Andrea Imperia- Italy

Why not? Observations on the Italian opposition to the modification of the European Stability Mechanism

24-054-Mehmed Ganić, Agim Mamuti, Ognjen Ridic-Bosnia and Herzegovina, North Macedonia, Bosnia and Herzegovina

Exploring Causality Between Foreign Aid and Economic Growth: A Cross-Country Analysis

24-058 - Suchetana Sadhukhan- India

Early Warning Systems for Risk Management in Financial Markets

03 October 2024 Thursday 16:30 - 17:30

WEBINAR 1 -Session Chair :**Dr.Aamir Aijaz Syed – India**
 -Moderator :**Dr. Suada A. Dzogovic- Kosovo**

24-068- Ana-Marija Vrtodušić Hrgović, Ema Petaković, Marta Žabčić— Croatia, Croatia, Croatia

Risk management as a requirement of ISO 9001

24-089-Aamir Aijaz Syed- India

Does Green Stock immune to Policy Uncertainties? Examining impacts on Indian economy amid US monetary, climate, oil, and energy uncertainties.

24-090-Razan Almidani, Hayyan Nassar Waked, S. B. Goyal- Malaysia, Malaysia, Malaysia

Strategic Risk Management and Trust-Building for Sustainable E-Commerce on TikTok

24-093 Seyed Amirhossein Bathaei Naieni, Hayyan Nassar Waked, S. B. Goyal- Malaysia, Malaysia, Malaysia

Leveraging Social Media to Enhance Sustainable Marketing in Luxury Car Market: A PLS-SEM Analysis of Consumer Behaviour

WEBINAR 2 -Session Chair :**Dr.Larisa Mistrean– Moldova**
 -Moderator :**Dr.Vlora Berisha- Kosovo**

24-079- Prasenjit Chatterjee –India

Prioritizing Critical Economic Sectors for Green Transformation: A Fuzzy Multi-Criteria Decision Making Perspective

24-077-Mamta Chawla, Silky Sharma – India, India

The Metaverse as a Catalyst for Quality Education- Implications and Assessment

24-081-Neelaxi Pandey, Gajender Kumar, Ankur Kumar, Mamta Chawla— India, India, India, India

Silver Nanoparticles (AgNPs): A Promising Tool to Enhance the Sustainable Agricultural Practices

24-087-Sanjib Biswas, Prasenjit Chatterjee – India, India

Challenges for Renewable Energy Supply Chain Management

WEBINAR 3 -Session Chair : **Dr. Elvis Elezaj– Kosovo**
 -Moderator : **Dr. Elvis Elezaj– Kosovo**

24-154-Mitrea Geta- Romania

Career Opportunities and Employability for Social Work Alumni in Romania

24-155-Mitrea Geta- Romania

Social Entrepreneurship in Romania

24-067- Mohammad Qais Rezvani, Nirmala Chaudhary, Rashmi Gujrati, Utkarsh Mangal – India, India, India, India

The 99 Day Diversity Challenge: Creating an Inclusive Workplace by Saundarya Rajesh a Book Review

24-073-Amrita Ghoshal- India

Historical and Philosophical Significance of the Upanishads

WEBINAR 4 -Session Chair : Dr. Seval Selimoğlu– Türkiye
-Moderator : Msc.Besfort Ahmeti– Kosovo

24-065- Seval Selimoğlu , Meryem Uslu- Türkiye, Türkiye

Bibliometric Analysis of Studies on The Role of Accounting Profession in Sustainability

24-084 -Mesut Doğan, Servet Say – Türkiye, Türkiye

The Impact of Cash Conversion Cycle on Financial Performance in Manufacturing Firms

24-085-Servet Say , Mesut Doğan – Türkiye, Türkiye

Testing the Relationship Between Financial Soundness and Profitability in Banks

24-132- Gönül Alkan, Gülşah Atağan, Ozan Can Kara- Türkiye, Türkiye, Türkiye

Robotic Process Automation in Audit

04 October 2024 Friday 09:00 - 10:15

WEBINAR 1 -Session Chair :Dr. Marie Therese Villa-Caoile –
Philippines

-Moderator :Dr. Suada A. Dzogovic- Kosovo

24-095- Shipra Shukla- India

Effect of Climate Change on Public Health: Examining the Risks and Developing Adaptive Strategies

24-104- Marie Therese Villa-Caoile – Philippines

Earth's Gold: Geothermal Energy Economics for Sustainable Finance and Marketing

24-088 -Sanjib Biswas, Biplab Biswas, Prasenjit Chatterjee- India, India, India

Readiness to Adapt Metaverse in Supply Chains: A Comparison

24-117-Yashomandira Kharde, Madan Jagtap, Seema Ghangale – India, India, India

Improving Logistics Operations of a Beverage Company: A Case Based Lean Thinking

24-118- Srikant Gupta, Prasenjit Chatterjee- India, India

Addressing uncertainty in closed-loop supply chain networks: a multi-objective approach to integrated production and transportation problems

WEBINAR 2 -Session Chair :Dr. Angela Secrieru – Moldova
-Moderator :Dr. Vlora Berisha-Kosovo

24-115- Sabarni Chowdhury – India

Labour Scarcity and explanations for an endogenous natural rate of growth: Evidence from developed economies

24-119-Cercel (Zamfirache) Camelia – Romania

Quantitative analysis of European Union environmental funding sources in the 2014-2020 and 2021-2027 programming periods

- 24-120- Eduard Kenig, Angela Secrieru – Moldova, Moldova**
General framework for building a financial system favorable to sustainable economic growth in the Republic of Moldova
- 24-128-Joshy Mathew, Akansha Mer, Vimlesh Tanwar –**
Blockchain Technology in Healthcare: Ensuring Data Security and Privacy in the Digital Age
- 24-136-L.M. Sembiyeva, A.B. Alibekova, D.D. Kerimkulova- Kazakhstan, Kazakhstan, Kazakhstan**
Methodological approaches to improving the assessment of inter-budgetary relations using a system of indicative and integral indicators

WEBINAR 3 -Session Chair :Dr. Ibrahim Erem Şahin –Türkiye
-Moderator :Dr. Elvis Elezaj- Kosovo

- 24-091- Guo Yantong, Hayyan Nassar Waked, S. B. Goyal – China, Malaysia, Malaysia**
The Role of Financial Development and Technological Innovation Towards Real Economy in Henan, China
- 24-098- Ibrahim Erem Şahin, Humayun Humta – Türkiye, Türkiye**
Stock Price Volatility and Return: ARDL Bond Testing Approach
- 24-099 -Mariya Shygun, Hryhorii Mukhomor – Ukraine, Ukraine**
Accounts receivable in the strategic accounting and management system
- 24-102- Georgi Marinov, Ognjen Ridić, Emil Knezović, Tomislav Jukić, Goran Ridić, Ramo Palalić, Abdul Wahab Aidoo – Bosnia and Herzegovina, Bosnia and Herzegovina, Bulgaria, Croatia, Germany, Oman, USA**
Abstractness versus Concreteness of economic terms in the perceptions of Bosnians and Herzegovinians, Bulgarians and Croatsians - an empirical study
- 24-114- Rehana Farhat, Temoor Anjum, Muhammad Khalid Sohail – Pakistan, Pakistan, Pakistan**
Factors Affecting the Adoption of AI in recruitment & selection: An Empirical Study in Pakistan

WEBINAR 4 -Session Chair :Dr. Alireza Rajebi –Iran
-Moderator :Msc.Besfort Ahmeti - Kosovo

- 24-080-Aparajita DasGupta Amist, Mamta Chawla- India, India**
Role of Social Media in Driving Sustainable Consumerism
- 24-082- Başak Kuru, Songül Bilgili Sülük, Ceyda Aysuna Türkyılmaz, Serdar Pirtini- Türkiye, Türkiye Türkiye, Türkiye**
Artificial Intelligence in Green Marketing: A systematic literature review
- 24-092-Wan Md Afnan Wan Mahmood, Hayyan Nassar Waked, S. B. Goyal – Malaysia, Malaysia, Malaysia**
Driving Growth through Carbon Policies, CSR, and Innovation in Malaysia’s Property Sector
- 24-094- Djurdjina Novakovic- Serbia**
The Impact of Human Resource Information Systems (HRIS) on Organizational Performance in the Hospitality Industry
- 24-103- Alireza Rajebi- Iran**
The effect of strategic thinking training on dependent decision-making style of the managers at the General Department of Tax Affairs of East Azerbaijan Province

04 October 2024 Friday 10:25 - 11:25

WEBINAR 1 -Session Chair :Dr. Suada A. Dzogovic- Kosovo
-Moderator :Dr. Suada A. Dzogovic- Kosovo

24-096- Shervin Zakeri, Prasenjit Chatterjee, Dimitri Konstantas, Ali Vaez Jalali- India, India, Switzerland, Iran

Location Selection for Solar and Wind Energy Installation: An Integrated Decision-Making framework

24-097- Shervin Zakeri, Prasenjit Chatterjee-, Dimitri Konstantas, Ali Vaez Jalali- India, India, Switzerland, Iran

Sustainable Supplier Selection in Dairy Industry using an Integrated TOPSIS-WLD Model

24-111- Andrii Shekhovtsov, Bartłomiej Kizielewicz, Wojciech Salabun –Poland, Poland, Poland

The modern methods for reducing pairwise comparison numbers in decision making

24-112- Bartłomiej Kizielewicz, Andrii Shekhovtsov, Wojciech Salabun – Poland, Poland, Poland

Application of the pymcdm Library for Multi-Criteria Decision-Making: A Case Study in Supplier Selection Using TOPSIS

WEBINAR 2 -Session Chair :Dr.Dumitru Todoroi- Moldova
-Moderator :Dr.Vlora Berisha- Kosovo

24-105- Igor Soroceanu - Moldova

Active political corruption in the electoral field

24-107- Dumitru Todoroi- Moldova

With the UN Decade and Senior Associations towards Healthy Ageing

24-109- Khuribayeva Elmira Gaydarovna, Kozhueva Gulzhamal Zhailoobaevna – Kyrgyzstan, Kyrgyzstan

The Evolution of Agricultural Vocabulary: From Traditional Terms to Modern Terms (Lexical Changes in Agricultural Practice with the Development of Technology)

24-123- Anila Plaku, Klodiana Leka- Albania, Albania

The role of leaders in shaping school culture

WEBINAR 3 -Session Chair : Dr.Robert Stanisławski - Poland
-Moderator : Dr. Elvis Elezaj - Kosovo

24-113- Saule S. Saparbayeva, Gulnar D. Amanova, Inara E. Sarybayeva – Kazakhstan, Kazakhstan, Kazakhstan

Methodology of cost analysis for occupational safety and health

24-131-Robert Stanisławski- Poland

Evaluation of the use and importance of green logistics: implementation of eco-friendly solutions among green warehouses in Poland - a practical dimension

24-149- Dolapo Faith Sule, Hakeem Habdul Sule, Afuye Babajide Patrick –South Africa, Nigeria, Nigeria

Credit Risk Management and Financial Performance of Deposit Money Banks in Nigeria

24-141- Ashı Özen Atabey, Mustafa Karakuş, Sevilay Ece Gümüş Özuyar – Türkiye, Türkiye, Türkiye

Exploring the Dynamics of Export Quality, Economic Growth, and Carbon Emissions in Türkiye: An Advanced Causality and Wavelet Analysis

WEBINAR 4 -Session Chair :**Dr. Mustafa Ertan Tabuk- Türkiye**
-Moderator :**Msc.Besfort Ahmeti- Kosovo**

24-086 - Esen Şahin, Canan Yaşar- Türkiye, Türkiye

Outsourcing in Supply Chain Management: A Theoretical Framework

24-133 - Mustafa Ertan Tabuk, Feramus Alperen Erarlan- Türkiye, Türkiye

Relationship between Physical Activity Enjoyment, Stress and Life Satisfaction

24-134- Ramazan Rüçhan Kaya, İbrahim Türkmen, Hale Ada – Türkiye, Türkiye

The Role of Trust in Physicians in the Effect of Open Communication Practised by Physicians on Treatment Compliance

24-138- İbrahim Türkmen , Ramazan Rüçhan Kaya – Türkiye, Türkiye

Evaluation of Individuals' Body Perception on the Most Important Organ Preferences

04 October 2024 Friday 11:35 - 12:45

WEBINAR 1 -Session Chair :**Dr.Maia Diakonidze - Georgia**
-Moderator :**Dr. Suada A. Dzogovic- Kosovo**

24-139-Babita Jha- India

Awareness about Cybersecurity risks and Data Privacy issues related to Open Banking

24-152- Maia Diakonidze – Georgia

Slow Tourism: Future Trend and Research Direction

24-156-Artina Zeqiri- North Macedonia

The Effect of Financial Literacy on Emotional Intelligence: Case of Businesses in North Macedonia

24-040- Larisa Mistrean, Halit Shabani, Ilinca Gorobeş- Moldova, Kosovo, Moldova

Applying Psychological Principles in Bank Marketing Strategies to Influence Consumers Behavior

24-158-Ahmad Al Yakin- Indonesia

Enriching Social Cognitive and Behavioral intention by mobilizing robotics tutor-based GenAI in Education 6.0

WEBINAR 2 -Session Chair :**Dr. Muthmainnah - Indonesia**
-Moderator :**Dr.Vlora Berisha- Kosovo**

24-110 -Venera Anarbekova Erkinbekovna – Kyrgyzstan

The Historical Significance of the Image of Women in the Heroic Epic "Maspatsha"

24-125- Brunilda Zenelaga, Sherif Dervishi- Albania, Albania

Exploring causes of university students disputes: A scoping review

24-143- Brunilda Zenelaga, Alma Shehu Lokaj, Vehbi Miftari- Albania, Kosovo, Kosovo

Electronic or printed literature? New perceptions and experiences of university students

24-148-Enes Ismeti, Ernest Ismeti- North Macedonia, Kosovo

A Comparative Linguistic and Cultural Study of Idiomatic Translation Between English and Albanian

24-157-Muthmainnah – Indonesia

AI CiciBot as Conversational Partners in EFL Education, focusing on Intelligent Technology Adoption (ITA) to Mollify Speaking Anxiety

WEBINAR 3 -Session Chair :Dr.Cantürk Kayahan- Türkiye
-Moderator :Dr. Elvis Elezaj - Kosovo

24-121- Ragif Huseynov, Ramida Khalilova –Azerbaijan, Azerbaijan

Investment and Sustainable Development for Green tourism in Azerbaijan

24-129- Aida Goga, Qamile Caca- Albania, Albania

Comparative approach on consumption society and societal progress

24-144-Shilpi Kumar- India

Predictors and Outcomes of Workplace Spirituality

24-147- Lulzim Vrapca- North Macedonia

The Impact of Populism on the Foreign Policies of Democratic States

24-160-Alina Ionaşcu – Romania

Implementation of Economic Sustainability in Highly Globalized Countries

24-162- Boris Coretchi, Eugenia Busmachiu – Moldova, Moldova

Advanced Analysis of Socio-Economic Inequality in the Republic of Moldova Through the Lens of Lorenz and Weidlich Models

WEBINAR 4 -Session Chair :Dr.Bilsen Bilgili - Türkiye
-Moderator :Msc.Besfort Ahmeti - Kosovo

24-135- Gazi Polat- Türkiye

A Study on Energy Security in Countries with Different Growth Processes

24-137- -Ceyda Kolkesen , Meltem Altınay Özdemir- Türkiye, Türkiye

Risks and Constraints Faced by Solo Female Travelers: A Conceptual Overview

24-140-Bilsen Bilgili –

Has Digital Transformation Changed or Improved the Labor Market?

24-142- Ashı Özen Atabey, Sevilay Ece Gümüş Özuyar, Ahmet Tayfur Akcan , Müşerref Arık- Türkiye, Türkiye, Türkiye, Türkiye

A Dual-method for Reviewing R&D Articles in VOS: Bibliometric and Content Analysis

24-159-Bengü Berkmen – TRNC

Could the Kahramanmaraş Earthquake Be the Second Collective Trauma of Turkish Cypriots? A Qualitative Study

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The relationship between working capital management and profitability: Evidence from EU firms

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Abstract

Introduction: This study was motivated by previous studies and investigates the effect of working capital management on profitability.

Aim: This study aims to examine the relationship between firm profitability and some indicators of working capital management for a sample of large firms from seven EU countries.

Method: The analysis is conducted from 2006 to 2015 using panel data estimations. The Arellano-Bover-Blundell-Bond system estimator is used with the generalized method of moments estimator, and different data specifications are tested.

Findings: The study reveals that the relationship between net trade credit and profitability is not manifested similarly in all investigated countries. Further, the study shows that firms with higher working capital and acid ratio are more profitable; firms with higher debt financing and cost of the financing are less profitable than counterparties; the ability of firms to convert sales into cash is found to matter for firm profitability, but the relationship is not significant in all countries; and the size and crises are found to be significant variables as well.

Originality and value: The study provides some findings that may be useful to scholars and managers as well as to prepare and implement better working capital management policies. The study suggests that firms with more aggressive policies on working capital could be less profitable. Even though the study provides limited empirical evidence, it might be helpful in preparing more appropriate policies and strategies towards better-working capital management.

Key Words: Profitability, Trade Credit, Working Capital, EU countries, Arellano-Bover-Blundell-Bond estimator.

Jel Codes: G30, G31.

1. INTRODUCTION

The relationship between working capital and firm performance has attracted the interest of several scholars, as documented by many empirical studies. While some

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studies reveal a positive relationship, others suggest a negative relationship between working capital and profitability.

Of course, there are arguments on both sides about whether a firm should keep a higher or lower working capital level to improve profitability. There is not a single answer as working capital management is a complex process. Investing in working capital is expected to have positive effects on firm performance due to an increase in sales.

Accordingly, whilst the conservative strategy implies increasing investments in short-term assets, the aggressive strategy suggests decreasing to increase firm profitability. On both sides, arguments are pro, and contra related to the costs and benefits of investing less or more in short-term assets.

Of course, for several internal and external reasons, firms will adjust their strategies following their needs (see e.g., cash adjustment strategy from Wang et al., 2014). For example, Tsuruta (2019) reveals that the working capital adjustment was weaker during the crisis. Also, Zimon and Dankiewicz (2020), by examining the trade credit management strategy in Polish group purchasing firms in the construction sector during the COVID-19 pandemic, reveal that firms changed trade credit management strategies from moderately conservative to highly conservative.

In addition, Martínez-Sola et al. (2014), by examining 11,337 Spanish manufacturing SMEs during the 2000-2007 period, reveal that managers can improve firm profitability by increasing investments in receivables and that the effect is greater for financially unconstrained firms (larger and more liquid firms), for firms with volatile demand, and firms with bigger market shares. Also, Bussoli and Conte (2020) examine a sample of Italian firms over the period 2008-2016 and reveal that firms might improve profitability by increasing investments in trade receivables to a greater extent than firms in their business sector.

However, there is an ongoing debate about the extent to which a firm should invest in short-term assets (either in inventory or in accounts receivable) to maximize profitability and if an inverted U-shaped relationship exists. For example, Paul et al. (2018), by examining 262 listed manufacturing firms over the period 2007-2011, find that whilst investment in accounts receivable in Malaysia is influenced by firm size, short-term finance, sales growth, and collateral, profit, liquidity, and gross margins have no role in affecting the decision of trade credit granting to clients. Further, Baker et al. (2020) find an inverted U-shaped relationship between trade credit and firm profitability and support an optimal receivables and payables level in the case of the large Bombay Stock Exchange (BSE) listed Indian firms. On the other hand, Deari and Palomba (2024) reveal a convex relationship between the cash conversion cycle and profitability.

In addition, trade credit management as a derivative of working capital management presents a complex task for financial managers because it is affected by several factors inside and outside the business. For example, while managers are oriented towards sales growth, they are simultaneously facing a crucial problem, i.e., profitability versus liquidity. Hence, managerial policies should correspond to the benefits and costs of

credit sales versus cash sales. However, the problem is even more difficult to solve because the firm has its own competitors and must sell on credit. Therefore, another managerial concern is the risk of not collecting money (i.e., bad debts).

Accordingly, financial managers must carefully examine the costs and benefits of extending or tightening the collection period. For example, Box et al. (2018) discover robust interferences between trade credit extension and firm performance and suggest that aggressive trade credit policies can influence managers to improve firm performance, whilst Aregbeyen (2013) recommends that firms shorten the average collection period and average payment period. Even so, some studies suggest an inverted U-shaped relationship between trade credit and firm profitability (see e.g., Baker et. al., 2020; Hoang et al., 2019). Also, Singh and Kumar (2017) find that firm profitability and sales growth are positively related to working capital, whilst operating cash flow and financial leverage are negatively related to working capital.

Consequently, finding an optimal period or ratio is quite difficult because the firm operates in a dynamic business environment. Additionally, trade credit management should compare accounts receivable with accounts payable and try to buy more than sell in credit (i.e., net trade credit). Consequently, trade credit management needs to synchronize accounts receivable and accounts payable. This approach should be comprehensive by matching not just the collection and credit period or levels of receivables and payables but the final impact that net trade credit has on firm profitability.

Accordingly, in our study, we selected some indicators of working capital management such as working capital, net trade credit, cash turnover, and acid test to examine the effect on firm performance measured by net profit margin. Cost of financing and total debt financing are used as control variables. Also, indicators that reflect the firms' characteristics (firm size) and an external – macroeconomic factor (such as the financial crisis 2008) are examined.

Therefore, firms from seven EU countries acting in all sectors of activity, except financial businesses, were selected. The analysis is conducted over 10 years (covering the period from 2006 to 2015) as we intend to study the effects of the 2007–2008 financial crisis. The analysis is conducted using panel data estimations. Arellano-Bover-Blundell-Bond system estimator is used with the generalized method of moments estimator, and different data specifications are tested.

This study extends previous research (see Deari et al., 2022) but differs in two respects. First, its sample composition examines firms operating in Belgium, Germany, Spain, France, Italy, the Netherlands, and Sweden. Second, it differs from the previous one regarding methodological aspects.

The rest of the paper is organized as follows: Section 2 presents the literature review; Section 3 presents data description and methodology; Section 4 presents results and discussions; and Section 5 contains conclusions.

2. LITERATURE REVIEW

The relationship between working capital and firm performance has been examined by intensive studies, as both financial practitioners and scholars have worked to develop various approaches over decades. However, there is still room for further research and innovative research questions, as an ample literature review highlighted future research directions about working capital management (see Prasad et al., 2018).

Over the past decades, some working capital management theories such as pecking order, trade-off, agency, Keynesian liquidity preference, free cash flow, price discrimination, and transactions costs theory (for more, see Ling et al., 2018) were developed, and empirical evidence is rather mixed. Thus, there is no unique evidence as explained by theoretical arguments and methodological perspectives. For example, Deloof (2003) reveals the existence of a negative linear relationship between net working capital and operating performance, whilst a positive impact on profitability and shareholder value is identified by analyzing panel data of 115 firms listed on the German Prime Standard (Hogerle et al., 2020). Yazdanfar and Ohman (2017) provide an empirical analysis indicating that liquidity level is positively related to profitability.

Working capital management shows the economic value of the business, which is the effect of the interdependence of risk and profitability (Prsa, 2020). Thus, working capital could be treated as a source of internal funds (Eckbo and Kisser, 2013) and therefore working capital management aims to control working capital to improve cash flow and strengthen the internal financing capacity of the firm (Semaia et al., 2020).

In addition, firms with a financially flexible strategy have a greater capacity to take on investment opportunities (Duchin et al., 2010). Magni and Marchioni (2020) consider that financial efficiency is greatly affected by working capital management. Based on a sensitivity analysis approach, the authors show that the return on investment is not a very important factor in making decisions if the working capital is uncertain. However, Abuzayed (2012) reveals that more profitable firms are less motivated to manage their working capital.

In addition, another perspective that has motivated several studies (see, e.g., Deari et al., 2024; Deari et al., 2022; Afrifa and Padachi, 2016; Altaf and Shah, 2018) is the working capital composition and if an optimal level consequently exists. At this point, arguments are pros and cons. For example, too much cash in net working capital can determine a non-linear relationship between firm performance and working capital level (Ek and Guerin, 2011). Peng and Zhou (2019) consider that the retailer's payment period could maximize the firm's profit, and this should be increased when the retailer's discount rate is high. Masri and Abdulla (2018) use a stochastic programming model to select an efficient working capital strategy and identify the optimal working capital. The authors consider that an aggressive working capital strategy has a positive impact on profitability but a negative impact on liquidity.

Sageder and Feldbauer-Durstmüller (2019) consider that managers can increase firm profitability by directing their investment in receivables for firms with volatile demand

and substantial market shares. Atanassov and Kim (2009) propose that for firms with too much working capital, corporate investment is a viable way through which the reduction of working capital leads to higher firm performance.

Moreover, Banos-Caballero et al. (2010) show that an aggressive working capital strategy has firms with higher leverage and more growth opportunities. Jędrzejczak-Gas (2017) identifies the type of current assets management strategy and current liabilities management strategy used by firms in the financial crisis context. To identify the net working capital management strategy, the author uses indicators of receivables turnover, stock turnover, and share of current liabilities, and reveals that the most frequently implemented strategy was moderate-aggressive. Mielcarz et al. (2018) reveal that profitable firms adopt a conservative working capital management strategy in recessions and that non-performing firms may cut working capital in response to rapidly descending cash flows.

The type of working capital financing policy (conservative, aggressive, or moderate) can be a stimulus for sales and profitability or may negatively impact them, and thus, these types of policies differ in principle by the degree of use of short-term credit (Dhole et al., 2019). Boisjoly et al. (2020) investigated aggressive working capital practices with longitudinal impact from 1990 to 2017. Further, protection instruments for the country's investor and financial development determine the promptness of adjustment to working capital targets (Banos-Caballero et al., 2021).

Therefore, motivated by prior studies, we aim to investigate the relationship between firm profitability and working capital management and contribute to the existing empirical evidence.

Hence, based on the above arguments, we aim to test the following hypothesis:

***Hypothesis 1:** A significant relationship exists between profitability and working capital management.*

3. DATA AND METHODOLOGY

3.1. Data description and analysis

The data used in this study is from the Amadeus database, provided by the Bureau van Dijk. The data is selected from firms in all sectors of activity, except financial entities, and covers the period from 2006 to 2015.

The selected firms operate in different business sectors in Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), the Netherlands (NL), and Sweden (SE). The higher number of observations, 1,672 (5.01%), is derived from NACE 7010, and observations from the other sectors are less or more equally distributed.

Data is organized in the form of panel data and is corrected for routine and conceptual checks. Inconclusive data was removed, and 33,403 firms remained in the study. The structure of the sample is presented as follows: 2,603 firms (7.79%) are from Belgium; 9,617 (28.79%) from Germany; 3,976 (11.90%) from Spain; 5,997 (17.95%) from France; 6,300 (18.86%) from Italy; 2,637 (7.89%) from Netherlands; and 2,273

observations (6.80%) from Sweden. Thus, the most representative country in the sample of firms is Germany, and the least representative is Sweden.

The entire sample generally shows that firms are not profitable. The mean net income of the complete sample is -1.52 Euros per 1 Euro of operating revenue. Loss is derived from firms in the Netherlands (-0.03 Euros), Spain (-0.21 Euros), Sweden (-3.45 Euros), and finally, mainly from firms in Italy (-6.90 Euros). This average probably is determined by the negative results generated by the financial crisis in 2007-2008. Also, on average, firms have higher current assets than current liabilities, which means they are liquid. Further, firms have sold more than bought on credit and thus, positive net trade credit is evidenced.

Table 1 shows the mean profit by year and country. It has been noticed that firms in Belgium, Germany, France, and the Netherlands have worsened profitability, whereas in Spain, Italy, and Sweden, there has been an improvement.

In addition, Table 1 shows that firms in Spain achieved the highest profit in the year 2006; in Germany and France in 2007; in Belgium in 2008; in Sweden in 2009; in the Netherlands in 2010; and finally, firms in Italy recovered their financial performances in 2013 when they even achieved the peak of profits. Thus, differences between and within countries are evident, and a possible explanation could be that the financial crisis of 2007-2008 is not manifested quite similarly in all countries. Some firms in some countries could probably be affected earlier or later compared to others, depending on the sector of activity.

Table 1: Mean of profit by year and country

Code	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	0.05	0.09	0.23	0.07	0.07	0.04	0.04	0.03	0.05	0.07
DE	0.14	0.20	0.06	0.04	0.04	0.07	0.05	0.06	0.04	0.09
ES	0.21	0.00	-2.61	0.16	0.08	0.09	0.05	-0.03	0.06	0.06
FR	0.09	0.15	0.06	0.09	0.06	0.05	0.04	0.07	0.05	0.08
IT	0.02	-68.13	0.02	0.02	0.02	0.01	-0.27	0.10	0.02	0.03
NL	0.05	0.06	0.03	0.03	0.07	0.03	0.05	-0.33	-0.12	0.03
SE	0.12	-35.77	-0.09	0.75	0.11	0.10	0.05	0.06	0.10	0.10

Notes: Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Table 2 shows the proportions of debtors to current assets, and Table 3 shows the creditors' share of current liabilities. As evidenced by results, firms in the Netherlands have higher debtors to current assets ratio (average 56%), which shows large trade credit terms, whereas Sweden had a lower (average 24%).

On the other hand, the logic of what a firm provides as credit to clients received from suppliers is not realized, as shown by comparing results from Table 2 and Table 3.

Firms in Belgium have received more credit (an average of 47%), whereas in Sweden, they received fewer (an average of 27%). We can observe that Swedish companies use less trade credit in business activity.

Table 2: Debtors to current assets

Code	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	40.09%	40.04%	38.66%	38.72%	37.27%	37.83%	36.51%	36.84%	35.72%	35.18%
DE	26.45%	25.88%	25.06%	24.13%	25.07%	24.90%	24.72%	24.40%	24.16%	18.61%
ES	53.22%	52.70%	47.96%	47.23%	45.85%	47.14%	46.38%	47.34%	45.44%	44.62%
FR	42.10%	41.63%	41.47%	40.50%	39.95%	39.03%	38.32%	37.83%	37.75%	37.08%
IT	37.50%	36.34%	35.44%	35.39%	34.92%	34.86%	32.90%	32.14%	30.77%	30.05%
NL	56.21%	56.87%	60.03%	56.24%	54.86%	56.16%	56.76%	55.53%	54.58%	52.56%
SE	24.94%	25.40%	24.25%	23.04%	24.55%	23.96%	23.58%	22.31%	22.52%	23.71%

Notes: Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Table 3: Creditors to current liabilities

Code	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	44.26%	46.09%	44.02%	45.67%	45.80%	47.43%	48.40%	47.83%	48.57%	47.59%
DE	31.12%	33.06%	31.78%	31.00%	32.86%	32.51%	32.38%	32.81%	31.57%	23.72%
ES	42.46%	40.49%	31.86%	31.27%	31.53%	30.37%	29.68%	28.39%	29.32%	26.35%
FR	44.39%	44.50%	42.71%	41.69%	43.31%	43.42%	44.20%	45.74%	44.86%	42.76%
IT	42.81%	42.59%	41.50%	41.94%	43.59%	42.45%	41.94%	42.23%	41.71%	40.35%
NL	30.32%	29.50%	31.12%	29.34%	29.84%	31.24%	31.43%	30.95%	31.31%	30.62%
SE	25.16%	26.67%	25.35%	25.65%	27.07%	27.90%	27.36%	28.07%	28.15%	26.67%

Notes: Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Further, we have divided collection and credit periods by age classification, such as less than 30 days (acronym 1), from 30 to 60 days (acronym 2), from 60 to 90 days (acronym 3), from 90 to 120 days (acronym 4), and more than 120 days (acronym 5). Thus, regarding the collection period, observations are distributed as follows: 36% are less than 30 days, 31% from 30 to 60 days, 17% from 60 to 90 days, 8% from 90 to 120

days, and 8% more than 120 days. Whereas regarding credit period, observations are distributed such as: 47% are less than 30 days, 31% from 30 to 60 days, 14% from 60 to 90 days, 5% from 90 to 120 days, and 3% more than 120 days.

In addition, firms are classified based on total debt financing (total debt/total assets) such as less than 10 percent (acronym 1), from 10 to 20 percent (acronym 2), from 20 to 30 percent (acronym 3), from 30 to 40 percent (acronym 4), from 40 to 50 percent (acronym 5), and higher than 50 percent (acronym 6). Based on this classification, observations are distributed, such as 53% being to Category 1, 14% to Category 2, 12% to Category 3, 9% to Category 4, 6% to Category 5, and 6% to Category 6.

Moreover, the analysis includes working capital as a comprehensive indicator to examine the relationship between current liquidity and profitability. Figure 1 (A, B and C) shows the net trade credit (NTC) calculated as $(Debtors - Creditors) / Total\ assets$ and takes attribute 1 for firms that provide more than buy on credit (i.e., positive net trade credit) and 0 otherwise.

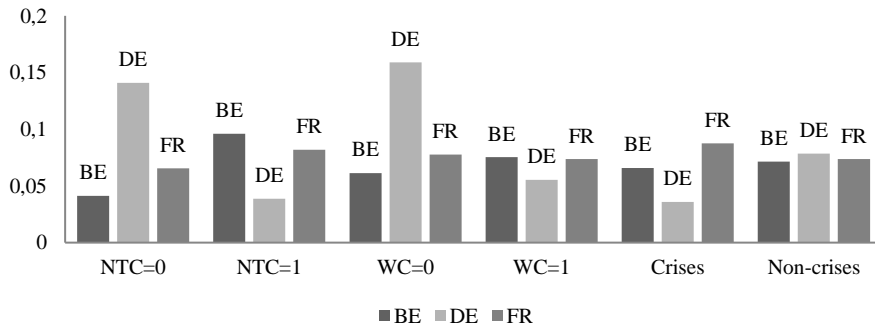


Figure 1A. Mean of profit by NTC, WC, and crisis

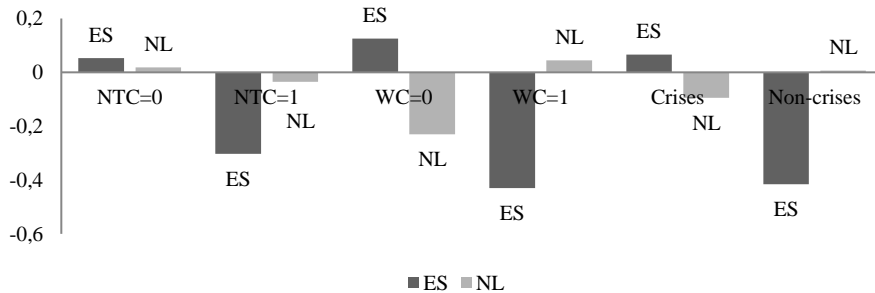


Figure 1B. Mean of profit by NTC, WC, and crisis

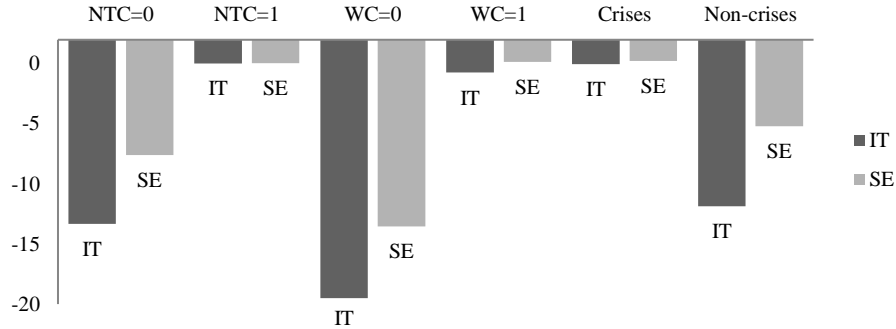


Figure 1C. Mean of profit by NTC, WC, and crisis

Working capital (WC) is calculated as *Current assets – Current liabilities* and takes the attribute *1* for firms with positive working capital (i.e., current assets higher than current liabilities) and *0* otherwise.

Additionally, if the country experienced a positive GDP growth (annual %) compared to the previous year, then it is listed as a non-crisis period and crisis otherwise. GDP growth data for the selected countries are extracted from the database World Development Indicators (World Bank national accounts data and OECD National Accounts data files, accessed on 07/10/2019).

Thus, as Figure 1 shows preliminary evidence, there is no single result, and the relationship between trade credit and profitability is not unique across countries. Figure 1 shows that firms in some countries performed better during the crisis period. The preliminary results show that firms in Belgium with positive net trade credit were, on average, more profitable than firms with negative net trade credit. The difference for firms in France is just 1%, whereas the effect is contrary for firms in Germany, which are firms with negative net trade credit and are more profitable compared to counterparties. The cases of Spain and the Netherlands are slightly like those of Germany. Even firms in Spain and the Netherlands with positive net trade credit have operated at a loss. Firms with negative trade credit in Sweden and especially in Italy have operated with important loss levels. On average, firms with positive net trade credit in Sweden have 0.05 Euros, respectively, while Italy has 0.03 Euros net income per each 1 Euro operating revenue.

Besides, results show that firms with higher current liquidity measured by working capital in Belgium, Netherlands, and Sweden have higher profitability than in other countries. In Spain, firms with negative working capital have performed much better than their counterparties. Hence, firms with positive working capital in the Netherlands, especially in Sweden, have performed much better than counterparties that operated with loss. For firms in France, the effect is trivial. The outlier case seems to be Italy, where both firms, with positive and negative working capital, have operated with loss.

Figure 1 also shows that crisis effects affect firms' profitability more and less in some countries. For example, firms' profitability in Belgium has not changed considerably, but

firms in Germany and the Netherlands have performed better in non-crisis times. In contrast, firms in other countries have performed better in times of crisis.

In addition, we perform a two-sample *t-test* by testing whether crises have affected profitability according to the collection, credit period, and debt financing categories. Overall results (all countries included) showed that the difference is statistically significant in the case of collection period by category 3 ($t = -2.12$) and category 4 ($t = -2.62$); credit period category 4 ($t = -2.49$); and debt financing category 2 ($t = -2.75$). It means that the relationship is statistically significant for firms with collection periods from 60 days to 90 days, 90 days to 120 days, credit periods from 90 days to 120 days, and firms that are financed from a 10% to 20% debt ratio. In addition, these firms have performed much better during non-downturn times rather than downturn times. Table 4 shows the mean profit by collection and credit period, and Table 5 shows the mean profit by debt financing, country, and crisis classification.

Table 4: Mean of profit by collection and credit period

Code	Collection period by the downturn					Code	Collection period by the boom				
	1	2	3	4	5		1	2	3	4	5
BE	0.03	0.05	0.15	0.04	0.02	BE	0.03	0.05	0.08	0.04	0.40
DE	0.05	0.02	0.03	-0.01	0.05	DE	0.11	0.03	0.06	0.29	-0.01
ES	0.06	0.04	0.04	0.05	0.15	ES	0.06	0.07	0.06	0.06	-2.24
FR	0.14	0.17	0.04	0.07	-0.18	FR	0.10	0.06	0.06	0.08	0.09
IT	-0.13	0.01	0.03	0.00	0.00	IT	-	0.04	0.03	0.02	0.01
NL	0.01	0.01	0.04	0.03	-0.68	NL	0.04	0.03	0.04	0.05	-0.18
SE	0.49	0.04	0.06	0.05	-6.59	SE	-9.51	0.06	0.04	0.01	-6.84
Code	Credit period by the downturn					Code	Credit period by the boom				
	1	2	3	4	5		1	2	3	4	5
BE	0.05	0.05	0.08	0.22	0.01	BE	0.04	0.09	0.05	0.05	0.15
DE	0.04	0.00	0.00	0.00		DE	0.08	0.03	0.58	1.50	-0.94
ES	0.10	0.04	0.03	0.00	0.06	ES	0.09	-	0.05	0.05	0.11
FR	0.16	0.05	0.25	0.02	-0.77	FR	0.12	0.06	0.06	0.06	-0.02
IT	0.04	0.05	0.08	0.00	-1.08	IT	-0.04	0.05	0.03	0.06	-166.09
NL	0.03	0.04	0.02	0.06	-10.76	NL	0.05	0.03	0.01	-	-2.58
										0.05	

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SE	0.08	0.06	0.18	-0.04	24.87	SE	0.07	0.13	0.71	0.05	-1171.14
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Notes: The collection and credit period are divided by age classification: less than 30 days (acronym 1), from 30 to 60 days (acronym 2), from 60 to 90 days (acronym 3), from 90 to 120 days (acronym 4), and more than 120 days (acronym 5). Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE) are represented by age classification.

Table 5. Mean of profit by debt financing

Code	Debt financing by the downturn						Code	Debt financing by the boom					
	1	2	3	4	5	6		1	2	3	4	5	6
BE	0.05	0.16	0.05	0.01	0.03	0.13	BE	0.05	0.17	0.08	0.04	0.15	0.05
DE	0.03	0.00	0.10	0.03	0.03	-0.02	DE	0.08	0.07	0.10	0.01	0.14	0.05
ES	0.11	- 0.05	0.08	0.04	0.03	0.05	ES	-1.06	0.06	0.11	0.05	0.19	0.57
FR	0.10	0.10	0.03	0.45	- 0.77	-0.02	FR	0.06	0.10	0.09	0.13	0.21	- 0.01
IT	- 0.12	- 0.01	0.13	0.05	0.07	-0.01	IT	-23.41	0.02	0.02	0.02	0.09	0.03
NL	0.05	0.02	0.02	0.02	- 1.97	0.01	NL	0.06	0.04	0.02	0.07	- 0.51	0.00
SE	0.27	0.17	0.06	0.06	0.36	0.08	SE	-6.27	0.31	0.04	0.15	0.01	2.15

Notes: The collection and credit period are divided by age classification: less than 30 days (acronym 1), from 30 to 60 days (acronym 2), from 60 to 90 days (acronym 3), from 90 to 120 days (acronym 4), and more than 120 days (acronym 5). Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE) are represented by age classification.

The overall finding (for the entire sample) shows that firms in categories 1 and 5 concerning the collection period have an average loss, whereas in categories 2, 3, and 4 have a profit. Further, according to the credit period, firms in categories 1, 3, and 4 realized profits in contrast to firms in categories 2 and, especially 5, which realized high losses. However, both firms with positive and negative net trade credit realized losses, but those with negative ones realized much more compared to counterparties. The same findings are related to working capital and profitability.

In other words, the results suggest so far that firms with better short-term liquidity are more capable of realizing profit compared to counterparties. On the other hand, firms in category 1 of debt financing operated with losses, whereas others with profits. However, these arguments are insufficient to conclude if firm profitability is affected by

short-term liquidity and debt financing, and thus, in the next section, some econometric estimations are performed.

3.2. The variables selection and econometric estimations

In this study, we use net profit margin as the dependent variable and a set of independent variables such as net trade credit, working capital, cost of financing, cash turnover, acid test, total debt financing, firm size, and crisis. Table 6 presents the definition of used variables in regression analysis.

The selection of examined variables aims to investigate the relationship between firm profitability and liquidity, by adding some other variables that are supposed to be relevant (control variables). For example, the relationship between profitability and liquidity cannot be examined separately without adding the effects of financing, or the external macroeconomic environment (e.g., economic condition as a downturn or growth as is included in this study). Enqvist et al. (2014) reveal that the working capital and profitability relationship is more highlighted in economic downturns than in economic booms.

While some studies use the cash conversion cycle as an independent variable to measure short-term liquidity (see e.g., Deari et al., 2024; Deari et al., 2022; Banos-Caballero et al., 2014; Afrifa and Padachi, 2016; Altaf and Shah, 2018), in this study, we use net trade credit. Hoang et al. (2019) use trade credit receivable and trade credit payable separately.

Hence, this study aims to investigate the effect of trade credit provided and obtained on profitability rather than the effect of the cash conversion cycle. Consequently, the study investigates if firms with positive net trade credit are more profitable than counterparties.

In contrast to previous studies that have examined separately accounts receivable and payable period (see Altaf and Shah, 2018), receivables to assets ratio (see Banos-Caballero et al., 2014), or receivables to assets ratio and payables to assets ratio (see Mättö and Niskanen, 2020), in this study we use NTC as a comprehensive and static measure by taking into consideration the joint effect of both.

Some prior studies use less or more similar variables as we investigate in this study, for example, firm profitability and net trade credit (see e.g., Madaleno et al., 2019), total debt financing (see e.g., Altaf and Shah, 2018; Banos-Caballero, 2012), firm size (see e.g., Deloof, 2003), cost of financing (see e.g., Banos-Caballero, 2013), etc.

The final baseline equation is given as follows:

$$Profit_{it} = \beta_0 + \beta_1 NTC_{it} + \beta_2 WC_{it} + \beta_3 Costfin_{it} + \beta_4 Cashturn_{it} + \beta_5 Acidtest_{it} + \beta_6 Total_debtfin_{it} + \beta_7 Size_{it} + \beta_8 Crise_{it} + \varepsilon_t \quad (1)$$

Where:

Profitability (denoted by the acronym *Profit*) represents the dependent variable being proxied by the net profit margin and is calculated as net income divided by operating revenue.

Net trade credit (NTC) is calculated as (debtors – creditors) divided by total assets.

Working capital (WC) is calculated as current assets – current liabilities.

Cost of financing (Costfin) is calculated as financial expenses divided by (long-term debt + loans).

Cash turnover (Cashturn) is calculated as operating revenue divided by cash and equivalents.

The acid test (Acidtest) is calculated as (current assets – stock) divided by current liabilities.

Total debt financing (Total_debtfin) is calculated as total debt divided by total assets.

Firm size (Size) is calculated as the logarithm of operating revenue.

Country crisis (Crisis) is an independent variable and measured as if the country's GDP growth (annual %) is positive value takes 1 (non-crisis) and 0 otherwise (crisis).

Finally, in equation (1) *i* stands for the firm and *t* for the period, having the error term been represented by ε_t .

Details about the variable's calculations are presented in Table 6.

Table 6: Variables calculations

Variable	Abbreviation	Definition
<i>Dependent variable:</i>		
Net profit margin	Profit	Net income / Operating revenue
<i>Independent variables:</i>		
Net trade credit	NTC	(Debtors – Creditors) / Total assets
Working capital	WC	Current assets – Current liabilities
Cost of financing	Costfin	Financial expenses / (Long-term debt + Loans)
Cash turnover	Cashturn	Operating revenue / Cash and equivalents
Acid test	Acidtest	(Current assets – Stock) / Current liabilities
Total debt financing	Total_debtfin	Total debt / Total assets
Firm size	Size	The logarithm of operating revenue
Country crisis	Crisis	GDP growth: positive value (1) and otherwise (0)

Equation (1) includes control variables such as cost of financing and total debt financing because the relationship between firm profitability and working capital management is quite complex, and firm financing is important in this context. For illustration, Akbar et al. (2022) show that firms that take more time to sell inventory and convert receivables to cash use more debt.

Further, in regression equation (1) we include squared NTC and WC to investigate if an inverted U-shape relationship between profitability and net trade credit and working capital (equation 2) exists.

By considering that the maximum firm profitability will be achieved at:

$$NTC \text{ (or WC)} = -\frac{\beta_1}{2 \times \beta_2},$$

than β_1 must be positive and β_2 negative (for more see: Banos-Caballero et. al., 2014). Thus, equation (2) is as follows:

$$Profit_{it} = \beta_0 + \beta_1 NTC_{it} + \beta_2 NTC2_{it} + \beta_3 WC_{it} + \beta_4 WC2_{it} + \beta_5 Costfin_{it} + \beta_6 Cashturn_{it} + \beta_7 Acidtest_{it} + \beta_8 Total_debtfin_{it} + \beta_9 Size_{it} + \beta_{10} Crise_{it} + \varepsilon_t \quad (2)$$

Where:

$NTC2$ and $WC2$ are squared net trade credit and squared working capital, respectively.

To better understand these interactions and their effects on profitability, we have initially applied simple panel data models to the overall sample of EU countries and by EU country.

From these applications, the Hausman test revealed that the fixed-effects model offers a better adjustment concerning the pooled OLS or the random-effects model. Even so, we skip the presentation of these results since we have a panel dataset with many panels but only a few periods and the best fitting models are the dynamic panel-data regression with default Arellano-Bond instruments and lagged difference. This type of model fits linear dynamic panel data where the unobserved panel-level effects are correlated with the lags of the dependent variable, which we verified to be the case from the previous data tests performed while applying simple panel-OLS models.

The Arellano-Bover-Blundell-Bond system estimator was used with the generalized method of moments estimator, and it assumes there is no autocorrelation in the idiosyncratic errors. Moreover, it requires the panel-level effects to be uncorrelated with the first difference of the first observation of the dependent variable. This method introduces more instruments, increasing efficiency. Moreover, the Arellano-Bover-Blundell-Bond estimator is suitable for this analysis considering it is a general estimator designed for situations with a linear functional relationship; one left-hand-side variable that is dynamic, depending on its past realizations; of independent variables that are not strictly exogenous, meaning they are correlated with past and possibly current realizations of the error; includes fixed individual effects, and is suitable for situations when there is possibly heteroskedasticity and autocorrelation within individuals but not across them.

Different data specifications are tested, and the results are as follows. Firstly, the results of the dynamic panel model are presented without considering possible lagged effects. Afterward, up to one period of lagged values is considered, and finally, up to two lagged periods have been considered during estimations. Secondly, results differ for the overall sample and the individual countries as well as by considering or not considering the lagged effects of the variables.

4. RESULTS AND DISCUSSION

Table 7 shows that overall, working capital, cost of financing, acid test, total debt financing, size, and crisis matter for firm profitability. Generally, our results show that firms with positive working capital, higher acid tests, and larger ones (see, e.g., Deloof, 2003) are more profitable than counterparties. Thus, there is a positive relationship between liquidity indicators and firm profitability, as indicated in previous studies (e.g., Altaf and Shah (2018) found a positive relationship between firm profitability and cash conversation cycle).

Further, firms with a lower financing cost and less debt financing are more profitable than counterparties. The crisis is also a significant variable, although not in all countries.

Results in Table 7 confirm a significant relationship between profitability and liquidity as measured by working capital and acid test in the long-run period. Also, results show that the profitability variable is affected by itself even negatively by the previous year. Gołaś (2020) also shows that return on assets (ROA) is affected negatively for the whole sample of firms.

In addition, there is no significance between profitability and net trade credit, even if the relationship is negative in overall terms. However, a significant negative relationship is found for firms in Belgium and the Netherlands, whilst in France, it is found to be positive. This result implies that firms in Belgium and the Netherlands with lower NTC are more profitable than counterparties and suggesting thus to sell lower than purchasing on credit. Meanwhile, firms in France can have more trade credit provided than obtained. As Table 10 shows, the squared NTC (NTC²) is significant just in the case of the Netherlands, and the optimal ratio should be 16%. Thus, any deviations from this ratio will result in lower firm profitability, but here β_1 and β_2 are contradictory to the theoretical arguments explained earlier (see Banos-Caballero et. al., 2014). Previous studies, for example, Baker et al. (2020) find the existence of an optimal receivables and payables level (i.e., an inverted U-shaped relationship between trade credit and firm profitability).

Further, firms with a higher cost of financing ratio are less profitable and the sign remains unchanged for Germany, Spain, France, Netherlands, and Sweden. The relationship is found to be insignificant for Belgium and Italy. Taking all countries together, it is suggested that less debt financing is used to increase profitability, and this is in line with Altaf and Shah (2018), who found a negative relationship. Debt financing is a relevant factor for profitability in Germany, France, the Netherlands, and Sweden.

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In addition, firms with higher cash turnover in Germany and the Netherlands are more profitable, whilst they are less profitable in Sweden than their counterparties. The acid test is also found to be a relevant factor, except for firms in Sweden.

Overall, results show that firms with higher acid ratios are more profitable. Finally, larger firms in Spain and Italy are more profitable, whilst in Belgium, Germany, France, Netherlands, and Sweden only the smaller ones are.

Table 7: GMM estimations for profit by country and for the overall sample (no lagged effects for independents)

Dep.: Profit	BE	DE	ES	FR	IT	NL	SE	All
L1.Profit	0.055***	-0.050***	-0.328***	0.199***	0.087***	-0.148***	0.442***	-0.336***
NTC	-1.050**	0.022	18.726	0.329*	0.018	-0.539**	-0.185	-0.714
NTC2	1.280	-0.159	4.447	0.391	-0.093	-0.073	-0.570	4.102
WC	-1.690***	0.033	16.978	0.797***	-0.792***	-0.539***	-1.226***	6.247***
WC2	0.059***	-0.001	-0.600*	-0.027***	0.024***	0.017***	0.039***	-0.202***
Costfin	0.023	-0.008***	-6.695***	-0.027***	0.004	-0.017**	-0.071**	-1.130***
Cashturn	-0.002	0.008**	-0.077	-0.007	-0.005	0.056***	-0.046*	-0.020
Cashassets	-1.944***	0.077	-13.116	-0.484	0.106	-0.273	1.075	3.811
Acidtest	-0.660***	0.015**	46.468***	0.688***	-0.069**	0.279***	-0.219	2.498***
Total_debtfin	0.150	-0.352***	12.141	-1.040***	-0.062	-0.541***	-1.118**	-9.346***
Size	-3.861***	-0.050***	76.727***	-0.964***	0.087***	-0.092**	-0.705***	24.493***
Crisis	0.404***	0.026***	-4.944***	0.065**	-0.001	0.017	0.206***	-1.557***
constant	included							
Year dummies	included							
Wald chi2	2010.55	84.42	1793.15	1064.90	391.98	206.83	345.61	4138.55
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: In logs are Costfin, Cashturn, WC and Acidtest. *, **, *** significant at 10%, 5% and 1%. L1 – lagged one period; L2 – lagged two periods of time. Variables are

defined in Table 6. Dependent variable: Net profit margin – Profit; Independent variables: Net trade credit – NTC; Working capital – WC; Cost of financing – Costfin; Cash turnover – Cashturn; Acid test – Acidtest; Total debt financing - Total_debtfm; Firm size – Size. Country crisis – Crise. Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Table 8 summarizes the results considering the optimal WC target identified previously (values are based on those presented in Table 7). Results show that only in France, besides the overall sample, there is an inverted U-shaped relationship between firm profitability and working capital. Overall, the optimal point in the working capital-profitability relationship is roughly 16 Euros, suggesting that positive working capital should be kept. Several prior studies reveal an inverted U-shape relationship between working capital and firm profitability (e.g., Banos-Caballero et al., 2014; Mun and Jang, 2015).

The italicized results show a reverse relationship in Belgium, Italy, the Netherlands, and Sweden. Below the WC target are France and Belgium, with significant results, and Spain but with no significance. Above the target are Germany (with no statistical significance), Italy, the Netherlands, and Sweden.

Table 8: Deviations from the optimum WC target level

Dep.:	BE	DE	ES	FR	IT	NL	SE	All
Profit								
WC	-1.690***	0.033	16.978	0.797***	-0.792***	-0.539***	-1.226***	6.247***
WC2	0.059***	-0.001	-0.600*	-0.027***	0.024***	0.017***	0.039***	-0.202***
Optimal (%)	14.32	16.50	14.15	0.02	16.50	15.85	15.72	15.46
Deviation (%)	-1.14	1.04	-1.31	-15.44	1.04	0.39	0.26	%

Notes: In logs are Costfin, Cashturn, WC and Acidtest. *, **, *** significant at 10%, 5% and 1%. L1 – lagged one period; L2 – lagged two periods of time. Variables are defined in Table 6. Dependent variable: Net profit margin – Profit; Independent variables: Net trade credit – NTC; Working capital – WC; Cost of financing – Costfin; Cash turnover – Cashturn; Acid test – Acidtest; Total debt financing - Total_debtfm; Firm size – Size. Country crisis – Crise. Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Table 9 presents regression results by examining both lagged dependent and independent variables. In general, considering all countries, there is a negative relationship between firm profitability and lagged net trade credit. It shows that firms with lower net trade credit in the current year are more profitable in the next year. Lower net trade credit means that firms can obtain more than they can provide trade credit.

This form of financing through suppliers, on the one hand, and lower investments in clients, on the other hand, could put firms in a better position. This suggestion contradicts the previous result by Fernandez-Lopez et al. (2020) who reveal a negative relationship between days payable outstanding (average payment period) and firms' profitability but is in line with Altaf and Shah (2018) and Kayani et al. (2020) who find a positive relationship.

However, the relationship is significant only for firms in Germany. One should consider that trade credit has its disadvantages, as Shi and Zhang (2014) find that more risk-averse suppliers tend to grant shorter terms, even though the impact of a risk attitude is insignificant.

Table 9: GMM regression results with one period lagged dependent and independent variables by country and overall

Dep.: Profit	BE	DE	ES	FR	IT	NL	SE	All
L1.Profit	-0.004	-0.032***	-0.515***	0.083***	0.321***	-0.207***	0.425***	-0.396***
NTC	0.181	0.013	-0.526	0.133	0.217*	-0.525**	1.802	-1.358
L1.NTC	-0.158	-0.108**	-1.665	-0.004	0.064	0.214	1.159	-6.214***
NTC2	-0.009	-0.077	15.379	0.009	-0.133	-0.022	-5.333	-1.143
L1.NTC2	-0.185	0.018	-70.404	-0.038	-0.019	-0.380	0.351	-20.032***
WC	-0.066	0.016	-10.836	0.094	0.541***	0.708***	-0.501	2.343
L1.WC	0.333***	0.163***	101.633***	0.184**	0.307***	0.411***	-0.169	-7.169***
WC2	0.003	-0.0001	0.378	-0.002	0.016***	0.022***	0.017	-0.101**
L1.WC2	-0.010***	-0.004***	3.200***	-0.005**	0.009***	0.015***	0.009	0.148***
Costfin	-0.002	-0.005**	-4.805***	-0.005	-0.006	-0.014*	0.117***	-1.186***

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L1.Costfin	-0.004	0.004*	-2.421***	0.004	0.008	0.001	0.064	-0.530***
Cashturn	-0.002	-0.0003	0.389	-0.003	-0.006	0.063***	-0.037	0.001
L1.Cashturn	0.001	-	0.013***	-0.457	-0.001	-0.007	0.037***	-0.013
Cashassets	0.339***	0.032	11.323	0.296**	0.199	-0.103	0.227	6.304***
L1.Cashassets	0.015	-0.150**	7.164	0.303**	-0.270	0.362	2.932**	9.663***
AcidTest	-0.072**	-0.001	-0.983	-0.076**	-0.046	0.276***	-0.027	1.135***
L1.Acidtest	0.142***	-	0.011***	-55.425***	-0.004	-0.049	-	0.256***
Total_debtfin	-0.025	-	0.137***	-1.442	-0.233**	-	0.342***	0.401***
L1.Total_debtfin	0.073	0.099**	10.766	0.136	0.238**	0.048	-0.087	-1.370**
Size	0.043	-	0.099***	46.579***	-	0.114***	0.012	-0.106**
L1.Size	-0.016	-	0.137***	18.680***	0.070**	0.114***	-	-0.402**
Crisis	-0.007	0.020***	-2.505***	0.015	0.012	0.006	0.205***	23.666***
constant	included							
Year dummies	included							
Wald chi2	48.77	380.90	6160.82	125.61	824.04	308.06	332.40	12576.79
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: In logs are Costfin, Cashturn, WC and Acidtest. *, **, *** significant at 10%, 5% and 1%. L1 – lagged one period; L2 – lagged two periods of time. Variables are defined in Table 6. Dependent variable: Net profit margin – Profit; Independent variables: Net trade credit – NTC; Working capital – WC; Cost of financing – Costfin; Cash turnover – Cashturn; Acid test – Acidtest; Total debt financing - Total_debtfin; Firm size – Size. Country crisis – Crise. Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

In addition, net trade credit is confirmed to be a significant variable in explaining profitability in the case of the Netherlands in actual and lagged one and two periods;

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Sweden, in actual, lagged one and two periods; and Germany lagged two periods (see Table 10). By testing all countries, working capital is a significant variable in current and previous periods.

Table 10: GMM regression results with two periods lagged independent variables by country and overall

Dep.: Profit	BE	DE	ES	FR	IT	NL	SE	All
L1.Profit	-0.117** *	-0.035** *	-0.003**	0.314** *	0.258** *	-0.292** *	0.377** *	-0.003** *
NTC	0.195	0.103	0.054	0.125	0.212	-0.454** *	1.696** *	0.040
L1.NTC	-0.187	0.013	-0.106	-0.040	0.001	-0.231* *	1.827** *	-0.059
L2.NTC	0.063	-0.130**	0.750	0.105	0.098	-0.267	0.635** *	-0.001
NTC2	-0.035	-0.066	0.528	-0.245	-0.167	0.710** *	0.131	-0.047
L1.NTC2	-0.291	-0.0002	0.724	0.004	-0.047	0.132	0.003	0.072
L2.NTC2	-0.162	-0.048	-0.777	-0.055	-0.413	0.122	1.971	-0.072
WC	-0.150	-0.103* *	-0.042	-0.176	-0.647** *	-0.531** *	0.175	-0.259** *
L1.WC	0.230	-0.196** *	1.176*	0.322**	-0.548** *	-0.350** *	2.040	-0.178*
L2.WC	-0.216	-0.096* *	0.770	0.278**	-0.566** *	-0.056	0.826	-0.113
WC2	0.006	0.004**	-0.005	0.007*	0.020** *	0.017** *	-0.003	0.008** *
L1.WC2	-0.007	0.007** *	-0.041**	-0.010**	0.016** *	0.010** *	-0.046	0.006*
L2.WC2	0.007	0.004**	-0.024	-0.009**	0.016** *	0.002	-0.013	0.004
Costfin	-0.001	-0.006**	-0.087** *	-0.011**	-0.009	-0.010*	-0.194	-0.015** *
L1.Costfin	-0.006	0.005**	0.034	0.008	0.005	0.006	-0.026	0.003
L2.Costfin	-0.001	0.002	-0.009	0.005	0.004	0.033** *	0.212	0.002
Cashturn	-0.004	0.00004	-0.053	-0.001	-0.008	0.043** *	-0.036	-0.009*
L1.Cashturn	-0.010	-0.008** *	-0.123** *	0.002	-0.015**	0.071** *	-0.024	-0.016** *
L2.Cashturn	-0.020	-0.0009	0.147** *	-0.006	-0.006	0.050** *	0.042	0.013**
Cashassets	0.336**	-0.080	-1.144	0.477**	0.086	0.206	-0.962	-0.136
L1.Cashassets	-0.127	-0.163**	-1.606**	0.257	-0.392	0.376**	0.620	-0.205

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L2.Cashassets	0.072	-0.161**	1.731** *	0.132	0.060	0.166	4.564**	0.064
AcidTest	- 0.143** *	-0.003	1.155	- 0.302** *	0.025	-0.090**	-0.053	0.010
L1.Acidtest	0.135** *	- 0.027** *	0.656** *	0.143** *	-0.050	0.148** *	-0.785**	-0.012
L2.Acidtest	- 0.140** *	-0.007*	- 0.098** *	0.129** *	0.022	0.104** *	- 1.064** *	-0.004
Total_debtfin	0.029	- 0.288** *	- 1.872** *	- 0.764** *	- 0.398** *	-0.206**	- 2.336** *	- 0.457** *
L1.Total_debtfin	0.005	0.013	0.679	0.273**	0.329**	0.046	-0.376	0.145
L2.Total_debtfin	-0.023	0.108**	0.288	-0.035	-0.192	0.231** *	0.746	0.036
Size	0.020	- 0.103** *	0.704** *	-0.027	- 0.098** *	0.012	-0.372	-0.039
L1.Size	-0.008	- 0.186** *	0.205	-0.043	0.233** *	-0.066**	-0.533	-0.024
L2.Size	0.025	- 0.055** *	- 0.484** *	-0.007	0.050**	- 0.061** *	-0.724**	- 0.071** *
Crisis	-0.011	0.009	0.067	-0.015	0.008	0.006	0.102	0.003
constant	included							
Year dummies	included							
Wald chi2	80.24	516.49	155.44	469.89	935.28	1504.36	269.34	200.77
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number Firms	2 603	9 617	3 976	5 997	6 300	2 637	2 273	33 403
Percent	7,79	28,79	11,90	17,95	18,86	7,89	6,80	100

Notes: In logs are Costfin, Cashturn, WC and Acidtest. *, **, *** significant at 10%, 5% and 1%. L1 – lagged one period; L2 – lagged two periods of time. Variables are defined in Table 6. Dependent variable: Net profit margin – Profit; Independent variables: Net trade credit – NTC; Working capital – WC; Cost of financing – Costfin; Cash turnover – Cashturn; Acid test – Acidtest; Total debt financing - Total_debtfin; Firm size – Size. Country crisis – Crise. Belgium (BE), Germany (DE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), and Sweden (SE).

Finally, the study finds systematic differences between and across countries of profitability and consequently results are revealed to be sensitive to the country and to the lagged terms of independent variables included in the analysis. Henceforth, financial managers must consider firms' characteristics as macroeconomic environmental effects

and prepare appropriate policies and strategies toward better-working capital management optimization.

5. CONCLUSION

The purpose of this study was to examine the relationship between firm profitability and working capital management by investigating a sample of 33,403 European firms from seven different countries (Denmark, Germany, Spain, France, Italy, the Netherlands, and Sweden) from 2006 to 2015 using dynamic GMM panel data estimation.

The main results show that firms with higher working capital and an acid liquidity ratio are more profitable. Firms with higher debt financing and cost of financing are less profitable than counterparties, and the ability of firms to convert sales into cash is found to influence profitability, even if the relationship is not significant in all countries. Moreover, the size and crises are found to be significant variables. In addition, the study suggests that aggressive working capital policies could further decrease firm profitability and that a moderate level of positive working capital should be kept.

The study contributes to the empirical evidence by examining the effect of working capital management on profitability and provides some results that can be useful to financial managers for preparing and implementing better-working capital management policies.

Our study undoubtedly has its limitations, given that it analyzes data from seven countries over the period 2006-2015. Therefore, for future studies, it is recommended to extend the period and include other factors, especially those that reflect ongoing macroeconomic crises.

REFERENCES

- Abuzayed, B. (2012). Working capital management and firms' performance in emerging markets: The case of Jordan. *International Journal of Managerial Finance*, 8(2), 155–179. <https://doi.org/10.1108/17439131211216620>.
- Afrifa, G.A., Padachi, K. (2016). Working capital level influence on SME profitability. *Journal of Small Business and Enterprise Development*, 23(1), 44–63. <https://doi.org/10.1108/JSBED-01-2014-0014>.
- Akbar, A., Jiang, X., Akbar, M. (2022). Do working capital management practices influence investment and financing patterns of firms?. *Journal of Economic and Administrative Sciences*, 38(1), 91-109. <https://doi.org/10.1108/JEAS-07-2019-0074>.
- Altaf, N., Shah, F.A. (2018). How does working capital management affect the profitability of Indian companies?. *Journal of Advances in Management Research*, 15(3), 347–366. <https://doi.org/10.1108/JAMR-06-2017-0076>.

Aregbeyen, O. (2013). The Effects of Working Capital Management on the Profitability of Nigerian Manufacturing Firms. *Journal of Business Economics and Management*, 14(3), 520–534. DOI: 10.3846/16111699.2011.651626.

Atanassov, J., Kim, E.H. (2009). Labor and Corporate Governance: International Evidence from Restructuring Decisions. *Journal of Finance*, 64(1), 341–375. <https://doi.org/10.1111/j.1540-6261.2008.01436.x>.

Baker, H.K., Pattnaik, D., Kumar, S. (2020). Trade credit and firm profitability: Empirical evidence from India. *International Journal of Finance & Economics*, 1–20. DOI: 10.1002/ijfe.2352.

Banos-Caballero, S., García-Teruel, P. J., Martínez-Solano, P. (2012). How does working capital management affect the profitability of Spanish SMEs?. *Small Business Economics*, 39(2), 517–529.

Banos-Caballero, S., García-Teruel, P. J., Martínez-Solano, P. (2013). The speed of adjustment in working capital requirement. *European Journal of Finance*, 19(10), 978–992. DOI: 10.1080/1351847X.2012.691889.

Banos-Caballero, S., García-Teruel, P., Martínez-Solano, P. (2010). Working capital management in SMEs. *Accounting and Finance*, 50(3), 511–527. <https://doi.org/10.1111/j.1467-629X.2009.00331.x>.

Banos-Caballero, S., García-Teruel, P., Martínez-Solano, P. (2021). The speed of adjustment in net operating working capital: an international study. *Spanish Journal of Finance and Accounting / Revista Española de Financiación y Contabilidad*, 50(4), 423–440. DOI: 10.1080/02102412.2020.1864176.

Banos-Caballero, S., García-Teruel, P.J., Martínez-Solano, P. (2014). Working capital management, corporate performance, and financial constraints. *Journal of Business Research*, 67(3), 332–338. DOI: 10.1016/j.jbusres.2013.01.016.

Boisjolya, R. P., Conine Jr. Th. E., McDonald, M. B. (2020). Working capital management: Financial and valuation impacts. *Journal of Business Research*, 108, 1–8. <https://doi.org/10.1016/j.jbusres.2019.09.025>.

Box, T., Davis, R., Hill, M., Lawrey, C. (2018). Operating performance and aggressive trade credit policies. *Journal of Banking & Finance*, 89, 192–208. DOI: 10.1016/j.jbankfin.2018.02.011.

Bussoli, C., Conte, D. (2020). Trade credit and firm profitability: moderation analysis of intercompany financing in Italy. *Journal of Small Business and Enterprise Development*, 27(6), 965–985. <https://doi.org/10.1108/JSBED-04-2020-0133>.

Deari, F., Palomba, G. (2024). Does the Cash Conversion Cycle Affect Firm Profitability? Some Empirical Evidence from Listed Firms in North Macedonia. *Zagreb*

International Review of Economics & Business, 27(1), 63-77.
<https://doi.org/10.2478/zireb-2024-0003>.

Deari, F., Kukeli, A., Barbuta-Misu, N., Virlanuta, F.O. (2022) Does working capital management affect firm profitability? Evidence from European Union countries. *Journal of Economic and Administrative Sciences*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JEAS-11-2021-0222>.

Deloof, M. (2003). Does Working Capital Management Affect Profitability of Belgian Firms? *Journal of Business, Finance & Accounting*, 30(3), 573–588. <https://doi.org/10.1111/1468-5957.00008>.

Dhole, S., Mishra, S., Mohan Pal, A. (2019). Efficient working capital management, financial constraints, and firm value: A text-based analysis. *Pacific-Basin Finance Journal*, 58. <https://doi.org/10.1016/j.pacfin.2019.101212>.

Duchin, R., Ozbas, O., Sensoy, B. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, 97(3), 418–435. <https://doi.org/10.1016/j.jfineco.2009.12.008>.

Eckbo, E., Kisser, M. (2013). Corporate funding: who finances externally? Tuck School of Business Working Paper No. 2012-110. https://econ.au.dk/fileadmin/Economics_Business/Research/Seminars/Finance_Accounting_Seminars/2013/Eckbo_and_Kisser__2013_.pdf.

Ek, R., Guerin, S. (2011). Is There a Right Level of Working Capital? *Journal of Corporate Treasury Management: The Official Publication of the Finance and Treasury Association* 4, no. 2.

Enqvist, J., Graham, M., Nikkinen, J. (2014). The impact of working capital management on firm profitability in different business cycles: Evidence from Finland. *Research in International Business and Finance*, 32,36–49.

Fernandez-Lopez, S., Rodeiro-Pazos, D., Rey-Ares, L. (2020). Effects of working capital management on firms' profitability: evidence from cheese-producing companies. *Agribusiness* 36(4), 770–791. DOI: 10.1002/agr.21666.

Gołaś, Z. (2020). Impact of working capital management on business profitability: Evidence from the Polish dairy industry. *Agric. Econ. – Czech*, 66, 278–285. <https://doi.org/10.17221/335/2019>.

Hoang, H.C., Xiao, Q., Akbar, S. (2019). Trade credit, firm profitability, and financial constraints Evidence from listed SMEs in East Asia and the Pacific. *International Journal of Managerial Finance*, 15(5), 744–770. DOI: 10.1108/IJMF-09-2018-0258.

Hogerle, B., Charifzadeh, M., Ferencz, M., Kostin, K.B. (2020). The development of working capital management and its impact on profitability and shareholder value:

evidence from Germany, *Strategic Management*, 25(2), 27–39. DOI: 10.5937/StraMan2002027H.

Jędrzejczak-Gas, J. (2017). Net Working Capital Management Strategies in the Construction Enterprises Listed on the New Connect Market. *Procedia Engineering* 182, 306–313. <https://doi.org/10.1016/j.proeng.2017.03.098>.

Kayani, U.N., De Silva, T.A., Gan, C. (2020). Working Capital Management and Firm Performance Relationship: An Empirical Investigation of Australasian Firms. *Review of Pacific Basin Financial Markets and Policies* 23(3). <https://doi.org/10.1142/S0219091520500265>.

Ling, S., Azlan bin Ali, S., Shin Yie, L. (2018). A conceptual paper on working capital management theories. *Int. J. Manag. Bus. Res.*, 8(4), 13–28.

Madaleno, M., Barbuta-Misu, B. N., Deari, F. (2019). Determinants of Net Trade Credit: A Panel VAR Approach Based on Industry. *Prague Economic Papers*, 28(3), 330–347. <https://pep.vse.cz/pdfs/pep/2019/03/05.pdf>.

Magni, C.A., Marchioni, A. (2020). Average rates of return, working capital, and NPV-consistency in project appraisal: A sensitivity analysis approach. *International Journal of Production Economics*, 229. <https://doi.org/10.1016/j.ijpe.2020.107769>.

Martínez-Sola, C., García-Teruel, P.J., Martínez-Solano, P. (2014). Trade credit and SME profitability. *Small Bus Econ*, 42, 561–577. <https://doi.org/10.1007/s11187-013-9491-y>.

Masri, H., Abdulla, Y. (2018). A multiple objective stochastic programming model for working capital management. *Technological Forecasting and Social Change*, 131, 141–146. DOI: 10.1016/j.techfore.2017.05.006.

Mättö, M., Niskanen, M. (2020). Role of the legal and financial environments in determining the efficiency of working capital management in European SMEs. *International Journal of Finance & Economics*, 26, 5197–5216. DOI: 10.1002/ijfe.2061.

Mielcarz, P., Osiichuk, D., Wnuczak, P. (2018) Working Capital Management through the Business Cycle: Evidence from the Corporate Sector in Poland. *Contemporary Economics*, 12(2), 223–236. DOI: 10.5709/ce.1897-9254.273.

Mun, S. G., Jang, S. Sh. (2015). Working capital, cash holding, and profitability of restaurant firms, *International Journal of Hospitality Management*, 48, 1-11. <https://doi.org/10.1016/j.ijhm.2015.04.003>.

Paul, S.Y., Guernat, C., Devi, S. (2018). Why do firms invest in accounts receivable? An empirical investigation of the Malaysian manufacturing sector. *Journal of Accounting in Emerging Economies*, 8(2), 166–184. <https://doi.org/10.1108/JAEE-01-2017-0005>.

- Peng, J., Zhou, Z. (2019). Working capital optimization in a supply chain perspective. *European Journal of Operational Research*, 277(3), 846–856. <https://doi.org/10.1016/j.ejor.2019.03.022>.
- Prasad, P., Narayanasamy, S., Paul, S., Chattopadhyay, S., Saravanan, P. (2018). Review of Literature on Working Capital Management and Future Research Agenda. *Journal of Economic Survey* 33(3), 827–861. <https://doi.org/10.1111/joes.12299>.
- Prsa, D. (2020). The Impact of Working Capital Management on the Profitability of Croatian Manufacturing SMEs. *Ekonomski vjesnik/Econviews - Review of Contemporary Business, Entrepreneurship and Economic*, 33(2), 371–382. Retrieved from <https://hrcak.srce.hr/ojs/index.php/ekonomski-vjesnik/article/view/9789>.
- Sageder, M., Feldbauer-Durstmüller, B. (2019). Management control in multinational companies: a systematic literature review. *Rev Manag Sci*, 13, 875–918. <https://doi.org/10.1007/s11846-018-0276-1>.
- Semaa, H., Hou, M.A., Fadili, Z., Farhaoui, Y., Malhouni, B. (2020). Design of an efficient strategy for optimization of payment induced by a rational supply chain process: a prerequisite for maintaining a satisfactory level of working capital. *Procedia Computer Science*, 170, 881–886. <https://doi.org/10.1016/j.procs.2020.03.118>.
- Shi, X., Zhang, S. (2014). Trade credit: the interaction of financing, marketing, operations, and risk behavior. *Rev Manag Sci*, 8, 225–248. <https://doi.org/10.1007/s11846-013-0103-7>.
- Singh, H.P., Kumar, S. (2017). Working capital requirements of manufacturing SMEs: evidence from emerging economy. *Review of International Business and Strategy*, 27(3), 369–385. DOI: 10.1108/RIBS-03-2017-0027.
- Tsuruta, D. (2019). Working capital management during the global financial crisis: Evidence from Japan. *Japan and the World Economy*, 49, 206–219. <https://doi.org/10.1016/j.japwor.2019.01.002>.
- Wang, Y., Ji, Y., Chen, X., Song, Ch. (2014). Inflation, operating cycle, and cash holdings. *China Journal of Accounting Research*, 7(4), 263–276. <https://doi.org/10.1016/j.cjar.2013.07.001>.
- Yazdanfar, D., Ohman, P. (2017). The impact of trade credit use on firm profitability: empirical evidence from Sweden. *Journal of Advances in Management Research*, 13(2), 116–129. DOI: 10.1108/JAMR-09-2015-0067.
- Zimon, G., Dankiewicz, R. (2020). Trade Credit Management Strategies in SMEs and the COVID-19 Pandemic - A Case of Poland. *Sustainability*, 12(15), 6114. <https://doi.org/10.3390/su12156114>.

Environmental Control and the Human Settlements Protection Regime

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Abstract

Introduction: This paper examines the critical role of environmental control mechanisms in protecting and promoting sustainable human settlements. It explores the linkages between unsatisfactory shelter, environmental conditions, and the lack of access to land and security of tenure, and their impact on social divisions, violence, and personal safety. The paper highlights the importance of a comprehensive approach to human settlements development that treats urban and rural problems as integral parts of the overall equation, particularly in the context of rapid urban population growth in developing countries, with an emphasis on Moldova.

Aim: The aim of this paper is to:

- Analyse the current state of environmental control mechanisms and their effectiveness in protecting human settlements
- Identify the key challenges and barriers to implementing sustainable environmental control measures in human settlements
- Propose innovative and practical solutions to enhance environmental control and protection in human settlements

Methodology: The paper will employ a mixed-methods approach, combining:

- 1) A comprehensive literature review of academic articles, policy documents, and reports related to environmental control and human settlements;
- 2) Analysis of case studies and best practices from various countries and regions;
- 3) Interviews with experts, policymakers, and stakeholders in the field of environmental management and human settlements;
- 4) Quantitative data analysis to assess the impact of environmental control measures on human settlements;

The **findings** of this paper are as follows:-Inadequate environmental control mechanisms were identified as a key issue. The study revealed that numerous human settlements, particularly in developing countries, are deficient in effective environmental control measures to address pressing concerns such as air pollution, water contamination, waste management, and land degradation. The research demonstrated a robust correlation between suboptimal environmental conditions in human settlements and elevated social issues, including poverty, crime, and health disparities. It emphasises the necessity for a comprehensive, integrated approach to human settlements development that addresses both urban and rural areas, and integrates environmental, social, and economic consideration

Originality and value: We urge for a better understanding of the current state of environmental control mechanisms and their impact on human settlements, identification of the key challenges and barriers to implementing sustainable environmental control measures in human settlements We will try to offer practical and innovative solutions to enhance environmental control and

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protection in human settlements, including policy recommendations and best practice, giving an emphasis on Increased awareness and advocacy for the importance of environmental control in promoting sustainable and resilient human settlements

Key words: environmental control, human settlements, development, legal responsibility

Jel Codes: K 1; K 10; K 15

1. INTRODUCTION

The paper emphasises the necessity of allocating priority attention to human settlements programmes and policies that reduce urban pollution, improve and expand urban services and infrastructure, and promote environmentally friendly urban transport and energy-efficient housing. Furthermore, we intend to highlight the crucial importance of action at the local level and the participation of people, including major group representatives, to facilitate effective local action and efficient management of human settlements.

By doing so, we need to give some considerations on the legal regime of protection of localities, International documents usually divide the human environment into:

- ◀Natural environment
- ◀built or artificial environment
- ◀social environment

In environmental law the first two are of interest, which are subject to complex legal protection both domestically and internationally. The natural environment together with the man-made environment constitute the environment in which humanity lives and carries out activities.

The artificial environment or the "civilized" environment is the environment created by the humans and consists of 2 elements: human settlements and all that is man-made outside human settlements (man-made constructions and works beyond the perimeter of towns and cities: roads, highways and railways, viaducts, dams, bridges) (Durac,2009).

Considering that possible influences on environmental factors can be exerted, in the first place, from within populated territories as a result of industrial, production and domestic activities, we will refer directly to the legal regime of protection of human settlements.

Thus, increasing the comfort claimed by the individual, from the beginning of its existence, and until now, would not have been possible to achieve without the diversification of social coexistence relationships, which generated the phenomenon of association and living within communities called "human settlements". These, as social ecosystems, are to be studied under a different aspect, taking into account more parameters than those used in the case of social ecosystems. Human settlements can be

considered complex ecological systems (ecosystems) created by human populations, anthropic formations in which most of the transformations of matter, energy and information are carried out by humans. (Marinescu,2008)

Compared to the other fields of ecology, the ecology of human settlements. (Godeanu S, Godeanu M.1992) has a special complexity, putting the habitat and the conditions of existence of the human being at the centre of attention

The notion of human settlement can be viewed under 2 aspects: in a broad sense and in a narrow sense. In a broad sense, a human settlement means a region where a stable group of people has been placed, which consists of their living space, their economic and cultural activity spaces, and the rest spaces that ensure their vital activity. And in the narrow sense, the notion of human settlement includes residential, public and industrial buildings, recreation parks, markets, streets, public, cultural, private institutions, in other words, everything that can be found in a location.

Throughout the history of mankind, 2 large groups of human settlements have been highlighted, these being:

1. urban settlements (cities, towns, municipalities)
2. rural settlements (hamlets, villages)

Despite the fact that there are many distinct characteristics between urban and rural localities, they are specific to both:

- living area
- industrial area
- the rest space
- green areas
- streets and communication ways
- the central area of the locality
- protected areas
- the area outside the village

Prior to the description of the legal framework for the regulation of locations, we will give a brief characteristics of the evolution of the regulations in the field of the development of human settlements, as well as the current situation in the Republic of Moldova in this regard.

2. THE HISTORY OF THE LOCALITIES DEVELOPMENT IN MOLDOVA

Over several centuries, two major factors have operated in the current space of the Republic of Moldova. On the one hand, the favourable natural conditions and the high agricultural capacity of the land have encouraged the population of the territory. On the other hand, the vulnerable geopolitical position has discouraged long-term investments and stopped the urbanisation processes. In the post-war years, the Republic of Moldova experienced a period of slow urbanisation. This process, which was generally positive, occurred within the context of a political system that was rigidly centralized and based on principles of extensive development, which were characteristic of the USSR. However, this approach was inadmissible for a region with limited resources, as was the case with the Republic of Moldova. The development of localities was contingent upon the location of industrial enterprises and the concentration of labour forces in urban areas, facilitated by the influx of rural populations from within the republic and from other former Soviet republics. The urban population increased fivefold, with the number of urban settlements rising from 16 to 64. Of these, 12 were newly constructed, while the expansion of industrial enterprises also contributed to this growth. Approximately one-quarter of the population of cities currently resides in blocks constructed using industrial methods approximately 20 to 30 years ago. However, the exploitation term of these blocks is approaching its limit. A plan to address the issues related to the deterioration of these blocks and the modernisation of the surrounding neighbourhoods within the next 10-20 years has yet to be developed. Following the year 1995, the Republic of Moldova presented a territory with a high degree of anthropogenic exploitation of the natural environment. Approximately 10% of the national territory is occupied by localities, which are defined as human settlements. According to some data, the density of this network is greater than that of neighbouring states, with 5 localities per 100 km². The population of the country is distributed across four municipalities, 60 cities (urban area), 1,600 villages, and 925 communes and separate villages (rural area).

3. CURRENT POLICIES REGARDING THE DEVELOPMENT OF HUMAN SETTLEMENTS

The prevention of the demographic decline, determined by the researches and programs, (Matei, Paladi, Sainsus, 2009) whose object of study was to anticipate the implications of the demographic evolution on the perspective development of the society as a whole, generally require the implementation of strict measures with the opposite effect that would bring advantages to the economic development of the state. The policies of recent years, which aimed to achieve the goals of extensive development, have resulted in hasty transformations of the planning structures of the localities. These transformations have been undertaken without taking into account the natural factors that determined the evolution of these structures in previous periods. Consequently, the surrounding environment of the localities has been affected, with the occurrence of landslides and soil erosion. Furthermore, the hydrological regime of lands built by

mudslides has been altered in an unwanted manner. Despite these circumstances, the current economic situation, the low standard of living of the population, and the phenomenon of migration have led to a continuous and tendentious decrease in the population. The population of the Republic of Moldova, according to the data of the last census carried out in 2024, has decreased from 4 million to 2,700. In light of these circumstances, it is imperative to conduct a thorough investigation into the newly established settlements within the territories designated for allotment. This is particularly crucial given that the initial assumption was that these settlements would be permanently populated. The emergence of these settlements, in the form of villages, has led to a multitude of challenges, both social and environmental. Consequently, the population has experienced a significant decline, resulting in a slow development of these settlements.

In this context, the limited autonomy of local public administration, the traditions and bureaucratic relations with the population, the lack of a mechanism of relations appropriate to the democratic society and market relations, and the inability to solve even simple problems such as greening the territory and maintaining sanitation, represent significant obstacles to the resolution of the described problems.

In order to overcome these obstacles, it is essential to adjust the legislative framework as a priority. The objects and subjects of law in the field of urban and territorial planning must be clearly defined and delineated. It is essential to establish the necessary mechanisms for the participation of the population as a subject of law in the supervision of the rational exploitation of environmental factors within human settlements. Zoning, easements, and prohibitions imposed on individuals and even authorities have been gradually accepted in the name of the higher requirements of collective well-being, including from the perspective of the natural environment. Dutu M.(2010) However, in the present era, there is a pressing need for the enactment of legislation and the implementation of effective mechanisms to ensure the sustainable development of localities. It is of paramount importance to ensure the effective supervision of urban planning and territorial development documentation, with the assistance of mechanisms established by special laws.

3.1 The legal framework for the protection of human settlements

The legal framework for the protection of human settlements constitutes the totality of regulations aimed at the activities regarding the coordination of social, economic, cultural and ecological needs in accordance with the fundamental values of society taken as a whole. The objective is to achieve a natural and harmoniously built framework, which favours social life and the culture of the population. (Zamfir,Trofimov(1998)

Indeed, for the first time, the general principles, framework of action and objectives for the protection of human settlements were established in the context of the Vancouver Conference of 1976. In the adopted declaration, it was demonstrated that in the circumstances in which a significant proportion of the population, particularly in underdeveloped countries, lives in inadequate settlements, the absence of positive and

concrete measures at the national level will result in a deterioration of these conditions.(Marinescu,(2008) Consequently, in order to prevent the potential deterioration of living conditions in human settlements, it is necessary to adjust the legal framework in this field to align with the new standards. At the present time, a significant portion of the legal regime for the protection of localities is occupied by territorial planning, which has its legal seat in Law no. 835/1996 on the principles of urban planning and territorial planning.

The legal regime for territorial development encompasses the following elements:

- a) Tasks set within the planning and urban planning activity
- b) Documentation regarding activities within the territory
- c) Planning: management of the territory of the locality
- d) Control in the field of urban planning and territorial development of the locality
- e) Legal responsibility for the violation of the legislation regarding the development of the territory

3.2 The tasks set within the planning and urban planning activity

In accordance with the legislation in the field, the tasks set before the authorities responsible for the development and implementation of urban planning and territorial planning policies are considered separately as tasks of the territorial planning and urban planning activities.

Consequently, the territorial planning authority endeavours to:

1. Promote balanced economic and social development in accordance with the specific conditions of each area.
2. Improve the quality of life of people and human communities.
3. Adhere to responsible management of natural resources and environmental protection.
4. Rationalise the use of the territory.

In accordance with the provisions of article 5, paragraph 1 of Law no. 835/1996, the urban planning activity aims to achieve the following objectives:

- a. Rationalise and balance the use of land necessary for the functioning of localities
- b. The determination of the functional structure of localities
- c. The provision of housing that meets the requirements and level of development of society

- d. The compositional aesthetics in the realisation of the built frame and the arrangement of the natural frame in the localities
- e. The protection of the population, the natural and built environment against pollution, foreseeable natural and technological risks
- f. The protection, conservation and granting of the corresponding status to monuments of cultural and natural value

In accordance with the aforementioned objectives, the authorities of the local public administration are responsible for preparing, within the limits of their established competence, programmes for the organisation and urban development of the localities. The direct technical management of the urban planning activity in the localities is carried out by the architecture and urban planning services of the local public administration, in accordance with the legislation and technical regulations.

The documentation pertaining to the activities undertaken in the development of the territory of the locality is defined in accordance with Article 1 of the Law on Ecological Expertise as the set of documents, prepared and approved in the established manner, pertaining to a specific territory. These documents analyse the existing situation and establish objectives, actions, and measures in the field of urban planning and territorial development. In accordance with Article 6, Paragraph 1 of Law no. 835/1996, territorial development and urban planning activities are carried out on the basis of territorial development plans, urban plans and related regulations. These documents set out the goals, means and phasing of the territorial planning and urban planning actions, as well as solutions for a balanced development of the territories and localities. They also offer solutions for the prevention and elimination of dysfunctionalities. In other words, the quality of urban planning and land development documentation affects the general condition of the territory. The success of construction projects in localities depends on it. Through urban planning and land development documentation of a regulatory nature, the destination of lands and the rules for their use are established. Based on this, urban planning certificates and construction authorisations are issued. The way of land use for any type of construction must be regulated by urban plans and land development plans. Therefore, the legislation in the field regulates 3 categories of territorial development plans and 3 categories of urban planning. The land development plans are as follows:

1. The development plan of the national territory
2. Regional land use plans
3. The local land development plan

The urban plans are as follows:

1. General urban plans are drawn up for the entire territory of the locality, including all the territories necessary for its operation and development

2. Zonal urban plans These are drawn up for part of the territory of a locality or for a territory that has been designated for the operation and development of the locality.

Detailed urban plans are the documentation that establishes the conditions for the location and execution of one or more constructions with a specified destination in a certain land. The aforementioned plans are designed to establish the level of exploitation of natural resources, and in some cases, their regeneration. They also establish the conditions for the inner and outer areas of the localities, as well as the areas where the major land development measures are expected to take place. With regard to the detailed plans for a concrete construction, it is necessary to mention that in order to obtain constructions of appropriate quality, the following requirements must be met and maintained for the entire duration of the construction's existence:

1. Resistance to stability
2. Safety and exploitation
3. Fire safety
4. Hygiene, people's health, restoration and protection of the environment
5. Thermal insulation
6. Noise protection

In addition, the obligation to conduct ecological expertise on new projects, programmes, plans and schemes aimed at economic and social development of Moldova, the reconstruction of municipalities, cities and villages, the supply of heat, water, gas and electricity, the construction of sewage systems and urbanism and territorial planning in urban and rural localities, arises in response to the demands of quality in construction and therefore the quality of life.

The management of municipal territories encompasses all actions aimed at their organisation, conservation and development. These actions are oriented towards achieving a physical and functional state of the natural and built environment that corresponds to human needs, in accordance with the public interest and the legislation in force.

The territory of the locality is intended to serve human needs. This territory is used for the allocation of people's dwellings, for the development of economic-industrial objectives, peasant households, and socio-cultural objects.

Although the local council is responsible for managing the territory of the locality, this does not imply that it is also the beneficiary of the territories it manages. Rather, the beneficiary is the society itself, which is comprised of natural and legal persons.

3.3 Environmental control in urban and spatial planning

The efficiency of any activity is usually ensured through the control and supervision by state bodies of the way in which the policies elaborated by them are implemented. The urban and spatial planning activity is carried out in accordance with the legislation, under the coordination of the central public authority for urban and spatial planning, respecting the principles of democratisation and local autonomy.

Although this is not explicitly stated, environmental control in the field of urban planning and territorial planning can be achieved through state policy and strategy in the relevant field. Furthermore, the urban planning and territorial planning services of the local public authority contribute to the achievement of this control. Environmental control over the activity of town and country planning is exercised by the staff of the specialist department of the central public administration authority for town and country planning or by the decentralised specialist departments of this authority in the districts or municipalities. In the context of administrative-territorial jurisdictions, the responsibility for regulating the activities of urban planning and spatial planning is delegated to the local public administration authorities. (Popescu,(1995)

4. THE LEGAL RESPONSIBILITY FOR THE LEGISLATION VIOLATION REGARDING THE DEVELOPMENT OF TERRITORIES

In the event of a violation of the legislation on the development of the territory, the following forms of liability are applicable: criminal, contraventional, civil and disciplinary. In the event of contravention, the following circumstances may give rise to liability:

a) the approval of urban planning and land development documentation without compliance with the established procedure.

b) the use of new constructions or those whose functional destination has been changed without the requisite authorisation for operation or change of destination.

c) the failure to provide data from the data bank. Furthermore, the aforementioned legislation stipulates that those responsible for urban planning and territorial development must comply with the relevant informational systems, which are necessary for the aforementioned activities. Additionally, the legislation states that those responsible must not provide erroneous information.

Finally, the legislation states that those responsible must comply with the terms and conditions set out in the relevant legislation regarding the execution of construction works.

The aforementioned norms establish certain rules regarding the protection of localities through their adequate development from an urban point of view. The violation of these

rules attracts responsibility in accordance with Law no. 1515 of 16 June 1993, which concerns the protection of the environment. It is incumbent upon the citizens of the Republic of Moldova to respect the aforementioned rules, which are as follows:

a) to comply with the legislation on environmental protection and to protect the environment, to use natural resources rationally, not to harm the rights and interests of other beneficiaries of natural resources, to alert the environmental authorities promptly or ecological organisations about the damage caused to nature by natural and legal persons.

b) to contribute to the landscaping of the territories, It is the duty of all citizens to ensure the protection of trees and green spaces, to refrain from their destruction, and to refrain from polluting the territory where they work or live. Furthermore, it is the responsibility of all citizens to recover losses and repair damage caused to the environment and the population.(Trofimov,Ardelean,Cretu,(2015)

In accordance with the legislation of other states, it is clearly stipulated that in the process of social-economic development, urban planning, and the planning of territories and localities, it is mandatory to respect ecological principles in order to ensure a healthy living environment. In this regard, local councils, as well as natural and legal persons, are responsible for ensuring that:

1) The arrangement and maintenance of springs and water bodies inside localities and in their neighbouring areas is intended to improve the urban microclimate. In addition, the landscape is to be beautified and protected, and street cleanliness is to be maintained.

2) The location of industrial facilities, roads and means of transport, sewage networks, treatment plants, household, street and industrial waste depots, and other facilities and activities is to be determined without prejudice to sanitation, the environment, the spaces of rest, treatment and recreation, health and comfort of the population.

3) Compliance with the special protection regime of balneo-climatic resorts, areas of tourist and leisure interest, historical monuments, protected areas and natural monuments. It is forbidden to place objectives and carry out activities with harmful effects in the perimeter and in the areas of their protection.

4) The adoption of appropriate architectural elements, the optimisation of housing density, simultaneously with the maintenance, upkeep and development of green spaces, parks, street and landscape arrangements with an ecological, aesthetic and creative function.

5) The regulation of access to certain areas of localities with a predominance of living spaces, areas intended for treatment, rest, recreation and leisure, including the temporary or permanent prohibition of certain types of vehicles and the development of activities that generate discomfort for the population.

6) The adoption of mandatory measures for all natural and legal persons regarding the maintenance and beautification of buildings, yards and their surroundings, green spaces in yards and between buildings, trees and decorative shrubs.

7) The initiation of local projects for the establishment of hygienic-sanitary groups and for the maintenance and development of street sewerage.(Lupan (1996)

5. CONCLUSIONS

This paper provides a holistic and in-depth analysis of the complex relationship between environmental control and human settlements, drawing on a diverse range of sources and perspectives. Besides, there are some challenges in implementation: The study identified several key barriers to the effective implementation of environmental control measures, including limited financial resources, weak institutional capacity, lack of community engagement, and competing development priorities.

The key recommendations for sustainable development in human settlements, as derived from our research paper, are as follows:

It is recommended that municipal governments be strengthened and that social participation in decision-making and activities related to urban development and social housing be increased. The current institutional structures are characterised by a high degree of centralisation, which has proven to be a significant obstacle to progress. Consequently, there is a clear need to empower local governments and communities. It is of the utmost importance to conduct a meticulous evaluation of the environmental impact of human settlements development during the implementation of environmental protection policies. It is imperative to gain a deeper understanding of the relationship between human settlements and the surrounding environment.

It is also recommended, that investment be made in the development of human capital, including knowledge, skills, and habits, in order to achieve sustainable goals such as affordable and clean energy, emissions regulation, and responsible consumption. It is imperative to promote sustainable urbanisation through rational resource use, meeting basic needs, and enhancing economic and social sustainability. It is also crucial to provide access to safe, affordable, accessible, and sustainable transport systems for all, with a particular focus on the needs of vulnerable groups.

We propose innovative and practical solutions to enhance environmental control and protection in human settlements, going beyond the traditional approaches and offering new frameworks for policymakers and practitioners. The study employs an interdisciplinary approach, integrating insights from various fields, including urban planning, environmental science, social policy, and governance, to provide a more nuanced understanding of the issue.

The findings and recommendations of this paper have direct and tangible implications for policymakers, urban planners, and community stakeholders, providing them with evidence-based guidance to improve environmental control and protection in human settlements. This paper contributes to the growing body of research on the nexus between environmental management and sustainable human settlements, addressing a critical gap in the literature and advancing the scholarly discourse in this important area.

There is a problem of inadequate environmental control mechanisms identified as a key issue. The study revealed that numerous human settlements, particularly in developing countries, are deficient in effective environmental control measures to

address pressing concerns such as air pollution, water contamination, waste management, and land degradation.

The interconnectivity between environmental conditions and social issues is another issue. There is a robust correlation between suboptimal environmental conditions in human settlements and elevated social issues, including poverty, crime, and health disparities.

The necessity for a comprehensive, integrated approach to human settlements development that addresses both urban and rural areas, and integrates environmental, social, and economic considerations, with a holistic approach is a must.

REFERENCES:

Durac, G. (2009). Dreptul mediului: Suport de curs. Iasi.

Duțu, M. (2010). Dreptul mediului (3rd ed.). București.

.Godeanu, S., Godeanu, M., & Popescu, M. (1992). Ecodezvoltare sau dezvoltare. Imprimeria Coresi.

.Lupan, E. (1996). Dreptul mediului (Vol. 1). București.

Marinescu, D. (2008). Tratat de dreptul mediului (3rd ed.). București.

Matei, C., Paladi, G., & Sainsus, V. (2009). Cartea Verde a populației Republicii Moldova. Chișinău.

Trofimov, I., & Zamfir, P. (1998). Dreptul mediului: Partea generală. Chișinău.

Trofimov, G., Ardelean, A., & Crețu, (2015). Dreptul mediului, Editura Bons Offices, Chișinău.

Trofimov, «Răspunderea ecologică - concepție contemporană», «Legea și viața» nr. 11, Chișinău, de dreptul mediului», «Fiat Justiția» nr. 1, Cluj-Napoca 1998.

Drept civil român. Introducere în dreptul civil. Subiectele dreptului civil, București, 1998.

Analysis of the Relationship Between Real Sector Confidence Index, Electricity Consumption, Manufacturing Industry Capacity Utilization Rate and Industrial Production Index in Turkiye

Esra N. Kılıcı⁶

Abstract

Introduction: In terms of increasing the production volume and improving economic growth in a country, the expectations of economic units and their confidence in the implemented monetary and fiscal policies are of great importance. Additionally, variables such as electricity use and manufacturing industry capacity utilization rate affect industrial production volume.

Aim: The objective of this study is to examine the relationship between real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate, and industrial production index in Turkiye using data for the period 2016:01-2024:07.

Method: The data used in the study is acquired from the Central Bank of the Republic of Turkiye Electronic Data Delivery System (EVDS). In the analysis, firstly, the stationarity of the series is tested using the Fourier ADF and traditional ADF unit root tests. In the second stage, the existence of a short-term relationship between the series is tested using the Fourier Toda Yamamoto Causality Test.

Findings: The analysis results indicate the existence of a short-term relationship between the real sector confidence index, manufacturing industry capacity utilization rate and industrial production index.

Originality and value: This study uses recent econometric approach which takes into consideration structural breaks.

Key Words: real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate, industrial production index

JEL Codes: C10, E22, O10

1. INTRODUCTION

Expectations undoubtedly influence economic investment decisions. As a result, positive and negative changes in economic actors' expectations might influence the degree of real economic activity. Theoretically, it makes sense that there would be a

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simultaneous relationship between expectations and the actions made by economic agents regarding production, spending, and investment. This is because expectations, whether positive or negative, can influence how much money households and firms spend. In behavioral finance, investors and economic agents are said to act irrationally and make decisions based on psychological variables such as expectations for the future. Consequently, the sentiment of businesses and consumers may have an impact on future economic performance (Kilci, 2020). Khan and Upadhyaya (2020) state that investments made in industrial sectors are largely affected by the expectations of investors regarding the future and are therefore decisive for the production planned to be made in the future. Arisoy (2012) also indicates that confidence indices have an effect on macroeconomic variables such as production changes, consumption expenditures, employment. In this context, determining the relationship between the confidence that enterprises have about the future and production decisions will be important for the planned economic policies and for investors. From this perspective, Albayrak (2018), Ay (2019) examine the relationship between real sector confidence index and find the evidence of a relationship between these variables.

During the times of a nation's economic development, energy usage is crucial. Among the explanations for this are the tight ties and structural dependency of the economy's industrial and agricultural sectors on energy as a production input. The relationships between energy use and macroeconomic factors including the gross domestic product, employment, and energy prices have been the subject of numerous studies conducted in recent years. For instance, using annual real GDP and energy consumption data for the years 1960-2006, Mucuk and Uysal (2009) investigate the causal relationship between energy consumption and economic growth in Turkiye. Their findings show that there is a positive correlation between energy consumption and growth.

The energy issue is unquestionably one of the most significant indicators of the production channels of industrialized and emerging economies. Furthermore, there are regional variations in the relationship between economic expansion and energy use. In a recent study, Akca (2023) investigate the relationship between Turkiye's economic development and energy usage between 2016 and 2022 by using the industrial production index to measure economic growth, and the daily amount of electricity power utilized to measure energy consumption and find that a long-term, one-way causal relationship between economic growth and energy consumption, based on the findings of the Toda-Yamamoto causality test.

The development of the industrial sector, which plays an important role in ensuring and maintaining economic growth, is one of the priority issues in determining macroeconomic policies. Similarly, the capacity utilization rate is the ratio of the production carried out in the country within a certain period to the production at full capacity, and it is of great importance especially in the manufacturing industry, as it can bring developments that will negatively affect the macroeconomic aspect such as

insufficient capacity, decreased productivity, loss of production, negative impact on economic growth, decrease in employment (Petek and Sanli, 2019).

Industrial production is a constant-weighted measurement of the physical production of factories, mines and also public organizations operating in a country. Changes in industrial production are an important indicator of how strong the manufacturing sector is. Total index measurements include electricity, manufacturing, construction, mining, water and gas industries. Since the industrial production index is published monthly as opposed to gross national product, it is considered a more useful indicator for monitoring economic activity (Turkish Statistical Institute, 2021; Investing, 2021). Studies focusing on the relationship between the industrial production index and economic growth indicate the existence of a positive and strong relationship between two variables.

In this study, we examine the interaction between the real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate, and industrial production index for Turkiye in the period 2016:01-2024:07 by using Fourier approach.

The study progresses as follows: Section 2 mentions the literature on the subject briefly and Section 3 presents the data, methodology used in the analysis and the findings obtained. The last section concludes by making a general evaluation.

2. LITERATURE REVIEW

The outlook in the industrial sector is an important indicator of a country's macroeconomic outlook. In the academic literature, there are many studies examining the determinants of the industrial sector performance. In this regard, the effective use of capacity in the industrial sector, the increase in confidence and energy consumption might show that the industrial sector is developed and has an effective role in economic growth. Bicil and Basarir (2022) utilize the real sector confidence index, a measure of expectations, and the industrial production index, a measure of economic activity, to examine the link between expectations and the level of economic activity in Turkiye between 2010 and 2021. Their findings indicate a one-way causal link between the real sector confidence index and the industrial production index.

Ozker (2013) analyze the interactions between selected indicators and national income by considering the capacity utilization rate, the industrial production index and the insufficiency of domestic market demand, which are important indicators in terms of the examination of the economic crisis processes, and find that these variables have a stronger effect in the short period in the crisis process. Employment rate is another important indicator which has an impact on industrial production. Therefore, Colak and Kara (2017) examine the interaction between macroeconomic indicators and employment in Turkiye for the period of 1999-2017 and they conclude that there is a mutual causal relationship between the industrial production index and employment. In their studies using the industrial manufacturing index as a total production variable, Kılıç and Yıldırım (2017) state that there is a weak relationship between production and employment in Turkiye in the 2006-2016 period.

Cagil et al. (2013) analyze the relationship between macroeconomic variables and energy consumption in Turkiye over a 22-year period by using the annual electricity energy consumption per capita as the dependent variable and gross domestic product, capacity utilization rate, industrial sector growth rate, agricultural sector growth rate and central bank foreign exchange reserves as the independent variable. Their findings show a one-way causality relationship between electrical energy consumption and the macroeconomic variables. On the other hand, they find a two-way but weak causality relationship between electricity consumption per person and the growth rate of the industrial sector.

PMI, which is called the purchasing managers index, is carefully followed by researchers and investors, especially because it reflects the expectations of the real sector regarding the economic outlook. Akdag et al. (2018) in Turkiye, using the monthly data of the period 2007-2017 period, investigate the causality relationship between PMI and the macroeconomic and financial indicators, including the industrial production index, capacity utilization rate and BIST industry index. They conclude that there is a causality between the BIST industrial index PMI in the medium and long term; from PMI to the industrial production index in the medium and long term and from PMI to the capacity utilization rate.

Pointing out that the implementation of strategies to increase labor productivity, which is seen as the locomotive of economic growth in order to increase competition in the manufacturing industry, is one of the necessary prerequisites for sustainable economic growth in Turkiye, in the period of 2005-2017, Akyol and Metin (2021) examine the relationship between manufacturing industry labour productivity and economic growth by using the GDP chained volume index, manufacturing industry production index and capacity utilization rate variables. They conclude that labor productivity has a long-term effect on growth.

3. ECONOMETRIC ANALYSIS

3.1 Data

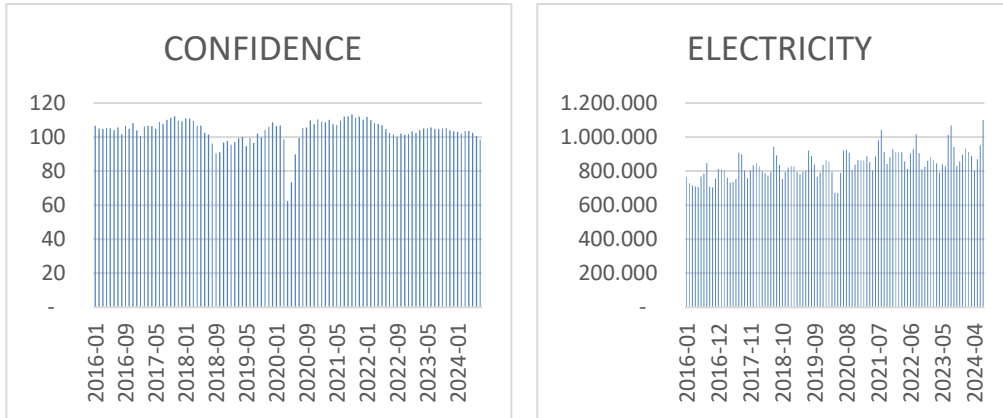
In this study, we aim to analyze the relationship between real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate and industrial production index in Turkiye for the period of 2016:01-2024:07. We obtain the data from the Central Bank of the Republic of Turkiye Electronic Data Distribution System (EVDS).

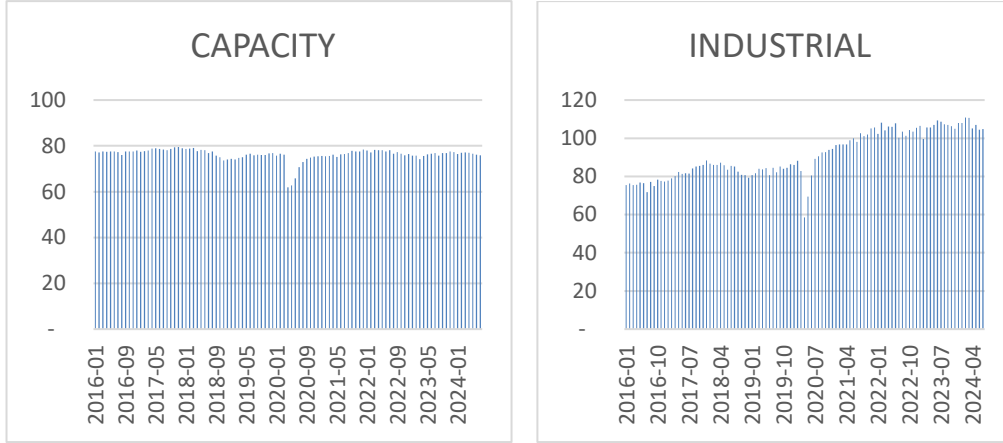
Table 1: Variables

	Variables	Abb.	Exp. Impact
Dependent variable	Industrial production index	INDUSTRIAL	
Independent variable	Real sector confidence index	CONFIDENCE	(+)
Independent variable	Electricity consumption	ELECTIRCITY	(+)
Independent variable	Manufacturing Industry Capacity utilization rate	CAPACITY	(+)

Below are the graphs of the variables. Graph 1 shows the real sector confidence index. The COVID-19 pandemic obviously has a very negative impact on this variable as seen from the Graph 1. The manufacturing industry capacity utilization rate data is designed to track the capacity usage of firms operating in the manufacturing industry based on their existing physical capacities. (CBRT, 2021). Graph 2, similar to the real sector confidence index, shows that the manufacturing industry capacity utilization rate is negatively affected by the COVID-19 Health Crisis. Graph 3 shows the electricity consumption (daily) and we observe that it has a moderate increase in the period of 2016:01-2024:07 except the year 2020. Finally, Graph 4 shows the annual percentage changes of the industrial production index which experiences sharp declines in the pandemic period.

Figure 1: Trend of the variables in the analysis period





3.2 Methodology and Results

In the analysis, after testing the stationary properties of series with Fourier ADF and traditional ADF unit root tests, the Fourier Toda Yamamoto causality test is used to determine the existence of a causality relationship between variables.

Enders and Lee (2012) state that one or more structural changes can be predicted with low-frequency Fourier functions. During the implementation of the Fourier ADF unit root test, it is important to estimate the appropriate number of frequencies of the Fourier function, the value of k , rather than the position and number of the structural change. Enders and Lee (2012) estimate the following model:

$$\Delta y_t = \rho y_{t-1} + \beta_1 + \beta_2 \text{trend} + \beta_3 \sin\left(\frac{2\pi kt}{T}\right) + \beta_4 \cos\left(\frac{2\pi kt}{T}\right) + u_t$$

In the following stage, the Fourier Toda Yamamoto test is used to test the existence of a causality relationship between variables. Nazlioğlu et al. (2016) employ the following equation:

$$y_t = \alpha_0 + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + \beta_1 y_{t-1} + \dots + \beta_{p+d} y_{t-(p+d)} + e_t$$

Table 2: FADF and ADF unit root test results

Series	Frequency	MinSSR	Fourier ADF t-statistic	ADF statistic	t- Fourier F-statistic
INDUSTRIAL	1	1337.84	-2.889	-1.690	3.173
CONFIDENCE	2	2048.96	-5.044	-4.217	3.629
ELECTRICITY	1	0.46773	-1.939	-1.161	1.327

CAPACITY 2 252.378 -4.209 -3.322 2.217

Note: In the analysis, the model with constant is used and the critical values in the study of Enders and Lee (2012) are taken into consideration for the Fourier ADF test statistics and F statistics. The critical values for the ADF t-statistic are -3.495, -2.890 and -2.582 for 1%, 5% and 10%, respectively.

Test results in Table 2 show that CONFIDENCE and CAPACITY series are stationary at the level while INDUSTRIAL and ELECTRICITY do have unit root. Therefore, we employ the Fourier Toda Yamamoto test to examine the relationship between variables.

Table 3: FTY causality test results

Relationship	Wald-test	Asymptotic	Bootstrap	Optimal	Optimal
		p-value	p-value	p	k
CONFIDENCE→ INDUSTRIAL	10.372	0.006	0.014	2	2
ELECTRICITY→INDUSTRIAL	0.269	0.874	0.884	2	1
CAPACITY→INDUSTRIAL	9.830	0.007	0.018	2	2

Note: The findings are acquired by using Schwarz criteria and 1000 bootstrap value. Since n is more than 50, we use the asymptotic p-value.

The findings of the FTY test statistics show that there is a causality run from CONFIDENCE to INDUSTRIAL and from CAPACITY to INDUSTRIAL. On the other hand, there is no causality relationship between ELECTRICITY and INDUSTRIAL. Therefore, we see that there is short run relationship between real sector confidence index, manufacturing industry capacity utilization rate, and industrial production index meaning that the real sector confidence index and manufacturing industry capacity utilization rate have impact on the industrial production index in the short term for Turkiye during the period of 2016:01-2024:07.

4. CONCLUSION

Real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate, and industrial production index are indicators that provide information about the outlook of the industrial sector. During the 2020-COVID 19 Health Crisis period, there was a significant deterioration in these indicators. The goal of this study is to examine the relationship between the real sector confidence index, electricity consumption, manufacturing industry capacity utilization rate, and industrial production index in Türkiye using monthly data for the period 2016:01-2024:07. According to the findings of the econometric analysis, it is seen that the real sector confidence index and manufacturing industry capacity utilization rate have impact on the industrial production index in the short run. In the second half of 2020, although there was a recovery in the real sector confidence index and manufacturing industry capacity utilization rate, the improvement in the industrial production index remained limited. According to the Turkish Manufacturing Industry Report prepared by the Istanbul Chamber of Industry, while production slowed down due to the epidemic, especially in the second quarter, there were difficulties in the supply of raw materials and high increases in input costs. The depreciation of the Turkish Lira and the upward trend in cost inflation brought with it a negative outlook for the industrial sector. However, with the gradual removal of measures and important steps to control the epidemic, we see a moderate recovery in industrial production index after 2023. As a result of measures and steps, the recovery is expected to continue in the following term.

REFERENCES

- Akca, T. (2023). The Effects of Energy Consumption on Industrial Production: A Frequency Domain Causality Analysis. *Ekonomi, İşletme ve Maliye Araştırmaları Dergisi*, 5(2), 124-138.
- Akdağ, S., Deran, A. & İskenderoğlu, O. (2018). PMI İle Çeşitli Finansal Göstergeler Arasındaki İlişkinin Dinamik Nedensellik Analizi İle İncelenmesi: Türkiye Örneği, *Finans Sempozyumu-Mersin*, 22.
- Akyol, S. E. & Metin, U. G. (2021). Türkiye’de İmalat Sanayinde İşgücü Verimliliği ve Ekonomik Büyüme İlişkisi. *Verimlilik Dergisi*, (1), 35-47.
- Albayrak, Ş. G. (2018). Türkiye’de Reel Kesim Güven Endeksi ve İmalat Sanayi Kapasite Kullanım Oranı Arasındaki İlişki Üzerine Ampirik Bir Uygulama (2007-2017). *Akademi Sosyal Bilimler Dergisi*, 5(15), 18-27.
- Arisoy İ. (2012). Türkiye Ekonomisinde İktisadi Güven Endeksleri ve Seçilmiş Makro Değişkenler Arasındaki İlişkilerin VAR Analizi. *Maliye Dergisi*, sayı:162, 304-315.
- Ay, B. (2019). İmalat Sanayi Kapasite Kullanım Oranı ve Reel Kesim Güven Endeksi Arasındaki İlişki: Türkiye İçin Ampirik Bir Çalışma. *The Journal of Social Science*, 3(5), 376-389.

Bicil, İ. M. & Başarır, Y. (2022) Symmetric and Asymmetric Relationship between Real Sector Confidence Index and Industrial Production Index. *BILTURK, The Journal of Economics and Related Studies*, 4(1), 46-52.

Çağıl, G., Türkmen, S. Y. & Çakır, O. (2013). Enerji ve Makroekonomik Değişkenler Arasındaki İlişki: Türkiye Açısından Bir Uygulama. *Muhasebe Ve Finansman Dergisi* (58), 161-174.

Central Bank of the Republic of Türkiye (CBRT) (2021). Electronic Data Distribution System (EVDS). <https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket>.

Çolak, M. & Kara, O. (2017). Türkiye'de Makro Ekonomik Göstergelerin İstihdama Etkileri. *Yüzcüncü Yıl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (Afro-Avrasya Özel Sayı)*, s. 259-272.

Dickey, D. & Fuller, W. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, *Econometrica*, 49(4), 1057-1072.

Enders W. & Lee, J. (2012), The Flexible Fourier Form and Dickey-Fuller Type Unit Root Tests. *Economics Letters*, 117(1), 196-199.

Investing (2021). Ekonomik Takvim. https://tr.investing.com/economic-calendar/turkish-industrial-production-618?__cf_chl_jschl_tk__=pmd_BF_idlvwo4nDz6kGS7tSzq6kXLeDbqBBFtHWspibMq4-1633431459-0-gqNtZGzNAICjcnBszQnl.

Istanbul Chamber of Industry (2021). Turkish Manufacturing Industry Report, May 2021. <https://www.markiteconomics.com/Public/Home/PressRelease/96f81bb95ea84302aa126747367d061c>

Khan, H. & Upadhyaya S. (2020). Does Business Confidence Matter for Investment? *Empirical Economics*, 59(4), 1633-1665.

Kilci, E. N. (2020). Do confidence indicators have an impact on macro-financial indicators? An analysis of the financial service and real sector confidence indexes: Evidence from Turkey. *European Journal of Government and Economics*, 9(1), 74-94.

Kılıç, E. & Yıldırım, S. (2017). Is Jobless Growth Still a Problem for Turkey? *V. Anadolu International Conference in Economics*, Eskişehir, Türkiye.

Mucuk, M. & Uysal, D. (2009). Türkiye Ekonomisinde Enerji Tüketimi ve Ekonomik Büyüme. *Maliye Dergisi*, 157, 105-115.

Nazlioglu, S., Gormus, N. A. & Soytaş, U. (2016). Oil Prices and Real Estate Investment Trusts (REITs): Gradual-Shift Causality and Volatility Transmission Analysis. *Energy Economics*, 60, 168-175.

Ozker, A. N. (2013). Kriz Dönemi Milli Gelir Değişimlerinde Kapasite Kullanım Oranları ve Sanayi Üretim Endeksi Etkileşimi: Türkiye Örneği, Uluslararası İktisadi ve İdari İncelemeler Dergisi, 5(10), 21-44.

Petek, A. & Şanlı, O (2019). Türkiye’de Gayrisafi Yurtiçi Hasıla, Döviz Kurları ve Sanayi Üretim Endeksinin Kapasite Kullanım Oranları Üzerine Etkileri: Zaman Serileri Analizi, International Review of Economics and Management, 7(1), 49-73.

Turkish Statistical Institute (2021). Statistics Data Portal. <https://data.tuik.gov.tr/Kategori/GetKategori?p=Sanayi-114>.

Investigation of Physical Activity and Social Interaction Behaviours in Elderly Individuals in the Case of Bosna Hersek Neighbourhood Parks

Sertaç Güngör⁷

Abstract

Introduction: City Parks are the most important places for individuals of all age groups to relieve daily stress and socialize. Urban parks, which are an indispensable recreation area, are also important for people to renew themselves, to get fresh air in the open air and to be alone with nature even if they are between building blocks in the city. These opportunities provided by parks are utilized by different age groups.

Aim: For this research, Bosna Hersek Neighborhood, where the elderly population in Konya city is densely populated, was selected as the sample area and the opinions of elderly individuals who use the large parks in this neighborhood were consulted about the research topic

Method: During the preparation of the survey questions, easy questions that the elderly can easily understand and will not take much time were used. The voluntary survey was conducted in 2024 at different times of the day with elderly people who use the parks in spring. 116 elderly individuals were interviewed verbally according to the snowball technique

Findings: By evaluating the issue from the perspective of elderly individuals and considering the results of the survey, suggestions were made on the Features that Encourage Physical Activity and Social Interaction and improvements in this regard. In our research, It has been revealed that there is an increase in the need for physical activity and socialization of the elderly, especially after the pandemic, and the needs of these individuals who will shed light on new generations with their experiences should never be ignored.

Conclusion: All these findings show that parks are an important social space for older people and therefore require careful planning and implementation in the design, management and use of parks. In this way, elderly people can benefit more from parks and have a more enjoyable time.

Originality and value: With this research, the physical and social needs of the elderly have been revealed and when the results are evaluated, it shows that local governments have important findings that can be evaluated in future park designs.

Key Words: Elderly design, Landscape design, Landscape Field Experiments, Physical Activity, Social Interaction.

Jel Codes: C93, D71

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1. INTRODUCTION

Ageing is a lifelong and irreversible process that starts at birth. Although it is not correct to accept a certain limit, chronologically, 65 years of age and above is accepted as old age all over the world. Life expectancy is increasing in the world and in our country and the ratio of the elderly population to the young population is gradually increasing. In 2025, the number of elderly populations in the world is expected to be 800 million. It is estimated that there will be 9 million elderly in our country. Depending on this increase, healthy aging and independence in social life gain importance (Anonim 2014).

Aging is an inevitable process that involves biological, psychological and social problems in human life. Physical activity and exercise are of critical importance in the prevention of non-communicable diseases such as cardiovascular diseases, stroke, diabetes, osteoporosis and some types of cancer seen in old age and falls that can lead to serious injuries and even death, maintaining independence and improving quality of life. Exercise programs including aerobic, resistance, balance and flexibility exercises should be planned for the protection and improvement of health in the elderly. In our country with an increasing number of elderly people, public awareness should be raised on the importance and benefits of physical activity and exercise in the elderly, related projects should be supported, suitable places for exercise should be created and elderly individuals should be encouraged to exercise (Özmen & Contarlı 2023).

Physical activity is one of the best ways to improve the health of older people. Each of the different exercise modalities targets different aspects of physical function/fitness, such as muscle mass and strength, cardiorespiratory fitness, balance and flexibility. The combination of different exercise modalities is likely to promote maximal impact on all components of physical performance and therefore maximize health benefits. Moderate intensity physical activities (brisk walking, swimming, stretching exercises, etc.) provide significant benefits in older people. These exercises improve balance, flexibility, coordination, endurance, mental health, cognitive function and muscle strength. This greatly increases the functional independence of the elderly (Erdem et al. 2021).

Urban parks with intensive physical activities are very important in this respect

2. LITERATURE REVIEW

Public open green spaces: parks and other recreation areas are considered as basic community resources that provide an environment for leisure time physical activities, benefit social and ecological functions, contribute to psychological well-being and community welfare in terms of various communities, and can improve quality of life and health at the same time (Alp & Ekşi 2021).

The concept of open space is one of the important basic elements of the urban fabric and is defined as openings or empty spaces outside architectural structures and transport areas. In other words, it is perceived as areas where there is no construction for any

purpose on the outdoor space and there is a potential opportunity for any recreational use. For example, water surfaces, squares with no or very limited number of vegetation elements and transport areas are defined as open spaces (Gül & Küçük 2001).

Urban parks are public service areas that undertake very important and various functions in the reconstruction of the disconnected nature-human relationship that develops due to urbanisation within the complex urban organisation. At the same time, they are usually centrally located in urban settlements and are visually part of the city. These areas are located in places that people can easily access in daily use and provide opportunities for individual or group activities such as walking, jogging, sitting outdoors, picnicking, playing games, etc. (Aykal et al. 2017).

3. RESEARCH METHODOLOGY

The questionnaire form prepared within the scope of the study was carried out with individuals aged 50 and over in the parks of Bosna Hersek neighborhoods, which is the most populous neighborhoods of Konya province Selçuklu district in terms of population. It is aimed to determine the thoughts and ideas of these individuals about the parks. For what purposes and why individuals prefer this park, with whom they come, which activities they use and the features they find missing for the park were determined. In the spring of 2024, 116 elderly individuals were interviewed face to face with the snowball technique at different times on weekdays and weekends based on volunteerism.

3.1.1. Data Analysis

Out of total 116 respondents, 20/20 were male and 40/36 were female. Similarly, most of the participants belonged to the age group of +65 and were high school. Table 1 shows the occupation, gender, income and residence status and education level of the participants according to their preferred parks. Table 2 shows the reasons for park selection and transport preferences of the participants according to the parks they prefer.

Table 1. Evaluation of Preferred Parks and Demographic Factors

N:116		Bosna Hersek Park	Saraybosna Park
		N=60	N=56
		N (%)	N (%)
Gender	Women	40 (67)	36 (64)
	Man	20 (33)	20 (36)
Age	50-64	25 (42)	26 (46)
	65+	35 (58)	30 (54)
Residence	Karatay	-	-
	Meram	-	-
	Selçuklu	60(100)	56(100)
Education	Primary School	20 (33)	22 (39)

	High School	25 (42)	30 (54)
	College	10 (17)	-
	University	5 (8)	4 (7)
	M.Sc-PhD	-	-
Income	<10000	-	-
	10000-15000	10 (17)	8 (14)
	15000-20000	44 (73)	42 (75)
	>20000	6 (10)	6 (11)
Occupation	Worker (Retired)	25 (42)	26 (46)
	Government (Retired)	10 (17)	11 (20)
	House Wife	25 (41)	20 (34)

The relationship between gender and preferred park was significant (woman). Chi-Square test, statistical significance $p < 0,05$

Table 2. Evaluation of the relationship between the preferred park and the mode of transport

N:116		Bosna Hersek Park N=60	Saraybosna Park N=56
		N (%)	N (%)
Reason for choosing	Near Home	50 (83)	49 (88)
	Easily Accessible	5 (8)	4 (7)
	Easy to move Around	4 (7)	1 (2)
	Elevator/Ramp	1 (2)	2 (3)
Preference for transport	Tranway	1 (2)	-
	Bus/Minibus	12 (20)	4 (7)
	By Walk	45 (75)	50 (89)
	Disabled Car	2 (3)	2 (4)

The relationship between reason for choosing and preferred park was significant (near home). The relationship between Preference for transport and preferred park was significant (by walk). Chi-Square test, statistical significance $p < 0,05$

4. CONCLUSION

In our country, it cannot be said that the elderly are physically active. In a study conducted in our country, it was determined that physical activity among the elderly was low, only 30 per cent of them walked and 15 per cent exercised at home. Therefore, for the population in our country to age healthily and be independent in daily life activities, physical activity should be encouraged and the level of awareness on this issue should

be increased. It is necessary to increase easily accessible, widespread, free of charge physical activity areas and social facilities for the elderly (Anonymous 2014).

In the examination of the reasons for going to the park, it was seen that elderly individuals prefer parks primarily to spend time during the day. In addition, it was determined that environmental factors were also effective in park selection. This shows that parks are important not only for physical activities but also for social interactions. Parks are thought to be an important platform to strengthen the social ties of the elderly and increase their interaction with society.

Studies on access to parks have shown that more people walk to parks. This shows that the location and accessibility of parks can affect the use of parks by older people. It has been determined that parks become more attractive in the eyes of the elderly thanks to their accessibility and easy accessibility.

All these findings show that parks are an important social space for older people and therefore require careful planning and implementation in the design, management and use of parks. With improvements to be made in green areas and urban furniture, elderly individuals can benefit more from parks and have a more enjoyable time.

REFERENCES

Alp, M. A., Ekşi, M. (2021). Kamusal Açık Yeşil Alanların Toplumsal Beklentiler Yönünden Değerlendirilmesi:Maltepe, Orhangazi Şehir Parki Örneği. *Peyzaj Araştırmaları Ve Uygulamaları Dergisi*, 3(1), 1-11.

Anonymous (2014). T.C. Sağlık Bakanlığı. Türkiye Fiziksel Aktivite Rehberi. 2. Baskı. Ankara: Kuban Matbaacılık Yayıncılık; 2014. https://hsgm.saglik.gov.tr/depo/birimler/saglikli-beslenme-hareketli-hayat-db/Fiziksel_Aktivite_Rehberi/Turkiye_Fiziksel_Aktivite_Rehberi.pdf. (Accessed 01.10.2024)

Aykal, F. D., Yılmaz, A., Çelik, S. (2017). Kent Parklarının Erişilebilirliği Üzerine Bir Araştırma: Van Dilek Doğan Kent Parki Örneği. *Mühendislik Bilimleri Ve Tasarım Dergisi*, 5, 29-40. <https://doi.org/10.21923/jesd.94534>

Demirel H, Özmert E. N, Kayıhan H, Doğan A. Türkiye Fiziksel Aktivite Rehberi. Sağlık Bakanlığı Yayınları, Ankara, 2014, s. 9-40.

Erdem H.R, Sayan M, Gökgöz Z, Ege M.R. (2021). Yaşlılarda Fiziksel Aktivite: Derleme. *YIU Sağlık Bil Derg* 2021;2:16-22.

Gül, A., & Küçük, V. (2009). Kentsel Açık-Yeşil Alanlar Ve Isparta Kenti Örneğinde İrdelenmesi. *Turkish Journal of Forestry*, 2(1), 27-48. <https://doi.org/10.18182/tjf.23277>

Özmen, T., Contarlı, N. (2023). Yaşlılarda Fiziksel Aktivite ve Egzersiz. *Unika Sağlık Bilimleri Dergisi*, 3(1), 452-459.

Investigation of Social Interaction Behaviours of Young Individuals Who Come to Parks to Use Bicycle and Skateboard: The Case of Konya Ihlamur Park

Sertaç Güngör⁸

Abstract

Introduction: Urban parks are urban social spaces that encourage physical activity for young people, as well as areas that increase social interaction and strengthen bonds of belonging. In order to prevent young people from falling into the clutches of bad habits, they need to be able to discharge their excess energy in a healthy environment.

Aim: Ihlamur Park, which was selected as the research area, is in Selçuklu district of Konya province. The park is an important park that attracts the attention of young people with its large green areas, bicycle and skateboard tracks and basketball/football sports fields. The park has a very large area of 43.000 m² in total. At the focal point of this area, there is a bicycle and skateboard track, which is the first example in Selçuklu district.

Method: During the preparation of the survey questions, questions that would not take too much time and attract the attention of the impatient young generation were utilized. The voluntary survey was carried out in the evening hours of the day after school leaving time for young individuals who used the park in the spring months in 2024. 124 young individuals were interviewed verbally according to the snowball technique.

Findings: The issue was evaluated according to young individuals' expectations and perspectives from life, and considering the survey results, suggestions were made about the features that encourage young people's social interaction behaviors and improvements in this regard. In our research, it has been determined that especially young people in adolescence have an increased need for physical activity and socialization, and at the same time they are trying to find a place for themselves in the community. It has become clear that the social needs of our youth, who are the guarantee of the future, should never be ignored.

Conclusion: It was determined that the social interaction behaviors of young individuals who came to the parks to use bicycles and skateboards developed due to group activities. The sense of socialization and belonging that emerged in team games such as football/volleyball was also seen in such social interactions.

Originality and value: With this research, the social needs of young people have been revealed and when the results are evaluated, important determinations have been made that will enable local governments to work towards the use and needs of young people in future park designs.

Key Words : Landscape design for teenagers, Landscape Field Experiments, Social Interaction.

Jel Codes : C93, D71

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1. INTRODUCTION

Socialisation is the process of learning the way of life of a particular group or society, as well as a process of mutual interaction. In this learning process, the stereotypical behaviours of the society are personalised by the individual and as a result the individual develops an identity belonging to that society or group. However, it is important to note here that socialisation does not only mean the shaping of the individual by conforming to a standard behavioural pattern (Şahan 2008).

Today, the rapid increase in urbanisation and the concentration of population density in urban centres have increased the need for individuals to be in touch with nature. In this context, urban use areas such as urban parks play an important role in meeting the physical and social needs of young people. Parks are not only spaces that encourage physical activity, but also spaces that increase social interaction, strengthen community ties and support physical activities. Ihlamur Park in Konya is an important living space where young people show great interest, offering various activities and social opportunities. However, detailed information on the purposes for which young people use the park and which features of the park encourage this use has not been fully identified. The aim of this study is to examine the purposes of use of Ihlamur Park by young people and to identify the features of the park that encourage physical activity and social interaction. The increasing vehicle traffic in Konya province prevents young people from travelling safely on bicycles and skateboards. The traffic accidents are the most concrete indicators of this, Ihlamur Park, which has a special usage area for skateboards and bicycles, is highly preferred by young people because of this feature. Our research has confirmed this conclusion.

According to Filiz (2010), the most important means of socialisation are family, play and friend groups, school and teacher, neighbourhood, workplace, clubs, associations, political groups, religious communities and mosques, art activities and mass media. In order to talk about socialisation, psycho-social learning that occurs as a result of the interaction of the individual with other people must also occur. In this process, the individual learns to adapt to social life effectively. One of the environments where this learning takes place is the sports environment.

The individual's acquaintance with his/her own self, self-development by realizing his/her interests and adaptation to the society can be supported through extra program activities. In this context, sports is one of the most effective alternatives for the physical, emotional and social development of individuals, the creation of mutual solidarity and the acquisition of community membership. Sport is a very important element in socialization in terms of both physical activities and giving individuals a personal and social identity and a sense of group membership. It is a known fact that sport has an important role in the socialization of the individual, as it is a social activity that enables the individual to participate in dynamic social environments. The most important reason for increasing and expanding the participation of masses in sports within the society is

that a benefit is expected for both the individual and the society (Osmanoğlu & Uzun 2022).

Green spaces such as Ihlamur Park, which encourage young people to engage in sports and socialize, are very important in this respect.

2. LITERATURE REVIEW

Aktaş (2023) argued that with the effect of globalisation, it has started to take more place in the lives of modern people. sport, which started, is nowadays a social activity that directly affects social life. phenomenon. In human life with various branches and global based activities It is gradually increasing and consolidating the place it has gained. Mass In modern life, thanks to the means of communication, it is both watched and mass and is performed by all social classes beyond traditional societies. participation in sports has been realised directly and indirectly. Professionally while spectator sport is followed by mass media, amateur sport is followed by mass media. sport is practised within the framework of the possibilities, either by paying money or in sports halls. or fields suitable for sports are built with state facilities. or sports fields for health, relaxation and recreation.

The most important means of socialisation are family, play and friend groups, school and teacher, neighbourhood, workplace, clubs, associations, political groups, religious communities and mosques, art activities and mass media. In order to talk about socialisation, psycho-social learning that occurs as a result of the interaction of the individual with other people must also occur. In this process, the individual learns to adapt to social life effectively. One of the environments where this learning takes place is the sports environment (Filiz 2010).

Socialisation defines the process in which a person feels his/her development within the society, his/her belonging to the society and his/her being a part of the society. As a concept, socialisation is defined as ‘the process that takes place from the childhood of individuals until they actively participate in social life’ and is explained as ‘the process that starts with the family, which is the smallest unit that ensures the transmission of the social culture formed to other generations, and in which individuals acquire the traditions, customs, traditions, customs, religion, values, skills and knowledge of the society they belong to’. (Aktaş 2023).

Osmanoğlu and Uzun (2022) concluded that gender status does not have an effect on personal development, socialization, physical benefit, integration, psychological development, moral development, emotional development and social integration, which are sub-dimensions of social integration. However, it is observed that education level, age, parents' education level and sport branch are effective on social integration. In the case of education, the average of the participants at the primary-secondary education level in personal development, socialization, integration, psychological and moral development is higher than the average of the individuals with high school. In other words, the result was in favor of the participants at the primary-secondary education

level. This shows us that individuals in primary-secondary education have a better level of social integration.

Sports is shown as an important factor in the socialization of individuals as it reveals the personal skills of individuals both individually and as a team, as well as providing unity, solidarity and solidarity within the group. Socialization is the process of recognizing, learning and adopting the ways of doing, hearing and thinking of a society through cooperation and interaction with other individuals. The individual acquires the necessary goals, skills and behavior patterns to participate in social life in this process. Sports-based physical activity is one of the most important tools in strengthening communication skills and socialization of children and young individuals. Sports-based physical activity has been effective in the individual's personality development and adaptation to society. It is obvious that physical activity and sports positively affect the physical, mental, psychological, spiritual and social development of the individual, make important contributions to being a healthy individual with high motivation by staying away from stress, and the higher the interest in physical activity and sports, the higher the individual's compliance with social rules in daily life (Karataş et al. 2021)

3. RESEARCH METHODOLOGY

While preparing the survey questions, questions that would not take much time and would attract the interest of the young generation, which is relatively more impatient than other age groups, were utilized. The voluntary survey was carried out in the evening hours of the day after school leaving time to reach young people using the park in the spring of 2024. 124 young individuals were interviewed verbally on a voluntary basis according to the snowball technique.

3.1. Data Analysis

3.1.1. Demographics

Out of total 124 respondents, 80 were male and 44 were female. Similarly, most of the participants belonged to the age group of 18-25 and were university students. Table 1 shows the gender, the section with the most time spent, reason for visiting the park, the most inadequate part of the park and neighborhoods status of the participants.

Table 1. Evaluation of Preferred Parks and Demographic Factors

N:124		Ihlamur Park N=124
		N (%)
Gender	Women	44 (35)
	Man	80 (65)
Age	12-18	26 (21)
	18-25	98 (79)
Neighbourhood	Yazır	104 (84)

	Selahaddin Eyyubi	18 (14)
	Sancak	2 (2)
The section with the most time spent	Skateboard and bicycle area	100 (81)
	Amphitheatre	4 (4)
	Seating areas with pergola	2 (2)
	Wooden playgrounds	16 (13)
Reason for visiting the park	For skateboarding and cycling	98 (79)
	For socializing and making new friends	24 (19)
	Spending time in the fresh air	1 (1)
	Picnic	1 (1)
The most inadequate part of the park	Sanitary facilities (Toilet)	23 (18)
	Insufficient cleaning	1 (1)
	Presence of many stray dogs	100 (81)
Preference for transport	Bus/Minibus	23 (18)
	By Walk	1 (1)
	Skateboard/bicycle	100 (81)

The relationship between gender and the section with the most time spent was significant (man). Chi-Square test, statistical significance $p < 0,05$.

The relationship between the section with the most time spent and reason for visiting the park was significant (For skateboarding and cycling). Chi-Square test, statistical significance $p < 0,05$

4. CONCLUSION

According to the survey results, all the young people who came to the park with skateboards and bicycles stated that they came because there was a special riding area in the linden park. Although the main purpose is to use skateboards/bicycles, young people stated that they can socialize more easily when they come together because they have common tastes. When the track in the park was not enough, it was determined that they used skateboards/bicycles in the area reserved for pedestrian walking, and therefore accidents occurred from time to time.

It is clear that such areas, which are in demand in terms of user profile, should also be included in new park areas. It is expected that local governments will take important steps in this regard.

REFERENCES

- Aktaş, F. (2023). Sports Sociology, Socialization and Social Integration. In: Türkmen, M. & Uluç, E. A. (eds.), Research on Sport Sciences. Özgür Publications. DOI: <https://doi.org/10.58830/ozgur.pub62.c288>
- Filiz, Z. (2010). Üniversite Öğrencilerinin Sosyalleşmesinde Spora Katılımın Değerlendirilmesi. *Beden Eğitimi Ve Spor Bilimleri Dergisi*, 4(3), 192-203.
- Osmanoğlu, H., Uzun, M. (2022). Sosyal Bütünleşme ve Spor: Suriyeli Mülteci Çocuklar Örneği, *International Journal of Eurasia Social Sciences (IJOESS)*, 13(47), 135-151. DOI: <http://dx.doi.org/10.35826/ijjoess.3091>
- Öztürk Karataş, E., Savaş, B. Ç., & Karataş, Ö. (2021). BEDEN EĞİTİMİ, SPOR VE OYUNUN SOSYALLEŞME ÜZERİNE ETKİSİ. *Kafkas Üniversitesi Spor Bilimleri Dergisi*, 1(1), 1-16.
- Şahan, H. (2008). Üniversite Öğrencilerinin Sosyalleşme Sürecinde Spor Aktivitelerinin Rolü. *Karamanoğlu Mehmetbey Üniversitesi Sosyal Ve Ekonomik Araştırmalar Dergisi*, 2008(2), 248-266.

Innovative approach: sustainability aspects in safety risks assessment in construction

Mia Poledica⁹

Abstract

Introduction: The importance of safety and health protection at work today is an imperative that manifests itself through the implementation of measures that guarantee safe conditions for all employees. All social actors strive to achieve the highest level of safety and health in the workplace to minimize unwanted consequences such as injuries at work, occupational diseases and diseases caused by work.

Aim: The aim of this paper is the systematization of safety risks in the construction field, focusing on the importance of risk management when it comes to the sustainability of this branch of industry.

Method: Review of existing literature in this area, review of methods and tools for assessing security risks and their assessment using the KINNEY method

Findings: Findings show what is the biggest safety risk in the construction industry and how it can be minimized and recommendations for improvements in daily work activities from the point of view of safety and sustainability.

Conclusion: Human factor has the most influence on safety and health, so recommendations in the paper are important for the purpose of minimization safety risks in construction.

Originality and value: The integrated strategy used in the study, which takes into account all sustainability-related factors while managing risk, is what makes the paper unique. The useful recommendations for scholars and construction industry professionals on how to promote sustainable development by enhancing risk management techniques is what makes it valuable.

Key Words: Risk assessment, KINNEY, Safety, Management

Jel Codes: L74, G32, Q56

1. INTRODUCTION

The management of security risks within any system, any subsystem and at any level of work activities of employees, is reflected in the achievement of measures that enable working conditions for all employees and visitors. The management of safety risks in construction is an important component, however, the assessment of these risks often does not take into account aspects of sustainability, so it can threaten the development and degree of sustainability of this branch of industry. In contrast to the traditional approach, innovative approaches consider ecological, economic and social aspects, which represents a significant step towards long-term management of construction projects. Integrating these aspects of sustainability within a risk assessment can improve

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overall project performance, minimize negative impacts on the environment, and improve economic efficiency in terms of reduced costs and increased profits. This approach not only contributes to increased safety on the construction site but also ensures that construction projects comply with the principles of sustainable development. The paper reviews the literature in this area and the KINNEY method for risk quantification. This method is described with all its advantages and disadvantages to leave room for future researchers who will use it. After risk quantification, preventive measures were defined to increase the level of safety, as well as look at it from the aspect of social sustainability. The aim of this paper is a systematic approach to safety risks in construction, their causes, and defining measures for risk management from the aspect of sustainable development.

2. LITERATURE REVIEW

In the study entitled "Construction safety risk assessment with introduced control levels", by Gunduz and Laitinen (2018), systematic approaches were presented when managing safety risks in construction. The authors suggest a multi-layered approach enables more detailed and effective management of safety hazards, allowing construction project managers to apply appropriate controls depending on the identified level of risk. In this study, risk assessment is based on identification and evaluation, during which the probability of events and measures to control them through different business levels (layers) are presented. Gunduz and Laitinen use empirical data and emphasize practical application. Zayed, Tarek, Mohamed Amer and Jiayin Pan (2008), in their paper, investigate the assessment of risk and uncertainty in Chinese highway construction projects using the AHP method. This method defines the criteria and sub-criteria defined by the authors for risk management. Research results show that political and financial risks have the greatest impact on China's highway construction projects. These risks include changes in legislation, fluctuations in financing, and economic instability, which these authors offer strategies for optimization. Uzun, Mert, G. Emre Gurcanli and Senem Bilir (2018) in their work, entitled "Change in Occupational Health and Safety Management System: ISO 45001: 2018", present the challenges and opportunities arising from the implementation of this standard. They emphasize the context of the organization, leadership, employee participation and processes related to the identification of risks and opportunities, as the most important aspects of an organization. This paper highlights the importance of employee training and education. Bala, Djihane, Amine Ferroukhi and Ratiba Chibani (2022) emphasize the benefits of implementing an integrated system (ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018) in their work. The focus of the work is a combination of aspects such as quality, environmental protection and safety and health at work. Also, the authors present the key implementation steps in the example of the AMENHYD company. The work by Khan, Waqas Ahmed, Talha Mustaq and Anmol Tabassum (2014) is a review paper that includes literature related to theoretical and practical aspects of risk management in the context of occupational safety. This study aims to research methods

for risk assessment, and the authors emphasize the importance of education and training of employees. Due to the complexity of different types of risks, in the example of the subway construction project, Jiang et al. (2020) in their study provide a systematic approach to risk management. This approach includes technical measures, evacuation plans and worker training. Rantala, Minna, Maria Lindholm and Sari Tappura (2022), in their work, use a qualitative approach to the examples of five companies. The data was collected through interviews with managers and employees, as well as a review of the available documentation of these companies. The authors identify areas of business where it is important to know risk assessment, as well as the importance of management support in decisions and proposals of employees. Aliyev (2022), in his work on the example of a shipyard in Azerbaijan, investigates the factors for the success or failure of ISO 45001 implementation. This study makes a significant contribution in terms of recommendations for experts in this field, for the implementation of this standard. Pinto, Nunes and Ribeiro (2011), in their paper "Occupational risk assessment in the construction industry – Overview and reflection", explore methods and tools for risk assessment. They emphasize that for the efficiency of work processes, a combination of different approaches in the assessment of security risks is important. McDonald, Mary Anne, et al. (2009), in a paper entitled "Safety is Everyone's Job: The Key to Safety on a Large University Construction Site", emphasizes the role of collective responsibility when it comes to occupational safety and health. Using a qualitative approach, and interviews with employees, the researchers concluded what are the key factors that affect safety and health at work, as an example of this study. They conclude that safety is the key, that all employees at all levels must cooperate, and that management support is of key importance for the success of such cooperation. And finally, the work used the standard IEC 31010:2019 "Risk management — Risk assessment techniques", to describe the risk assessment method that was used.

3. RESEARCH METHODOLOGY

Risk assessment is the process of identifying, analyzing and evaluating risks, at any level of work activities. After evaluating the risks, measures are defined for dealing with the given risks. These measures are monitored and their effectiveness is controlled to minimize risks. Risk analysis techniques based on specific characteristics of applied methods are divided into four categories:

- Deterministic methods,
- Probabilistic methods,
- Qualitative methods and
- Quantitative methods.

However, the issue of risk assessment from the aspect of scientific research is based on the application of three fundamental approaches:

1. Qualitative approach,
2. Semi-quantitative approach and
3. Quantitative approach.

Tabular methods use an upgraded concept taken from matrix methods and imply quantification of the probability of occurrence of incidents and their consequences based on tabular qualitative description. were developed based on the essential lack of a matrix approach with a tendency towards quantitative risk interpretation. Through a comparative analysis of the matrix and tabular methods, it is concluded that a greater share of the qualitative approach entails a greater subjectivity of the risk assessment. From this, it can be concluded that tabular methods are more advanced than matrix methods precisely because risk quantification is inversely proportional to the built-in subjectivity of the expert in the assessment result. All parameters that can be measured or identified in some direct or indirect way (e.g. visually, with a measuring instrument, experientially, etc.) are significantly more reliable than subjective assessments. Tabular methods are based on this very concept. According to the *KINNEY method*, the risk is calculated using the expression:

$$R = V \times U \times P$$

Where are they:

- V** – the probability of the occurrence of an undesirable event (incident)
- U** – frequency and time of exposure to danger
- P** – the consequences of the incident.

Defining the probability of the occurrence of an incident **V**, i.e. the risk factor due to the occurrence of an unwanted event, is carried out using a scale with 7 ranking levels. The advantages of this method are simplicity and flexibility of application in different industries and for different types of risks. Also, it provides a clear quantification of risk, due to clearly defined scales. The disadvantages of this method are subjectivity, even though there is a scale, and limitations in terms of complex systems, so this method is used mainly with other methods, such as Monte Carlo and Fault Tree Analysis. Despite its shortcomings, the Kinney method is a useful tool for basic risk assessment, especially in situations where speed and simplicity of assessment are important.

3.1. Assessment of safety risks in construction and recommendations for improving safety

Risks related to construction:

1. Financial risks;
2. Time risks;
3. Regulatory risks;
4. Safety risks;
5. Technical risks;
6. Environmental risks;
7. Operational risks;
8. Risks of risk management.

Financial risks can occur due to fluctuations in material prices, labor costs or design changes, but also due to deficiencies in project financing or changes in interest rates that affect loan repayment. Weather risks include delays due to weather conditions, supply chain disruptions or slow permit approvals. Poor project planning leads to inefficient use of resources and time, while regulatory risks lead to financial penalties due to non-compliance with existing literature. The group of safety risks includes those risks that can lead to accidents and injuries to workers, resulting in delays, additional costs, etc.

When it comes to environmental risks, certain construction activities lead to pollution and habitat destruction, while unfavorable weather conditions can stop or postpone construction activities, which also causes additional costs. Technical risks include errors in the design and selection of machines and equipment used. Also, a lack of materials, labor or equipment affects the progress of the project. Changes in economic conditions affect the cost of materials and the availability of skilled labor. As the focus of this work is the management of security risks, these risks will be further grouped and the KINNEY method will be applied to quantify them. The group of security risks includes (Table 1):

1. Fall (from a scaffold, ladder, or roof, due to work at height);
2. Falling of material from a height;
3. Impacts of machinery on workers;
4. Collisions of machinery with other machines;

5. Collapse (working at depth);
6. Contusions, twisting of hands and other parts of the body;
7. Electric shock;
8. Heat stroke/ hypothermia;
9. Poisoning (due to exposure to dangerous substances);
10. Fire and explosion;
11. Burns (due to welding);
12. Dust and congestion;
13. Noise;
14. Heavy physical work (skeletal damage and diseases due to constant repetition of the same actions with heavy weights);
15. Slipping, tripping;
16. Poor visibility conditions;
17. Cuts.

Table 1: Safety risks in construction

<i>Risk</i>	<i>Cause</i>	<i>V</i>	<i>U</i>	<i>P</i>	<i>R</i>
Fall	Due to work at height, inadequately installed equipment	1	3	3	9
Falling of material from a height	Unsecured packing space, inadequate handling	0.6	2	6	7.2
Hits by machinery into the worker	Carelessness of the driver, or poorly programmed systems	0.2	3	6	3.6

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Collisions	Carelessness, insufficient training	0.3	1	6	1.8
Collapse	Inadequately secured and prepared site for working in-depth	0.1	1	10	1
Bruises, sprains	Inadequate use of equipment	0.1	1	6	0.6
Electric shock	Bad installations	0.1	1	1	1
Hypothermia/ heat stroke	Inadequate equipment for work, breaks	0.1	1	10	1
Poisoning by dangerous substances	Inadequate handling, storage	0.1	1	10	1
Fire, explosion	Inadequate handling, storage of hazardous materials	0.1	1	10	1
Burns	Inadequate handling of welding equipment, etc	0.2	3	6	3.6
Dust and congestion	Dirty space	0.2	3	6	3.6
Hard physical work	Lifting illegal weights	0.3	3	6	5.2
Noise	Inadequate use of personal protective equipment	0.2	3	6	3.6
Slipping, tripping	Clogged space, spilled material	1	2	3	6
Poor visibility conditions	Rooms without light sources	0.2	2	6	2.4
Cuts	Inadequate handling	0.2	3	6	3.6

Improper handling or non-observance of prescribed rules can lead to high-risk events that often occur when it comes to construction works, as can be seen from the final results in the table above. Falls and slips happen very often, and usually do not cause serious injuries. Hypothermia, electric shock, radiation and suffocation have a low probability of occurrence, but the outcome in the event of an event is often fatal. The Kinney method shows that the biggest risks to the safety of these works are falls, falling materials that cause injuries, as well as tripping and slipping due to unsecured work surfaces.

It is seen by identifying risks and causes from the table, that the most common cause is inadequate handling, untrained staff. So, the most common cause is the human factor. Preventive measures to prevent injuries at work, occupational diseases and illnesses at the workplace include several key activities. These activities include the use of appropriate personal protective equipment, proper handling of machinery in compliance with traffic regulations, application of instructions for the operation and maintenance of vehicles by the instructions, as well as the organization of more frequent and shorter breaks to reduce fatigue. Also, regular maintenance of the vehicle is important to preserve its correctness and functionality. Employee training includes training in the fields of occupational safety and health, fire protection and first aid, which are conducted theoretically and practically. It is important to point out that a key factor in prevention is the education of employees, as well as periodic refreshers of knowledge.

3.2. The social aspect of sustainability in safety risks management

Economic interpretations of sustainability usually take as their starting point the consensus reached by the World Commission on Environment and Development (WCED 1987), which defined sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." One of the first attempts in economics was the systems approach, which characterizes sustainability as the maximization of goals through ecological, economic and social systems. This approach is attributed to Barbier(1987), who first identifies three systems as fundamental to any development process: the environmental or ecological system, the economic system, and the social system. Since there are 17 sustainability goals, **those directly or indirectly affected by construction are:**

1. **No poverty** - ending poverty in all its forms, everywhere,
2. **Good health and well-being** - to ensure and promote a healthy life,

3. ***Good jobs and economic growth*** - promote sustainable, inclusive and sustainable economic growth, full and productive employment and decent work for all,
4. ***Industry, innovation and infrastructure*** - build resilient infrastructure, promote inclusive and sustainable industrialization and encourage innovation,
5. ***Sustainable cities and communities*** - making cities and human settlements inclusive, safe, resilient and sustainable,
6. ***Climate measures*** - Take urgent measures to combat climate change and its impacts,
7. ***Partnerships for goals*** - a successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships built on principles and values, a shared vision and common goals that put people and the planet at the center, are needed at the global, regional, national and local levels,
8. ***Responsible consumption and production*** - ensure sustainable patterns of consumption and production,
9. ***Affordable and clean energy*** - ensure access to affordable, reliable, sustainable and modern energy for all,
10. ***Good jobs and economic growth*** - promote sustainable, inclusive and sustainable economic growth, full and productive employment and decent work for all,
11. ***Quality education*** - ensure inclusive and fair quality education and promote lifelong learning opportunities for all.

This branch of industry has a **strong impact** on sustainability goals. By developing this branch, it is possible to create new jobs, as well as education for potential professional staff. Furthermore, researches show how the construction industry significantly affects the GDP of every country, and therefore of such an important city for the economic balance and stability of a country. As far as ecology is concerned, the use of renewable energy sources for the construction of buildings or the use of renewable materials will significantly contribute to this aspect of sustainability. As the KINNEY method shows the **human factor is crucial** when it comes to endangering safety and health in construction, this factor affects sustainable development. By achieving and implementing preventive measures, the working conditions and health of workers will improve, which is a key social aspect of sustainable development, which represents a direct impact. An indirect impact is the reduction of costs, when it comes to tropes resulting when it comes to injuries, line stops and delays due to a shortage of workers.

4. CONCLUSION

The research findings in this paper show that the human factor is most often the cause of safety risks that result in injuries at work. A systematic presentation of preventive measures that can be implemented serves as a kind of recommendation for managers on construction sites, as well as for all experts in this field. Also, the application of the KINNEY method is presented, due to its flexibility and conciseness in the presentation of results, which implies that this method can be used for other branches when it comes to security risks. The work provides the opportunity to look at all aspects of security management, from the point of view of methods and approaches for assessing and reducing the impact of risk. What is evident is that the importance of this area is recognized, but due to the lack of knowledge about its importance, it has not been fully implemented. Raising the awareness of employees and employers is very important, because it makes them realize the importance and the very benefits of complying with regulations and recommendations for safe and healthy work. In addition to a healthy and safe work environment, employees will feel safer, and compliance with all given measures will reduce the so-called wastage in expenses incurred as a result of employee sick pay in the event of injuries or stoppage of production lines. Progressive progress and positioning of companies on the market based on applied safety measures are expected. Introducing aspects of sustainability when it comes to such risks is the future of responsible and efficient project management. Integrating sustainable practices into security risk management contributes to the long-term efficiency of projects, reducing costs, improving company reputation and creating a safer work environment for all workers and visitors.

REFERENCES

Aliyev, Ali. "Investigating the implementation of the occupational safety and health management system in the scope of ship construction and repair yards in Azerbaijan compatible with ISO 45001." (2022).

Bala, Djihane, Amine Ferroukhi, and Ratiba Chibani. "Contribution to the implementation of an integrated management system by ISO 9001: 2015, ISO 14001: 2015 and ISO 45001, 2018 Standards: a case study of AMENHYD Company in Algeria." *Int J Finance Insurance Risk Manage* 12.4 (2022): 175-192.

Gunduz, Murat, and Heikki Laitinen. "Construction safety risk assessment with introduced control levels." *Journal of Civil Engineering and Management* 24.1 (2018): 11-18.

IEC 31010:2019 "Risk management — Risk assessment techniques"

Jiang, Xiaoyan, et al. "A decision method for construction safety risk management based on ontology and improved CBR: Example of a subway project." *International journal of environmental research and public health* 17.11 (2020): 3928.

Khan, Waqas Ahmed, Talha Mustaq, and Anmol Tabassum. "Occupational health, safety and risk analysis." *International Journal of Science, Environment and Technology* 3.4 (2014): 1336-1346.

McDonald, Mary Anne, et al. "'Safety is everyone's job:' The key to safety on a large university construction site." *Journal of Safety Research* 40.1 (2009): 53-61.

Pinto, Abel, Isabel L. Nunes, and Rita A. Ribeiro. "Occupational risk assessment in the construction industry—Overview and reflection." *Safety science* 49.5 (2011): 616-624.

Rantala, Minna, Maria Lindholm, and Sari Tappura. "Supporting occupational health and safety risk assessment skills: a case study of five companies." *International journal of environmental research and public health* 19.3 (2022): 1720.

Risk management - Risk assessment techniques (IEC/ISO 31010:2009)

Uzun, Mert, G. Emre Gurcanli, and Senem Bilir. "Change in occupational health and safety management system: ISO 45001: 2018." *5th International Project Management and Construction Conference (IPCMC 2018)*. North Cyprus: Cyprus International University. 2018.

Zayed, Tarek, Mohamed Amer, and Jiayin Pan. "Assessing risk and uncertainty inherent in Chinese highway projects using AHP." *International journal of project management* 26.4 (2008): 408-419.

Does Strong ESG Performance Create Company Value for Investors? Evidence from Publicly Traded Companies.

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Abstract

Introduction: Environmental, Social, and Governance (ESG) factors have gained significant prominence in recent years. This trend is evident in the way investors are allocating capital, utilizing ESG business services, and responding to initiatives by non-governmental organizations. Additionally, evolving regulations and a growing body of academic literature underscore the increasing importance of ESG considerations in the global financial landscape.

Aim: This article explores the value created by ESG performance from an investor's perspective. The literature reveals notable divergences in company reporting and ESG ratings, largely attributable to the subjectivity involved in selecting relevant ESG topics, determining their significance, and employing various measurement methods. Consequently, investors are encouraged to choose ESG ratings that align closely with their understanding and objectives.

Method: In this study we conduct an econometric analysis to provide a deeper understanding of the relationship between ESG performance and financial outcomes. We will estimate a cross-sectional regression model for over 700 publicly traded companies listed on the New York Stock Exchange (NYSE), using LSEG ESG scores from 2021 and 2022 to measure ESG performance.

Findings: First experimental results are showing promising results as the ESG performance variable has significant and positive effect.

Conclusion: While further investigation is needed, and results are not final they suggest that selection of ESG rating can help investors with their decision-making.

Originality and value: This study not only contributes to the ongoing discourse on the financial implications of ESG performance but also offers practical guidance for investors navigating the complex and evolving landscape of ESG investing.

Key Words: Environmental, Social, and Governance Performance; Financial Performance; Investment Decisions, Econometric Analysis

Jel Codes: Q56, G11,C21

1. INTRODUCTION

The importance Environmental, Social and Governance (ESG) factors and the interest have increased due to the growing interest of investors. This is also supported by data, as global investments in sustainable assets reached 30 trillion (GSIA, 2023) in 2023, as well as spending on ESG business services going from 37,7 billion USD in 2023 to a forecasted 65 billion USD in 2027 (IDC, 2023). According to Edmans (2023),

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this is due to recognition of ESG factors as being critical for companies' long-term financial value, while also being a subset of other long term value drivers.

Christensen, Serafeim and Sikochi, (2022) point out that reliability of ESG ratings has called into question due to large differences between providers, quoting SEC commissioner that it is difficult to see how ESG ratings can guide investment decisions. To make the right decision investors need to understand current issues related to ESG ratings as well as ESG reporting. ESG reports present source of data for independent evaluation and for ESG ratings. In the past reporting frameworks were not necessary, and companies could use one of the guidelines that standardized reporting like Global Reporting Initiative (GRI) and Sustainability Accounting Standards Board (SASB). Result of this are incomparable data, which is probably one of the reasons we are seeing actions from European and United States regulators with Corporate Sustainability Reporting Directive (CSRD) (European Commission, 2023) and increased requirements by U.S. Securities and Exchange Commission (U.S. Securities and Exchange Commission, 2024), respectively.

Similarly to credit ratings, ESG ratings play an important role in decision making as an aggregated single measure of performance or risk. ESG ratings are provided by numerous providers, with most prominent being MSCI, Thompson Reuters, Sustainalytics, LSEG (formerly Refinitiv). While the role of ESG ratings cannot be denied it is important to recognize their shortcomings. With measurement and topics not being standardized and hard to measure due to the nature of the content, it provides opportunities for subjectivity. The latter rises with increased disclosures as there is more opportunity for interpretation (Christensen, Serafeim and Sikochi, 2022). This results in mentioned problem for investors.

Investors, therefore, must decide what ESG ratings to choose, which should be done based on their understanding of ESG and investment objectives. Aligned with this proposition we choose LSEG ESG Score, as investor potentially would, for our econometrics analysis of relationship between ESG performance and financial performance. We estimate a cross-sectional regression model for over 700 publicly traded companies listed on the New York Stock Exchange (NYSE), one of premier global markets, where ESG trends are expected to be reflected in the companies' financial performance. Sample is limited to United States based companies, with ESG scores reported for 2021 and 2022. Results of first experiments are showing a lot of promise as ESG performance variable is significant and positive for both models. This suggests that selection of ESG rating can help investors with decision-making, but further investigation is needed, as results are not final.

2. LITERATURE REVIEW

Existing literature provides a good starting point for our research. It helps us to understand issues with ESG reporting an ESG ratings, while existing literature on relationship between ESG and financial performance helps us with selection of variables

and understanding of dependencies. It is important to note, that literature is not only found under ESG, but also under term like sustainability and corporate social responsibility.

2.1. ESG Reports

Lack of mandatory standards and alignment leads to diverging data which is afterwards used for calculation. Despite this research shows, that large number of companies choose to use reporting guidelines, as 78% of G250 (the world's 250 largest companies by revenue, based on the 2021 Fortune 500 ranking) already used GRI in 2022, followed by SASB (KPMG, 2022). These frameworks are compatible as first focuses on the interests of shareholder, while the latter focuses on interest of investors (IFRS, 2024). To reduce these problems, there are initiatives which are aligning guidelines (European Commission, 2019), as well as international standards (EFRAG and IFRS, 2024).

Kaplan and Ramanna (2021) research on S&P companies in 2020 to 2021 period shows modest growth in reporting length, which significantly varies between sectors. At the same time vocabulary became similar across industries. They find that it is common for companies to use SASB standard which covers 26 topics, use of which also increased the proportion of material information by 11%, but this remains varied due to absence of audits, mandates and regulation. Additionally, it was observed that companies disclose more on topics related to their business and 48% more material topics and provide more information on topics considered material for their sector. Related to the issues Kotsantonis and Serafeim (2019) identified 4 issues related to reports and measures that lead to different results. These issues are differences in measurement, lack of transparency in benchmarking, different approaches to handling missing values, and disagreement resulting from more revealed data, which provides opportunities for different interpretations and methods. Additionally, Del Giudice and Rigamonti (2020) show, that ratings from audited companies remain stable, while for non-audited tend to decline.

2.2. ESG Ratings

Reporting problems then get passed on to ratings when reported data get used in the calculations. While ESG ratings providers like MSCI, Thompson Reuters, Sustainalytics, LSEG (formerly Refinitiv) cover similar topics, scopes and interpretation of this is very different.

Research results from Christensen, Serafeim and Sikochi (2022) demonstrate that increased disclosures provide more opportunities for interpretation and subjectivity, whereas with less data similar imputation techniques or rules are used, such as assuming no reporting indicates poor performance. Disagreement is more significant for environmental and social factors, as well as for companies with poor ESG scores. Additionally, results suggest that disagreement is larger for ratings based on actual

company performance rather than objectives of companies, with highest discrepancies occurring when comparing the two. Berg, Koebel and Rigobon (2022) decompose ratings into scope (what is intended to be measured), weight and measurement (how is measured), to examine the divergence. Results show that measurement is the main driver of divergence, with fundamental disagreements in the underlying data. Additionally, comparison of ESG ratings across full set of underlying indicators using a common taxonomy, which allows them to identify the categories leading to the most divergence: climate risk management, product safety, corporate governance, corruption, and environmental management systems. While “rater effect” is also highlighted, where an evaluator who rates a company positively in one category tends to rate it higher in others, it is not conclusive. Additionally, Larcker et al. (2022) find bias towards larger companies probably due to greater resources and exposures, as well as industry bias, to which Sipiczki (2022) adds geographical bias attributed to different reporting practices.

Mentioned research on the topics of ESG reporting and ratings, gives an insight into the issues, which can help investors disassemble the ratings in a way that they can align components with their investment objectives and choose the “correct” rating.

2.3. ESG Rating Impact

There is a growing body of literature on the relationship between ESG performance and financial performance. In this literature researchers take different approaches in analyzing the relationship, which as mentioned helps to guide our study related to dependencies and variables.

Related to ESG factors we can find research focused on a single factor, like using CDP score for environmental factor, which covers three environmental areas (Jagrič et al., 2020) or Miroshnychenko, Bartolini and Testa (2017) which cover multiple environmental areas. Additionally, others cover one aspect of the factor like emissions (King and Lenox, 2001), green supply chain management (Testa and Iraldo, 2010), or green product development (Leenders and Chandra, 2013). On the other hand, we have research focused on ESG as a whole, either using different measures for ESG factors (Saygili, Arslan and Birkan, 2022), or similar to ours, using a single aggregated measure (Chen, Song and Gao, 2023).

Review of the literature results in conclusion, that most common measures of financial performance, used as dependent variables is Return on Assets (ROA) (Nollet, Filis and Mitrokostas, 2016; Jagrič et al., 2020; Naeem, Cankaya and Bildik, 2022, Saygili, Arslan and Birkan, 2022, Shin, Moon and Kang, 2023; Fu and Li, 2023, Chen, Song and Gao, 2023). Additionally, there are number of other measures used like Return on Equity (ROE) (Naeem, Cankaya and Bildik, 2022; Lech, 2013), Tobin’s Q (Giannopoulos et al., 2022; Naeem, Cankaya and Bildik, 2022, Saygili, Arslan and Birkan, 2022). Return on Capital (ROC) (Nollet, Filis and Mitrokostas, 2016), Return on Investment (ROI) (Jagrič et al., 2020). This is aligned with results from Alshehhi, Nobanee and Khare (2018), which find that most common are ROA, ROE, Sales, ROI Earning Per Share (EPS) and Tobin’s Q.

When it comes to control variables, we can identify three main groups of variables (i) demographic characteristics of companies, (ii) financial indicators, and (iii) economic indicators. When it comes to demographic characteristics of companies measures of size, either financial (Shin, Moon and Kang, 2023; Giannopoulos et al., 2022) or by number employees (Saygili, Arslan and Birkan, 2022), company age (Fu and Li, 2023), and sector classification (Jagrič et al., 2020). Financial indicators can't be narrowed down in same way as there is a lot more variation. If we for example list some indicators being used: Price to Book Value Ratio, revenue development capacity, cash flow capacity, financial leverage, mortgage ability, interest coverage ratio (Chen, Song and Gao, 2023), ratios of cash dividends per share to market price per share, net income to sales, sales to average total assets, total liabilities to shareholders' equity (Saygili, Arslan and Birkan, 2022), debt to equity, debt to assets (Naeem, Cankaya and Bildik, 2022), R&D expenses, beta factor, total debt to total assets, percentage change in sales, ratio of property, plant and equipment to total sales, cash to total assets (Velte, 2020), consideration of 19 ratios from 5 ratio systems (Kralicek Quicktest, Altman Z-Score, and Beermann, Bleier, and Weinrich ratio systems) (Jagrič et al., 2020). From this and other reviewed articles we conclude that controlled variables used in the existing literature are meant to control for financial performance and health of the companies or more specific to capture companies' value, profitability, and risk. Economic indicators found in research are GDP growth (Shin, Moon and Kang, 2023) and GDP (Zhou, Liu and Luo, 2022), to which we would add other basic indica. Additionally, some studies like Shin, Moon and Kang, (2023) include other control variables which are case specific.

3. RESEARCH METHODOLOGY

Purpose of this study is to analyze the relationship between ESG performance and companies' financial performance from investors perspective. Motivation for this are the explained differences in ESG ratings, which require investors to choose the ratings which aligns with their preference and investment objectives. For this purpose, we measure financial performance using Return on Equity (ROE) and ROA, which is used as dependent variable. This is aligned with literature review, with these two measures being the most common. Main independent variable is measure of companies ESG performance for which we use LSEG ESG score. Additionally, for other independent variables, which serve as control variables, we consider demographic characteristics of companies and financial indicators as they are most used in existing research. We omit economic indicators as our sample is limited to a single country, which means that companies are operating under same economic conditions. Difference between years can be captured by adding dummy variable for year. Hypothesis of this study is therefore, whether the investors should make their investment decisions based on selected ESG score, as ESG performance should positively impact financial performance of the companies.

3.1. Dataset

As previously mentioned LSEG ESG score was chosen as a measure of ESG performance, due to its high coverage of metrics considered in the calculation of the final score. LSEG ESG score measures performance based on verifiable publicly reported data, assessing company's ESG performance and degree of transparency in its reported materials. Score is calculated in the following way. LSEG calculates over 630 metrics, from which a subset of 186 is selected, depending on comparability and materiality by industry. Metrics are extracted from reported data, with numerical data ranked by percentile and Boolean answers converted to numeric values. Percentile rank of each metrics is then calculated and summed by each of 10 categories (Environmental: resource use, emissions, innovation; Social: workforce, human rights, community, product responsibility; Governance: management, shareholders, CSR strategy). The percentile rank scores are then calculated using the following equation:

$$\text{score} = \frac{\text{no. of companies with a worse value} + \frac{\text{no. of companies with the same value included in the current one}}{2}}{\text{no. of companies with a value}}$$

Percentiles scores by category are then sorted from largest to smallest, after that percentile formula is applied again. Weights are determined based on calculated materiality matrix, which adjusts the categories according to their importance for different industries. These weights are then applied to category percentiles to calculate the final score (LSEG, 2023). ESG scores was manually retrieved between December 2023 and January 2024. Similarly, we also manually retrieved sector data during July 2024. As this data was manually collected it is important to note the possibility of errors, which come with manual data collection process.

Sample includes 805 companies from New York Stock Exchange (NYSE), with ESG scores for reporting years of 2021 (274 samples, 34%) and 2022 (531 samples, 66%). Sample is firstly limited to companies that have LSEG ESG score, to which we include limitation of companies that are based in United States. Descriptive statistics for ESG by sector that follows The Refinitiv Business Classification (TRBC) that is used during the scoring process, are presented in Table 1. We can see that all the sectors are represented by a good number of examples with exception of Academic & Educational Services, which is not represented. Additionally, only Healthcare average deviates strongly from sample and other sector averages.

Table 1: LSEG ESG Descriptive Statistics by Sector

Sectors	No.	Mean	Std. dev.	Min	Max
Basic Materials	80	57,85	19,25	89	89
Consumer Cyclicals	112	57,28	16,29	94	94
Consumer Non-Cyclicals	52	61,48	20,39	93	93
Energy	74	51,57	18,34	86	86
Financials	53	53,91	16,34	86	86
Healthcare	63	64,44	16,32	92	92
Industrials	148	58,10	15,16	86	86
Real Estate	102	59,36	15,85	89	89
Technology	76	58,03	18,08	95	95
Utilities	45	57,58	15,38	86	86
Sample statistics	805	57,92	17,15	95	95

Descriptive statistics for used dependent and independent variables are presented in Table 2. We can see a large deviation of minimum and maximum values from the mean, which presents a challenge for modeling.

Table 2: Descriptive Statistics for Dependent and Control Variables

Variables	Mean	Std. dev.	Min	Max
returnOnEquity	0,39	8,73	-31,96	237,83
returnOnAssets	0,04	0,16	-3,14	0,46
returnOnEquity_t1	-1,13	33,68	-948,89	63,88
returnOnAssets_t1	0,03	0,11	-0,98	1,08
priceCashFlowRatio_t1	6,16	367,14	-8835,18	2420,71
longTermDebtToCapitalization_t1	0,51	0,38	-2,36	4,80
returnOnInvestedCapital_t1	0,08	0,21	-1,85	3,48
freeCashFlowYield_t1	0,05	0,33	-3,79	4,67
earningsYield_t1	0,02	0,26	-2,96	3,32
netDebtToEBITDA_t1	2,73	41,60	-709,50	597,38
tangibleBookValuePerShare_t1	17,87	159,94	-244,33	4043,34
priceToSalesRatio_t1	65,34	1540,68	-2,76	43332,31
daysSalesOutstanding_t1	147,71	1298,86	-87,86	35463,54
debtEquityRatio_t1	-54,69	1936,64	-54229,06	8721,33

3.2. Models

Results of exploratory data analysis for the variables showed significant outliers for both dependent variables, ROE and ROA, which also had significant impact on models' performance during experimentation. For this reason, we considered removing outliers using standard deviations, but due to the high value of outliers, we chose fixed values which dropped any significant outliers. Final samples therefore include 728 and 796 examples, respectively. While large deviations are present for dependent variables as well, they weren't dropped as that would significantly reduce the sample. Models were estimated using classic multivariate OLS regression models.

During the experimentation process we incorporated numerous financial indicators. There were predominantly ratios, which help us to avoid the problem of multicollinearity and introduce more individual financial variables to the model. Dependent financial variables are lagged by 1 year to capture the effect of previous financial performance.

Due to ESG ratings varying between 0 and 100, with higher ratings representing better performance we expect a positive prefix. Additionally, as higher ESG score indicates better performance, the higher value of regressor indicates higher positive impact on financial performance.

3.3. Results and Discussion

First experimental results of the research are showing promising results and are presented in Table 3. Explanatory variable for ESG performance ('esgScore') has positive effects on both measures of financial performance. Signs for 'esgScore' are in both cases positive, which is in line with expectations, that ESG performance will positively affect financial performance. While values of coefficients for 'esgScore' are relatively low, we find this reasonable and explainable. Factors that are used to construct ESG ratings may not be direct drivers or predictors of financial performance themselves. However, they indirectly help to improve financial performance through improvement of other aspects as company image, revenue, costs and taxes. Despite this, results suggest that selection of specific ESG rating can help investors with decision-making. While the results support our hypothesis, we are not yet prepared to accept or reject it, as the results are not final.

Table 3:Two Regression Models with Regression and Statistics Results

Name	Dependent Variable: ROE			Dependent Variable: ROA		
	Coef	t-Stat	Prob	Coef	t-Stat	Prob
const	0,0624	2,367	**	0,0216	2,609	***
dummy_2022	-0,0587	-4,161	***	-0,0184	-4,180	***
returnOnEquity_t1	0,3748	6,578	***	0,6692	23,073	***
esgScore	0,0007	2,013	**	0,0002	2,037	**
dummy_2022*returnOnEquity_t1	0,2537	4,047	***			
economic_sector_Basic Materials	0,0516	2,560	**	0,0150	2,140	**
economic_sector_Energy	0,0495	2,171	**	0,0346	4,627	***
economic_sector_Technology	-0,0492	-2,138	**	-0,0305	-4,190	***
economic_sector_Real Estate	n.a.			-0,0179	-2,832	***
priceCashFlowRatio_t1	3,59e-05	2,208	**	n.a.		
longTermDebtToCapitalization_t1	-0,0402	-2,242	**	n.a.		
returnOnInvestedCapital_t1	0,1810	3,723	***	n.a.		
freeCashFlowYield_t1	0,0771	3,473	***	0,0185	2,703	***
earningsYield_t1	-0,1165	-2,819	***	-0,0490	-4,665	***
netDebtToEBITDA_t1	0,0003	2,118	**	n.a.		
tangibleBookValuePerShare_t1	0,0001	2,063	**	n.a.		
priceToSalesRatio_t1	-0,0015	-2,300	**	n.a.		
daysSalesOutstanding_t1	n.a.			0,0185	-3,251	***
debtEquityRatio_t1	n.a.			-0,0490	2,087	**
R-squared	0.444			0.498		
Schwarz criterion	-480.7			-2229		
Log likelihood	293.05			1154.7		
F-statistics	37.97		***	70.70		***
Akaike information criterion	-554.1			-2285		
Adjusted R-Squared	0.433			0.491		
RESET Test (F-statistics):	1.150			0.2605		
Durbin-Watson stat	1.972			1.978		
Sample (adjusted)	805			805		
Observations (after adjustment)	728			796		
Method	OLS			OLS		

*** indicates below 1 % level of significance, ** indicates below 5 % level of significance, * indicates below 10 % level of significance. Source: Authors' calculations

R-squared indicator is solidly high for both regression models. This is despite the focus on finding the relationship between ESG and financial performance, and not optimizing for explanatory power of the model. The Ramsey RESET test F-statistics were not significant at 1% level of significance indicating correct specification of the model. Residuals deviate from normality, as commonly for regression models in finance, with reliability of the results being ensured by large sample size. Additionally, looking at beta coefficients in Table 4, we can see that there is no major difference between ESG score, and many other variables. It is also interesting to note ESG Score value similarity between both models.

Table 4: Beta Coefficients for Regression Models

Dependent variable: ROE	Beta Coefs	Dependent variable: ROA	Beta Coefs
returnOnEquity_t1	0,3843	returnOnAssets_t1	0,6972
d2022*returnOnEquity_t1	0,2202	economic_sector_Energy	0,1247
returnOnInvestedCapital_t1	0,1201	freeCashFlowYield_t1	0,0768
freeCashFlowYield_t1	0,1039	economic_sector_Basic Materials	0,0559
economic_sector_Basic Materials	0,0728	debtEquityRatio_t1	0,0533
economic_sector_Energy	0,0655	esgScore	0,0525
priceCashFlowRatio_t1	0,0637	const	0
netDebtToEBITDA_t1	0,0602	economic_sector_Real Estate	-0,0748
tangibleBookValuePerShare_t1	0,06	daysSalesOutstanding_t1	-0,0841
esgScore	0,0578	dummy_2022	-0,1087
const	0	economic_sector_Technology	-0,1108
economic_sector_Technology	-0,0623	earningsYield_t1	-0,1522
longTermDebtToCapitalization_t1	-0,0657		
priceToSalesRatio_t1	-0,0674		
earningsYield_t1	-0,1007		
dummy_2022	-0,1272		

Source: Authors' calculations

4. CONCLUSION

While there is a growing body of literature related to the topic of the relationship between ESG and financial performance, this study takes a different perspective on the relationship. This is due to large ESG ratings divergence pointed out by existing literature, which creates a problem for investors during the decision-making process. Because of these differences, investor should inform themselves and choose a rating that most closely aligns with their investment strategy.

For this reason, we selected one of the more prominent ESG ratings, the LSEG ESG Score, and companies from the largest global market, to see if selected ESG rating could help to predict their financial performance. First experimental results of the study show promising results, as ESG performance variable significantly and positively predicts financial performance measured by ROE and ROA. Low values of coefficients can also be explained by the indirect effects of ESG factors, as they are not necessarily direct drivers of financial performance. While results are not final, results up to this point support our hypothesis that selecting a specific ESG rating can aid investors' decision-making. Further investigation will make these results more conclusive. If we further look at the results, significant negative values for 2022 dummy variable are most likely reflective of economic turmoil in that year. Similarly, inclusion of sector dummy variables shows sectoral differences, with dummies for basic material and energy have a positive sign, while technology and real estate have a negative one. The inclusion of financial health and performance variables, contributes to explanation of financial performance, what is aligns with the results of existing research.

Results of the study up to this point already have important implications for investors. Looking from investors perspective, selecting a specific ESG rating can be used in the decision-making process as the effects of ESG performance are significant for financial performance. Despite this, it is again important to emphasize the context of this study. Results are significant for LSEG ESG Score, as our hypothetical choice of ESG rating to analyze investors perspective on the relationship, which does not imply same results for other ESG ratings. Even though results are significant, this does not mean that such a selection is suitable for all investors. As emphasized, it is important that the ESG rating is aligned with investors understanding of ESG and investment objectives. Further shifts in investment trends towards sustainable investing and advancing regulation will likely improve data quality. Inclusion of ESG factors will likely rise in importance as divergence decreases. Although results are viewed from the investors perspective, they could also be interpreted from the banker's perspective. Due to the stricter regulation of bank financing, ESG performance could be used to manage credit risk. This leads to overall conclusion that ESG factors should be considered in decision-making but in line with investors perspective.

This research also relates to larger scope of our research, where we are trying to leverage artificial intelligence for ESG score predictions. Additionally, this aligns with

the results from yearly research from our institute, Corporate Risk Monitor, where the model shows significant overall effect of risk management process on company performance (Jagrič et al. 2021; Malnar et al. 2022; Jagrič et al. 2023). It is therefore not surprising that ESG has effect on company performance, while it is also not surprising that it is relatively small, as it is only a part of risk management process.

REFERENCES

- Alshehhi, A., Nobanee, H. & Khare, N. (2018), “The Impact of Sustainability Practices on Corporate Financial Performance: Literature Trends and Future Research Potential”, *Sustainability*, 10(2), 494.
- Berg, F., Kölbl, J. F. & Rigobon, R. (2022), “Aggregate Confusion: The Divergence of ESG Ratings”, *Review of Finance*, 26(6), 1315–1344.
- Chen, S., Song, Y. & Gao, P. (2023), “Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance”, *Journal of Environmental Management*, 345, 118829.
- Christensen, D. M., Serafeim, G. & Sikochi, A. (2021), “Why is Corporate Virtue in the Eye of The Beholder? The Case of ESG Ratings”, *The Accounting Review*, 97(1), 147–175.
- Del Giudice, A. & Rigamonti, S. (2020), “Does Audit Improve the Quality of ESG Scores? Evidence from Corporate Misconduct”, *Sustainability*, 12(14), 5670.
- EFRAG and IFRS (2024). ESRS-ISSB Standards: Interoperability Guidance, Available online: <https://www.efrag.org/Assets/Download?assetUrl=/sites/webpublishing/SiteAssets/ESRS-ISSB+Standards+Interoperability+Guidance.pdf>, (Accessed: 5.6.2024).
- European Commission. Guidelines on non-financial reporting: Supplement on reporting climate-related information, Available online: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620(01)), (Accessed: 7.6.2024).
- European Commission. Corporate sustainability reporting, Available online: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en, (Accessed: 5.6.2024).
- Fu, T. & Li, J. (2023). “An empirical analysis of the impact of ESG on financial performance: the moderating role of digital transformation”, *Frontiers in Environmental Science*, 11.

Giannopoulos, G., Kihle Fagernes, R. V., Elmarzouky, M. & Afzal Hossain, K. A. B. M. (2022), “The ESG Disclosure and the Financial Performance of Norwegian Listed Firms”, *Journal of Risk and Financial Management*, 15(6), 237.

GSIA. Global Sustainable Investment Review finds US\$30 trillion invested in sustainable assets, Available online: <https://www.gsi-alliance.org/global-sustainable-investment-review-finds-us30-trillion-invested-in-sustainable-assets/>, _____ (Accessed: 8.6.2024).

IDC. Worldwide Spending on Purpose-built Sustainability Services Will Reach \$65 Billion in 2027, According to a New IDC Forecast, Available online: <https://www.idc.com/getdoc.jsp?containerId=prUS51179423#:~:text=In%20a%20new%20forecast%20that,the%202022%2D2027%20forecast%20period,> _____ (Accessed: 8.6.2024).

IFRS. How do GRI and SASB Standards work together? Do companies report on both sets of standards?, Available online: <https://help.sasb.org/hc/en-us/articles/360052463951-How-do-GRI-and-SASB-Standards-work-together-Do-companies-report-on-both-sets-of-standards>, (Accessed: 5.6.2024).

Jagrič, T., Grbenic, S. O., Ovin, R., Fister, D., (2020), “Should banks invest into “green” companies? – Empirical evidence from Europe”, *Bančni vestnik*, 69(7-8), 11-18.

Jagrič, T., Fister, D., Jagrič, V., Pivec, J., & Mun, J. (2021), *Slovenian corporate risk monitor 2021* (str. IX, 114). Pearson.

Jagrič, T., Taškar Beloglavec, S., Zdolšek, D., Amon, A., Herman, A., & Jagrič, V. (2023), *Slovenian corporate risk monitor 2023*. Pearson.

Kaplan, R. S. & Ramanna, K. (2021), “How to Fix ESG Reporting”, *SSRN Electronic Journal*.

King, A. A. & Lenox, M. J. (2001), “Does It Really Pay to Be Green? An Empirical Study of Firm Environmental and Financial Performance: An Empirical Study of Firm Environmental and Financial Performance”, *Journal of Industrial Ecology*, 5(1), 105–116.

Kotsantonis, S. & Serafeim, G. (2019), “Four Things No One Will Tell You About ESG Data”, *Journal of Applied Corporate Finance*, 31(2), 50–58.

KPMG. Big shifts, small steps: Survey of Sustainability Reporting 2022, Available online: <https://assets.kpmg.com/content/dam/kpmg/se/pdf/komm/2022/Global-Survey-of-Sustainability-Reporting-2022.pdf>, (accessed on 8 June 2024).

Larcker, D. F., Pomorski, L., Tayan, B. & Watts, E. M. (2022), “ESG ratings: A compass without direction”, *Rock Center for Corporate Governance at Stanford University Working Paper* Forthcoming.

Lech, A. (2013), “Corporate Social Responsibility and Financial Performance. Theoretical and Empirical Aspects. Comparative Economic Research”, *Central and Eastern Europe*, 16(3), 49–62.

Malnar, A., Jagrič, T., Amon, A., & Jagrič, V. (2022), *Slovenian corporate risk monitor 2022* (str. 122). Pearson.

Miroshnychenko, I., Barontini, R. & Testa, F. (2017), “Green practices and financial performance: A global outlook”, *Journal of Cleaner Production*, 147, 340–351.

Naeem, N., Cankaya, S. & Bildik, R. (2022), “Does ESG performance affect the financial performance of environmentally sensitive industries? A comparison between emerging and developed markets”, *Borsa Istanbul Review*, 22, S128–S140.

Nollet, J., Filis, G. & Mitrokostas, E. (2016), “Corporate social responsibility and financial performance: A non-linear and disaggregated approach”, *Economic Modelling*, 52, 400–407.

Securities and Exchange Commission. The Enhancement and Standardization of Climate-Related Disclosures for Investors, Available online: <https://www.sec.gov/files/rules/final/2024/33-11275.pdf>, (Accessed: 5.6.2024).

Shin, J., Moon, J. J. & Kang, J. (2023), “Where does ESG pay? The role of national culture in moderating the relationship between ESG performance and financial performance”, *International Business Review*, 32(3), 102071.

Sipiczki, A. (2022), *A critical look at the ESG market*, CEPS Brussels, Belgium.

Saygili, E., Arslan, S. & Birkan, A. O. (2022), “ESG practices and corporate financial performance: Evidence from Borsa Istanbul”, *Borsa Istanbul Review*, 22(3), 525–533.

Testa, F. & Iraldo, F. (2010), “Shadows and lights of GSCM (Green Supply Chain Management): determinants and effects of these practices based on a multi-national study”, *Journal of Cleaner Production*, 18(10–11), 953–962.

Zhou, G., Liu, L. & Luo, S. (2022), “Sustainable development, ESG performance and company market value: Mediating effect of financial performance”, *Business Strategy and the Environment*, 31(7), 3371–3387.

Implementation of sustainable logistics practices in retail: Analysis of the current state and proposals for improvement

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Abstract

Introduction: The retail sector is a fast growing sector, and retailers play a central role in supply chains. In order to position themselves on the market, as intermediaries between producers and consumers, they must prioritize economic use within the principles of sustainable development.

Aim: The paper aims to identify the key sustainability challenges in retail and propose some of the policies and strategies that will lead to an increase in the performance of the retail sector.

Method: The paper is based on a review of the relevant literature in this field in the last decade. From the analyzed literature, the most common challenges in the retail sector that make sustainable business difficult have been extracted.

Findings: Analyzing relevant research in the field of retail, it was observed that the most common challenges are related to the emission of harmful gases, the use of non-recyclable materials, the lack of infrastructure and the education of employees about the segment of sustainability. The combination of implementing solutions related to eco vehicles, employee training and better allocation of resources would have a significant impact on raising the level of sustainability.

Conclusion: The paper shows that sustainable practices in retail influence continuous improvement.

Originality and value: This paper presents the current state of sustainable logistics practice in the retail industry, pointing out specific challenges and providing evidence-based recommendations for improvement based on an analysis that represents the originality and value of the paper.

Key Words: Supply Chain, Logistics, Sustainability, Retail

Jel Codes: Q56, L81, R41

1. INTRODUCTION

Sustainability, as an omnipresent field of research, has gained significance across various industries. The term "sustainability" in consumption first emerged in the late 20th century, while research on this topic has expanded in a broader context over the last 20–25 years. Generally, sustainable business encompasses a wide range of aspects aimed at the long-term sustainability of both companies and organizations and the society and environment in which they operate. In modern research, sustainability is grouped into three categories/aspects: environmental, economic, and social (Bălan, 2020). It has become a key element for retailers, who must pursue economic benefits while adhering

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to the principles of sustainable development. Retailers, as intermediaries in the supply chain between producers and consumers, are one of the most promising means of promoting sustainability within the supply chain. There are many different ways retailers can influence society, elevating sustainability to a higher level. A distinction can generally be made between activities that are more focused on social issues and those that concentrate on environmental sustainability (Jones and Comfort, 2020; Ruiz-Real et al., 2018). Environmental sustainability is undoubtedly one of the growing and important supply chain management issues that retailers face today. Retailers worldwide, such as Wal-Mart, Tesco, and Carrefour, have adopted environmental protection practices in managing and improving their logistics processes (Tang et al., 2016). However, research on social sustainability has largely been limited to manufacturing, and the literature lacks a serious focus on the retail sector (Lai and Wong, 2012; Zhu et al., 2011). Traditionally, social sustainability in business refers to the integration of economic and social aspects. The primary goal of this aspect is to ensure the best possible conditions for workers while also contributing to society in general. The growing concern for environmentally friendly processes is leading to the development of full integration of economic, environmental, and social aspects (Gong, 2013). Some authors suggest that retailers minimize harmful gas emissions, wastewater, and waste through continuous improvement of their internal processes, known as internal-operational practices in sustainable retail (Tang et al., 2016).

This paper seeks to address several key gaps in the existing literature. First, there is a lack of research on the importance of retail as one of the main actors in serving customers within the supply chain. Second, although research on the role of retail in influencing consumers toward sustainable purchases and consumption is evolving, academic literature still lacks systematic reviews on this specific topic. Additionally, experts have identified a "research gap" regarding the theoretical meaning of consumer engagement in sustainable consumption. A particular field of research covers the role of retail in influencing consumers toward sustainable purchases and consumption. Research in this area is developing, with an increasing number of published articles. Despite this progress, academic literature still lacks systematic reviews on this specific topic, highlighting the need for such a review. This paper aims to fill these gaps by providing a detailed review and analysis of these areas.

The paper is organized into several chapters. Following the introduction, the second chapter provides an analysis of the current state of sustainable practices in retail. In this chapter, a review of relevant studies offers an overview of the current state of retail from the perspective of sustainability. The third chapter presents the challenges in retail, identified through a literature review. Within this chapter, special emphasis is placed on specific challenges in retail. The fourth chapter offers recommendations for overcoming the identified challenges. Finally, the conclusion provides a summary of the entire paper, a perspective on sustainability issues in retail, and directions for future research.

2. SUSTAINABILITY ANALYSIS IN RETAIL: CURRENT STATE – LITERATURE REVIEW

Sustainable retail is becoming an increasingly important topic in modern business as companies strive to balance economic goals with social responsibility and environmental sustainability. Understanding the current state of sustainability in the retail sector is a crucial step toward identifying the challenges and obstacles that companies must overcome to achieve long-term sustainability. This chapter aims to provide an overview of the current state of sustainability in retail by analyzing dominant retail chains. The term sustainable retail refers to the management of retail operations in an environmentally conscious manner, using eco-friendly resources. Sustainable retail is a concept of managing logistics processes that aim to enhance the retail supply chain by minimizing waste, increasing efficiency, and reducing costs (Pertiwi and Hartati, 2023; Ashari, 2022; Sinha and Chaudhuri, 2014).

Wal-Mart has invested \$500 million in sustainability, with goals including incorporating renewable energy, minimizing waste through the LEAN concept, and selling eco-friendly products. The company is developing a fleet of hybrid trucks and energy-efficient stores, switching to LED lighting, reducing energy consumption, and using green technologies in warehouses. Home Depot focuses on protecting endangered forests and selling eco-friendly products. They promote understanding of environmental issues among employees and use sustainable production and packaging methods. Ahold, a Dutch food retail chain, encourages recycling and waste reduction. Their "Healthy Ideas" logo signifies products that meet environmental standards. Target, a leading retail chain in Australia, discontinued plastic bags in 2009 and introduced the Buddy Bag program, which promotes reusable bags. Customer education about these bags is carried out through in-store signage, printed advertisements, and online campaigns (Sinha, 2011).

The challenge of sustainability in retail lies in implementing eco-friendly practices that often require significant investments and changes in daily operations. Although these practices can greatly impact the sustainability of the sector, these initiatives often face resistance from both employees and customers. Customers sometimes struggle to adapt to new habits, while employees may resist changes that require additional effort or modifications to existing processes. This combination of investment challenges and human resistance can slow the pace of the transition to sustainable practices in retail (Sinha, 2011).

The following research indicates that multiple factors influence consumers' decisions regarding brand choices, purchasing, and their commitment to sustainable development. The results highlight that consumers who claim to support sustainable development and make purchases accordingly can accurately identify eco-friendly brands and products, as well as stores where these items can be found. This fact directly speaks to the market positioning of such companies. There is a rising demand for high-quality products, eco-friendly food, recycling policies, and an increasing demand for alternative

(environmentally friendly) forms of transportation. As a result of these changes, a new market segment has emerged. This segment consists of environmentally conscious consumers, a group that companies planning to enter retail should not overlook when conducting market research. Furthermore, past practices indicate that the price of such products is higher than others, which can pose a distribution challenge. A solution to these challenges is consumer loyalty programs. Club members are encouraged to choose environmentally safe products, recycle, and reuse packaging. By promoting eco-friendly consumption, companies not only contribute to environmental protection but also enhance their brand value (Stefańska and Śmigielska, 2016).

Tesco has organized educational programs for children through initiatives such as "Tesco for Schools" and "For the Environment," as well as campaigns for recycling glass, waste, and e-waste. Carrefour launched the "From Love to Environment" campaign, celebrates Earth Day, conducts educational campaigns for employees and customers, and monitors ozone-depleting cooling factors. The company also reduces energy and waste consumption and collaborates with suppliers to lower transportation costs. IKEA runs a tree-planting campaign and participates in the "Read Labels—Protect Yourself and Your World" campaign. It implements solutions for energy and water conservation, uses sustainable raw materials (wood and cotton), and employs technologies that use less water. Additionally, it utilizes production waste to create new products and selects suppliers based on sustainability standards (Stefańska and Śmigielska, 2016).

Authors Morcillo-Bellido and Duran-Heras analyzed leading retail chains in Spain, which hold about 40% of the food market. Their study focuses on the significance of supplier selection for sustainability. Company A is a pioneer in implementing sustainable practices, extending them to suppliers with a broad product network. It has developed a plan to expand these principles to raw material suppliers. Company B is a multinational company in Spain that focuses on lowering prices without considering the total cost of ownership. This negatively impacts environmental sustainability due to transportation from distant locations. Company C is a Spanish firm involved in selling food products and providing delivery services. It has a strategy similar to Company B, focused on short-term offers. Company D is a distribution company that does not recognize long-term agreements for supply chain improvement as important for business. Instead, it uses a conventional structure and cyclical price negotiations. The study concludes that while companies acknowledge the value of sustainability, there is significant room for improvement in applying holistic approaches, especially in multinational firms that often prioritize short-term financial success over long-term environmental sustainability (Bellido and Duran-Heras, 2020).

When it comes to sustainability, there are major retail companies that have implemented green concepts, such as Walmart, IKEA, Tesco, Carrefour, etc. However, eco-strategies are also being developed at the national level. India has a National Mid-Term Development Plan that includes responsible resource consumption, which is one of the sustainable development goals. This goal is very relevant to the retail industry.

Therefore, retail companies should make improvements to support this agenda. Participation in the Sustainable Development Goals (SDG) will positively impact companies, especially in terms of future sustainability, enhancing their image, and providing a competitive advantage. Research on the retail sector in India identifies several factors. Regarding the financial aspect, the owners of one of the largest retail chains have opened more locations, which has increased their profit, and this is an advantage. A weakness is that they have not planned funds for development and innovation. A notable advantage is that this chain has 600 satisfied employees, including managers who support their staff in every store. Each store is located optimally for customer access, but the positioning of certain products in the stores is not ideal, making them difficult to access. Concerning suppliers, they implement a win-win strategy and have backup suppliers in case of delays. A weakness of this chain is that purchases can only be made in-store, as there is no online shopping system, and they do not have a well-developed social media marketing strategy. The chain has its logo, but its colors and symbols are similar to those of competitors, making it hard to distinguish. This company also has high energy consumption and uses non-eco-friendly resources, such as plastic bags and single-use packaging (Pertiwi and Hartati, 2023).

The research results indicate that this market is optimal as a local market, with all its advantages. However, weaknesses include resistance to changes and innovations, which slows the development of this market. Regarding external influences, opportunities, and threats, the research shows that this market generates a lot of waste and excessive use of plastic bags, making such solutions unsustainable. Based on this analysis, recommendations for this Indian market include a greater focus on sustainability, such as collaborating with other businesses and the local community, promoting a system where customers bring their bags, using eco-friendly lighting and devices, as well as implementing online shopping and developing an application (Pertiwi and Hartati, 2023).

A review of the literature on current sustainability practices in retail has shown that, while there has been significant progress in implementing sustainable strategies, there are still many areas where further optimization is needed. The analysis indicates that companies are increasingly aware of the need to integrate sustainability into their business models, but they often face numerous obstacles. These challenges, which include regulatory requirements, economic factors, and changes in consumer behavior, will be examined in detail in the next chapter, which will focus on the key challenges and barriers that the retail sector must overcome to successfully implement sustainable practices.

3. EXPLORING RETAIL SUSTAINABILITY CHALLENGES

Based on the analysis of the current state of the retail sector from a sustainability perspective, several key challenges can be identified. These challenges are crucial for improving the retail sector and include the need for deeper integration of sustainable

practices into business strategies, increasing transparency in supply chains, reducing the costs of implementing sustainable technologies, educating employees about the importance of sustainability, and overcoming consumer resistance to change. Addressing these challenges requires coordinated efforts and long-term commitment from all sector participants to achieve a sustainable transformation of retail:

- **Reduction of CO2 emissions:** The retail sector is responsible for about a quarter of global emissions, with a significant portion of these emissions generated within the retail value chain. Reducing carbon emissions in this sector is crucial for achieving global climate goals, and it also offers retailers additional benefits, such as compliance with regulations, waste reduction, and increased efficiency (Buchmann et al., 2024).

- **Transport optimization:** In 2020, the significance of transportation forecasting became evident, but its weaknesses were also highlighted. The pandemic and global lockdowns caused major disruptions in supply chains, prompting companies to reassess their forecasting methods, especially in retail, where sudden changes in consumer behavior presented numerous challenges. Retail was particularly affected as forecasts proved inaccurate due to unexpected shifts in demand. Transportation forecasting in retail pertains to predicting costs relative to future volume and services, but it should not be confused with transportation planning, which deals with finished products and demand levels (Trax, 2021).

- **Eco-friendly packaging:** In today's business world, sustainability is becoming crucial as consumers increasingly seek products that are not only high-quality but also environmentally friendly. One area where companies can have a significant impact is packaging. Sustainable packaging not only reduces negative environmental impacts but also enhances brand reputation and attracts eco-conscious consumers. However, transitioning to sustainable packaging presents challenges. One of the main challenges is finding the right materials, as traditional materials like plastic and Styrofoam are not environmentally friendly. Companies must explore alternatives that are recyclable, biodegradable, or renewable, such as cardboard or paper. Additionally, sustainable materials can be more expensive, so it is important to balance costs with sustainability. Although initial costs may be higher, long-term benefits, such as customer loyalty, outweigh these costs (Fulfillment, 2024).

- **Specific issues:** The retail industry has recognized the need to transition to sustainable practices. One area where this transition is occurring is store development, as retailers increasingly seek ways to incorporate sustainable materials into their sales spaces. From floors and fixtures to signage and display units, the use of eco-friendly materials in retail spaces not only helps reduce harmful emissions but also attracts a growing number of conscious consumers who prioritize sustainability in their purchasing decisions. Although using sustainable materials in retail store development offers numerous benefits, there are several challenges and considerations that retailers must address when integrating these materials into their store designs (Uddin, 2024; Pardo-Bosch et al., 2021).

Costs: Sustainable materials often have a higher initial cost compared to traditional materials. This can be a barrier for some retailers, especially those operating with limited budgets. However, it is important to consider the long-term benefits. Sustainable materials can lead to energy savings, reduced maintenance costs, and increased durability, which can offset the initial investment over time.

Availability: The availability of sustainable materials can vary depending on location and industry. Some eco-friendly materials may not be widely available or may have limited supply chains. Retailers need to carefully research and work with suppliers who can consistently and reliably provide the desired sustainable materials.

Performance and durability: Retail stores are high-traffic areas that require materials resistant to wear and tear. When using sustainable materials, retailers must ensure that they meet necessary performance and durability standards. This may require additional testing and research to ensure that the selected materials can withstand daily demands.

Design and aesthetics: Sustainable materials may have different textures, colors, or finishes compared to traditional materials. Retailers need to consider how these materials will fit into the overall design and aesthetics of their store. It is important to strike a balance between sustainability and maintaining a visually appealing and cohesive brand image.

Maintenance and cleaning: Some sustainable materials may require specific maintenance and cleaning procedures to ensure their longevity. Retailers need to consider these additional aspects when incorporating sustainable materials into store design. This may include training staff on proper cleaning techniques or working with suppliers to develop maintenance guidelines.

Education and awareness: Many consumers are becoming increasingly aware of environmental issues and actively seek out sustainable businesses. Retailers using sustainable materials need to educate their customers about the benefits of these materials and the importance of their choices. This can be achieved through signage, packaging, or even through stories in display areas that highlight the implementation of sustainable initiatives.

Partnerships and collaboration: Developing a sustainable retail store requires collaboration with various stakeholders, including architects, designers, suppliers, and contractors. Retailers should seek partnerships with experts in sustainable construction practices to ensure that the store design aligns with sustainability goals. Regular communication and collaboration throughout the entire development process are crucial for overcoming challenges and achieving the desired outcome.

4. RECOMMENDATIONS FOR OVERCOMING SUSTAINABILITY CHALLENGES IN RETAIL

Although progress in implementing sustainable practices in retail is evident, many companies still face significant challenges that make this process difficult. These challenges, which may include regulatory barriers, high initial costs, a lack of technologies, and changes in consumer preferences, require a strategic approach to overcome. This chapter will present key recommendations that can help retail companies overcome these obstacles and achieve long-term sustainability. Through the analysis of various case studies and insights from existing literature, this chapter will provide practical guidelines and strategies that organizations can apply to integrate sustainability into all aspects of their operations. Recommendations for improving sustainability in the retail sector include promoting eco-friendly products, optimizing energy consumption, reducing waste, educating and engaging employees, supporting local producers, and digitizing and reducing paperwork. Additionally, achieving a circular economy encompasses the economic aspect of sustainable development through product and packaging recycling and reuse/resale (Ronda, 2024; Vadakkepatt et al., 2021; Erol et al., 2009). Here are detailed recommendations for overcoming sustainability challenges in retail:

- Promotion of eco-friendly products, such as recycled products, is achieved through marketing strategies. These strategies involve providing sustainable choices for consumers, reshaping norms to encourage sustainable consumption, informing consumers about sustainability aspects, and promoting sustainable shopping and consumption behavior (Bălan, 2020).
- Providing sustainable choices involves offering a range of goods and services in addition to conventional options, enabling consumers to make sustainable decisions. This strategy includes providing a selection of products with varying levels of sustainability and ensuring their availability. It also encompasses the development of eco-brands and services for consumers, such as recycling, repair, and rental options (Bălan, 2020).
- Consumer education on sustainable consumption is a crucial marketing strategy in the current state of consumer awareness, attitudes, and behaviors related to sustainability. This type of marketing strategy involves developing new and relevant knowledge and attitudes regarding sustainable consumption among consumers. Examples of applied marketing strategies include establishing partnerships between businesses and non-governmental organizations to achieve higher educational goals and strategies for increasing consumer environmental awareness, educational programs through sustainability campaigns, and techniques using verbal informational signage (Bălan, 2020).
- Consumer involvement in sustainable practices depends on various factors, including consumer awareness of sustainable products, responsibility, beliefs, attitudes, psychological variables, purchase intentions, in-store attention, willingness to buy and

pay for green and organic products, selection of sustainable products in the store, consumer buying behavior, sustainable consumption routines, behavior related to packaging use, and consumer behavior regarding food waste (Bálan, 2020).

- Companies are advised to invest in transparent supply chains to meet the growing consumer demand for environmentally sustainable products. The use of advanced technologies to track the origin of raw materials and the product lifecycle can help identify unethical and environmentally harmful aspects of the supply chain, allowing companies to reduce harmful emissions and waste. Additionally, investing in sustainable sources, such as responsible forestry, can ensure the long-term availability of materials and enhance the company's reputation (Morgan, 2022).

- Retailers, especially in the fashion industry, are recommended to use advanced technologies such as artificial intelligence for more accurate demand forecasting. This will allow them to reduce the amount of unsold merchandise and waste that ends up in landfills, as well as optimize markdown processes. More precise demand forecasting can significantly contribute to waste reduction and improve business efficiency (Morgan, 2022).

- Retail companies are advised to explore remanufacturing opportunities, such as reselling products, to extend the product lifecycle and reduce negative environmental impacts. Many companies are already using recycled materials and organic cotton to minimize waste and conserve resources. To overcome challenges such as counterfeit products, it is recommended to implement technologies for tracking and verifying product authenticity throughout its entire lifecycle (Morgan, 2022).

- Retail companies are encouraged to explore sustainable packaging alternatives to reduce plastic use and its environmental footprint. Utilizing recycled materials, redesigning packaging, and exploring reuse models can significantly contribute to waste reduction. Examples such as Walmart, which aims to cut its plastic use by 15% by 2025, demonstrate how a proactive approach can lead to substantial environmental progress (Morgan, 2022).

5. CONCLUSION

In line with modern business trends, retail must align with sustainable practices to remain competitive within the supply chain. Sustainable development is becoming a key factor for improving competitiveness and efficiency in retail, as it not only reduces environmental impact but also brings long-term economic benefits. Integrating sustainable practices into the retail sector strengthens brand reputation, increases customer satisfaction, and optimizes operational processes. The focus of this paper was on analyzing the current state of sustainability in the retail sector, achieved through a review of relevant studies in this field. The literature review identified the dominant challenges in retail from the perspective of sustainability. Among many challenges, such as reducing harmful gas emissions and using environmentally friendly packaging, specific challenges stand out, particularly education, partnerships, and collaboration among supply chain participants.

For sustainability to be effective, all supply chain participants—from employees to end consumers—must be aware of the importance and methods of implementing sustainable practices. Without proper education, sustainable initiatives may face resistance or a lack of enthusiasm. Sustainable supply chains often require close collaboration between various participants, including suppliers, distributors, and retail companies. Collaboration enables resource sharing, process optimization, and the achievement of common goals in reducing the environmental footprint. If these collaborations do not function effectively, the implementation of sustainable practices can be difficult or inefficient. Based on the identified challenges, the paper proposes certain recommendations for improving sustainability. These recommendations include promoting environmentally friendly products, educating consumers through campaigns, involving consumers in sustainable practices, researching sustainable packaging alternatives, and many others.

In this paper, through the analysis of relevant sources, a topic has been introduced that can serve as a foundation for numerous future research studies. The importance of sustainability in the retail sector is particularly emphasized, reflecting its close connection with consumers. Future research should pay special attention to the sustainability segment in retail by introducing strategies, technologies, and practices that contribute to reducing the environmental footprint, increasing operational efficiency, and strengthening relationships with consumers. It is also important to explore how digitalization and innovations, such as process automation and the use of renewable energy sources, can contribute to sustainable goals. Additionally, analyzing the role of regulatory frameworks and partnerships within the supply chain in achieving long-term sustainable outcomes is crucial.

REFERENCES

- Bălan, C. (2020). How does retail engage consumers in sustainable consumption? A systematic literature review. *Sustainability*, 13(1), 96.
- Ruiz-Real, J. L., Uribe-Toril, J., Gázquez-Abad, J. C., & de Pablo Valenciano, J. (2018). Sustainability and retail: Analysis of global research. *Sustainability*, 11(1), 14.
- Tang, A. K., Lai, K. H., & Cheng, T. C. E. (2016). A multi-research-method approach to studying environmental sustainability in retail operations. *International Journal of Production Economics*, 171, 394-404.
- Lai, K. H., & Wong, C. W. (2012). Green logistics management and performance: Some empirical evidence from Chinese manufacturing exporters. *Omega*, 40(3), 267-282.
- Zhu, Q., Geng, Y., Sarkis, J., & Lai, K. H. (2011). Evaluating green supply chain management among Chinese manufacturers from the ecological modernization perspective. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 808-821.
- Gong, Y. (2013). *Global operations strategy. Fundamentals and practice.*

Sinha, R., & Chaudhuri, R. (2014). Green retailing: environmental strategies of organized retailers and competitive advantage. *International Postgraduate Business Journal*, 6(1), 115-119.

Ashari, M. (2022). Mengenal Lebih Jauh Konsep Green Retail. <https://kfmap.asia/blog/mengenal-lebih-jauh-konsep-green-retail/2153>.

Pertiwi, L. I., & Hartati, S. (2023). Proposed Green Retailing Concept for Maintaining the Sustainability in the Company. *International Journal of Current Research and Review*, 6(7).

Stefańska, M., & Śmigielska, G. (2016). NEW CHALLENGES FACING RETAIL AND MARKETING–SUSTAINABLE CONSUMPTION AND INNOVATIONS OF TRADE ENTERPRISES. *Zeszyty Naukowe SGGW, Polityki Europejskie, Finanse i Marketing*, (16 (65)), 79-87.

Sinha, R. (2011, July). Green retailing: An exploratory study examining the effects of sustainability on the global retail landscape. In *Proceedings of the Conference on Inclusive & Sustainable Growth Role of Industry, Government and Society*.

Jones, P., & Comfort, D. (2020). Sustainability in retail supply chains. *International Journal of Sales, Retailing and Marketing*, 9(2), 51-60.

Buchmann, L., Passet, C & Farbstein, E. (2024). Retailers can drive impactful carbon reductions by engaging their value chains. <https://normative.io/insight/reduce-retailer-emissions/>.

Trax. (2021). A Retail Transportation Forecasting Guide: Challenges, Best Practices, and How to Optimize. <https://www.traxtech.com/blog/a-retail-transportation-forecasting-guide-challenges-best-practices-and-how-to-optimize>.

Fulfillment, Hub USA. (2024). Navigating the Challenges of Sustainable Packaging: A Roadmap for Businesses. <https://fulfillmenthubusa.com/navigating-the-challenges-of-sustainable-packaging-a-roadmap-for-businesses/>.

Pardo-Bosch, F., Pujadas, P., Morton, C., & Cervera, C. (2021). Sustainable deployment of an electric vehicle public charging infrastructure network from a city business model perspective. *Sustainable Cities and Society*, 71, 102957.

Uddin, S. (2024). The Future of Retail: Sustainable Materials for Store Development <https://www.linkedin.com/pulse/future-retail-sustainable-materials-store-development-uddin-vmmdc>.

Vadakepatt, G. G., Winterich, K. P., Mittal, V., Zinn, W., Beitelspacher, L., Aloysius, J., ... & Reilman, J. (2021). Sustainable retailing. *Journal of Retailing*, 97(1), 62-80.

Ronda, L. (2024). Overcoming barriers for sustainable fashion: bridging attitude-behaviour gap in retail. *International journal of retail & distribution management*, 52(1), 44-61.

Morgan, K. (2022). How Retailers can Overcome the Challenges Faced on the Path to Sustainability. <https://www.retailtouchpoints.com/topics/sustainability/how-retailers-can-overcome-the-challenges-faced-on-the-path-to-sustainability>.

Morcillo-Bellido, Jesús, and Alfonso Duran-Heras. "Sustainability governance mechanisms in supply chains: An application in the retail sector." *Sustainability* 12.17 (2020): 6911.

Evaluating Risks and Sustainability in the Technological Transfer of Biofuel Optimization Software

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Abstract

Introduction: Technological transfers are essential for the adoption and integration of innovations. This is especially true in the solid biofuel industry, where significant risks and sustainability assessments are necessary. Our project evaluates the risks and sustainability of innovative software designed to optimize the composition of pellets and briquettes used for heating.

Aim: This study aims to analyze the risks and sustainability aspects associated with the technological transfer of software that reduces the resources required for experimental research and optimizes solid biofuel production for small enterprises.

Method: The analysis employs traditional risk assessment techniques combined with ecological and economic sustainability evaluations. It includes impact simulations and cost-benefit analyses to measure the software's effectiveness and overall impact.

Findings: Results indicate that while the software significantly reduces the resources needed for experimental research, technological and economic risks may affect its adoption. The findings highlight substantial ecological and economic benefits, although successful implementation and support for small businesses are crucial.

Conclusion: The study concludes that the innovative software offers significant advantages in terms of resource efficiency and sustainability for small biofuel producers. However, careful implementation and ongoing support are vital to mitigate risks and ensure successful adoption.

Originality and value: This study presents a comprehensive approach to evaluating risks and sustainability in technological transfer, integrating ecological and economic assessments. This approach provides a solid foundation for the effective development and deployment of innovative technologies in the industry.

Key Words: Technological Transfer, Risk Assessment, Biofuel Industry, Optimization

Jel Codes: O33, Q40, Q55

1. INTRODUCTION

Research is an essential part of academic development. The impact of the research can be evaluated by the knowledge and technology transfer from the research institutes

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towards industry. There is a strong link between research and applied research. The linear process linking research to applied research, development, commercialization and their consequences is commonly known as technological innovation and development (Zahra et al., 2007).

Over the last century, innovation has gradually become the most important driver of productivity growth. Consequently, the role of academic research and its applications in socio-cultural and economic development can no longer be denied. Once this fact is established, companies can turn to the handy solution of looking to academia for solutions to improve their production. Thus, real-life processes and phenomena are studied through their physical, chemical or mathematical models (Maris et al, 2017).

According to the Global Competitiveness Index 2014-2015 (Schwab, 2014), Romania occupied the 59th place out of 144 (and in the innovation chapter it was on the 66th place). The same report, for the period 2015-2016 (Schwab, 2015) showed that Romania was in 75th place out of 140 economies analyzed in terms of innovation (with a score of 53). At that time, Romania was considered, together with 19 other countries, in transition from an efficiency-oriented economy to an innovation-oriented economy. From the point of view of innovation capacity, Romania was in 63rd place, from the point of view of engineers and scientists available to do research, our country was in 57th place, from the point of view of collaborations between universities and industry - on the 71st place, but from the point of view of the research and development expenses of the companies, Romania occupies the 94th place. In 2019, Romania was in 51st place out of 141 (Schwab, 2019), with an overall score of 64.4, the maximum score being recorded for macroeconomic stability (90), and the minimum score (42) for innovation capability. Although in terms of the prominence of research institutes, Romania ranks 36th out of 141 countries analyzed, and in terms of the number of patent applications submitted, it ranks 49th, the budget allocated for research places Romania in 65th place.

These scores reflect an increased concern for R&D and innovation. Moreover, Romania's innovation capacity can be improved through a collaboration between universities and the private sector and by increasing the number of technological transfers.

The technological maturity level (TRL – Technology Readiness Level) (UEFISCDI, 2020) of a technology was introduced for the first time by NASA and refers to the stage of development of that technology: at the level of idea, theoretical research, experimental research, implementation or application of research. Maturity level increases from 1 to 9 as follows:

- Levels 1-3 (TRL 1 – TRL 3) constitute the research phase, in which the basic concepts are started, the technological concept is formulated and initial laboratory research is carried out.
- Levels 4-6 (TRL 4 – TRL 6) constitute the development phase, in which laboratory research is gradually extended to be validated and then demonstrated in industrially relevant environments.

- Levels 7-9 (TRL 7 – TRL 9) constitute the implementation phase, in which the technologies are used and validated on an industrial level.

Technological transfer from academic research to industry requires reaching a minimum TRL of 6.

The present paper analyzes the possibility of achieving a technological transfer from theoretical research to application in the solid biofuels industry, from the point of view of sustainability and risks.

2. METHODS

2.1. The offer for the technology transfer

The result of the doctoral research carried out by Simina Maris under the direction of Prof. Titus Slavici has materialized in a software for optimizing the composition of pellets and briquettes used for heating. The great advantage of the software solution that we have validated and propose is that it significantly reduces the resources allocated to experimental research, providing ready-to-use manufacturing recipes based on the raw materials available at a given time and in a given area. Technology transfer is primarily aimed at small firms that produce solid biofuels and that cannot afford to invest a lot of material and time resources in research and development.

The basic principles of TT (TRL1) were observed and published in (Maris, Slavici, Nenu, & Baciu, 2017), (Maris, Nenu, Maris, & Slavici, 2017), (Nenu, Maris, Forgacs, & Maris, 2017). It refers to the possibility of determining a priori, using linear optimization algorithms, recipes of heating material mixtures (pellets, briquettes) that meet certain requirements.

Based on the basic principles, the technological concept (TRL2) of the algorithm for determining mixtures of materials of maximum calorific value, when the level of emitted noxes does not exceed certain threshold values established by standards, was formulated and presented in (Maris, Cernescu, Maris, Darvasi, & Slavici, 2018) and (Ionica, Maris, Dicu, & Maris, 2019).

The functionalities and characteristics of the technological concept (TRL3) have been demonstrated at an analytical or experimental level by creating a specialized software to calculate the mass ratio of 2 or more components of a mixture for making pellets/briquettes, having as a starting point a base of data with available combustible materials in the area and their elemental composition. The database used initially was designed based on existing materials in the area.

The components have been validated in laboratory conditions (TRL4) since 2018, by making recipes based on software outputs and analysing their properties in laboratory conditions, for 2-component mixtures with or without additive. New functionality has been added: the ability to add a material to the database, the ability to add an additive to the recipe, the ability to use custom limit values for noxes. The database has been expanded to include materials available in an expanded geographic area, South-Eastern Europe.

The components have been validated under relevant operating conditions in the industrial environment (TRL5) by using the software to determine mixtures of several components with or without added additive and the use of these recipes in production, at the level of a company. Also, the other functionalities of the software were checked under these new conditions.

The prototype was validated at full scale (TRL6) in a specialized plant for the production of heating pellets and briquettes.

Currently, the software includes:

- a consultation component of international standards
- a database with combustible materials specific to South-Eastern Europe, with the possibility for the user to add a new material to this database
- a component for determining an optimal recipe based on standards and database
- the possibility to establish a recipe if additives are used
- the possibility to establish the properties of a recipe if the amount of raw material used is provided

When launching the program, the user has the options to consult the standards, determine a recipe or add a new material to the database. If the user chooses to determine a recipe, he will have to choose from the list of components available in the database, then he will have to decide whether to use an additive or not. Also, the user has the possibility to choose between his own set of maximum values for noxes or a set of maximum values for noxes established by international standards. In case there is a recipe (mass ratio of mixture components) for which the calorific value is maximum while the emitted noxes fall within the user's requirements, the program lists the percentage composition of this recipe, the estimated purchase price of the component materials and the calorific value of mixtures. If there is no recipe that meets all the requirements, the user will receive a message to that effect.

This solution can be successfully used by solid biofuel producers to determine viable recipes based on the materials available at a given time. Much of the time and cost associated with determining new recipes is eliminated, while keeping production flexible, depending on the materials in the area.

The software solution proposed by us will allow small companies in the field of heating pellets and briquettes to optimize their production, using an already validated research result and thus reducing the resources allocated to experimental research.

Technology transfer is primarily aimed at small firms that produce solid biofuels and that cannot afford to invest a lot of material and time resources in research and development.

2.2. Methods for evaluating the risk

There are several ways to assess risks, depending on the context in which they are used. In the context of a technology transfer like the one presented above, the most handy

risk assessment methods are the risk matrix, SWOT analysis, scenario analysis and cost-benefit analysis.

The risk matrix involves evaluating risks based on potential impact and likelihood of occurrence. Based on these input data, a matrix of risks with qualitative values "low", "medium" or "high" is built. It is an easy-to-implement method that provides a quick picture of the risks. The classification of a risk on the basis of the risk matrix depends on the experience and how the assessors perceive the situation in question. Of course, a more precise analysis can be achieved by numerically estimating the potential impact and its probability of occurrence using statistical models. However, although the estimate is more accurate, applying this method requires more data and technical expertise.

The SWOT (strengths, weaknesses, opportunities, threats) analysis provides an easy-to-understand perspective for assessing the internal and external risks of an organization or a project.

Scenario analysis involves stating and evaluating the various scenarios that may arise during the course of the project.

Cost-benefit analysis involves evaluating risks by comparing the costs associated with risk management with the benefits expected to be obtained.

2.3. Methods for evaluating the sustainability

The sustainability analysis aims at the economic and social impact that the technology transfer project has. The purpose of the analysis is to investigate how current development compromises or does not compromise the ability of future generations to meet their needs.

The stages of sustainability analysis involve defining objectives, identifying key factors (economic, environmental, social), collecting data, analyzing data, assessing impact, evaluating alternative scenarios, involving stakeholders, making decisions, monitoring the implementation of decisions taken.

In the sustainability analysis, the life cycle analysis, the impact on the environment, the social evaluation, the carbon footprint are carried out.

3. RESULTS AND DISCUSSION

3.1. Risk analysis

Risk analysis considers the following methods:

Risk matrix involves evaluating risks based on their potential impact and the likelihood of occurrence. Risks are classified qualitatively as "low," "medium," or "high." While this method offers a quick and clear overview, it can be enhanced through the use of statistical models to numerically estimate the impact and probability, providing a more precise analysis. The ease of implementation makes this method practical, but the accuracy depends on the available data and expertise.

SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) provides a comprehensive perspective by examining both internal and external factors affecting the project. Strengths and opportunities highlight positive aspects, while weaknesses and threats focus on potential risks that could impact the technology transfer process.

Scenario analysis involves projecting various possible scenarios that could occur during the project's course. Different scenarios are evaluated for their likelihood and potential consequences, helping to prepare for and mitigate risks under varying conditions.

Cost-benefit analysis evaluates risks by comparing the costs involved in managing or mitigating those risks with the potential benefits expected from the project. It helps in understanding the economic feasibility and determining whether risk management strategies provide sufficient value.

The risk analysis for the technological transfer of the software proposed by Maris in 2020 is structured using the following key aspects:

1. Technological risks:

- **Adoption barriers:** Small biofuel producers may be reluctant to adopt a software-based solution due to unfamiliarity or skepticism regarding its reliability. Many small producers are accustomed to traditional methods, which could delay the acceptance of new technological tools.
- **Software limitations:** Although the software can generate recipes based on available raw materials, there is a possibility that not all raw material combinations in different regions will be compatible, which could lead to suboptimal recipes or production interruptions.
- **Validation risks:** While the software has been validated in laboratory and industrial settings (TRL 6), the full-scale validation (TRL 7) is still ongoing. There is a risk that real-world conditions may reveal new challenges not encountered during earlier testing phases.

2. Market risks:

- **Competition:** Established producers of biomass fuel may already have proprietary recipes and research capabilities. Competing with larger, established firms or research institutes with in-house development teams could limit the market penetration of this software.
- **Unauthorized use:** The possibility of unauthorized distribution or use of the software could diminish its market value, particularly if competitors gain access to the technology without licensing.

3. Economic risks:

- **Initial investment:** Small producers, the primary target audience, may face financial constraints, making it difficult for them to invest in new technologies, especially if they are unsure of the software's return on investment.
- **Pricing strategy:** The software's pricing model, based on licensing or annual subscriptions, must balance affordability for small producers with covering

operational costs. Mispricing could either alienate potential customers or limit revenue.

4. Environmental and regulatory risks:

- **Regulatory compliance:** The software must ensure that all generated biofuel recipes comply with local and international environmental standards, particularly regarding emissions. Non-compliance could lead to legal and operational issues for users.
- **Changing regulations:** Shifts in environmental laws or emissions standards could affect the software's usefulness or require frequent updates, posing additional costs and challenges.

3.2. Sustainability analysis

The sustainability analysis focuses on the project's long-term economic, environmental, and social impacts. The key steps in sustainability analysis include:

- **Defining objectives:** Clarifying the specific sustainability goals of the project, such as reducing carbon emissions or improving the social well-being of local communities.
- **Identifying key factors:** These include economic, environmental, and social variables that affect the sustainability of the technology transfer. For example, the economic viability of using optimized biofuels, the environmental benefits such as reduced emissions, and the social impact on local industries.
- **Life cycle analysis (LCA):** A thorough analysis of the environmental impacts throughout the entire lifecycle of the biofuel production process, from raw material extraction to the end use of the product.
- **Carbon footprint:** Evaluating the total carbon emissions associated with the biofuel production process, aiming to minimize this footprint for better sustainability.
- **Social evaluation:** Investigating how the project affects social aspects, such as job creation, the well-being of communities involved in biofuel production, and the equitable distribution of benefits.
- **Stakeholder involvement:** Engaging with stakeholders to assess their views on the technology transfer's sustainability, ensuring that decisions are made transparently and inclusively.

Based on the data provided by Maris in 2022, the sustainability analysis includes the following components:

1. Economic sustainability

The software targets small biofuel producers, helping them reduce research and development costs by providing ready-to-use manufacturing recipes based on available raw materials. This approach enhances the economic viability of these small firms by:

- **Cost reduction:** The software reduces the need for costly experimental research.
- **Production optimization:** Efficient use of available materials lowers operational costs and maximizes the calorific value of the biofuel products.

- **Flexibility:** The ability to adapt to different raw materials ensures that small firms can remain competitive in fluctuating market conditions. This aligns with the long-term economic sustainability goals, as small producers can continuously optimize their processes without incurring significant additional costs.

2. Environmental sustainability

The software includes functionalities that allow users to optimize biofuel mixtures with minimal environmental impact, particularly in terms of emissions. Key environmental benefits include:

- **Emission control:** The software allows users to set emission thresholds based on international standards, promoting compliance with environmental regulations.
- **Resource efficiency:** By optimizing the composition of biofuel mixtures, the software ensures that raw materials are used more efficiently, reducing waste and resource consumption.
- **Carbon footprint reduction:** The use of biomass as a renewable energy source contributes to lower carbon emissions compared to fossil fuels, which enhances the environmental sustainability of the production process.

3. Social sustainability

The transfer of this technology to small biofuel producers supports social sustainability in several ways:

- **Job creation:** By enabling small firms to optimize production, the software can lead to business growth and, potentially, the creation of new jobs.
- **Skill development:** The adoption of the software by producers encourages the development of technical skills related to biofuel production and software use.
- **Support for small enterprises:** The focus on helping small businesses that typically cannot afford extensive research fosters inclusive economic growth, reducing inequalities in the sector.

4. Technological maturity and adoption

The software is currently at Technology Readiness Level 7 (TRL7), meaning it has been demonstrated in a relevant operational environment. This level of maturity suggests that the software is ready for widespread adoption, but its successful transfer to industry will depend on:

- **Ongoing support:** Providing technical support and updates to ensure the software remains useful and adaptable to changing industry needs.
- **Collaboration with research institutions:** Engaging in partnerships with research institutions will help improve the software and ensure it remains relevant to the evolving market.

5. Long-term impact

The software is designed to evolve with industry needs, allowing for continuous updates, including the expansion of its material database and the ability to integrate new standards and regulations. This ensures the long-term relevance and sustainability of the technology.

4. CONCLUSIONS

The software evaluated in this study demonstrates significant potential to improve the efficiency of biofuel production by offering ready-to-use manufacturing recipes, tailored to the available raw materials. This technological solution reduces both time and costs, enabling small biofuel producers to remain competitive in a market that increasingly values resource optimization and sustainability.

The risk analysis performed indicates that while the software offers numerous benefits, including reductions in experimental costs and operational flexibility, several risks related to technology adoption, economic viability, and operational integration need careful consideration. Managing these risks through strategic planning and support for small businesses is essential for the successful adoption of the technology.

The sustainability analysis shows that the adoption of this software can result in considerable ecological benefits, such as reduced carbon emissions and more efficient use of raw materials. Moreover, the economic and social impacts, especially in terms of job creation and improved market competitiveness for small producers, align with broader goals of sustainable development.

This research, supported by the project "Performance and Excellence in the Field of Environment and Renewable Energy through Modern Cluster-Type Entities" (PEDMEREMC, SMIS code 138692), funded by the European Regional Development Fund, further emphasizes the need for ongoing innovation in renewable energy technologies. The findings confirm that the integration of advanced technological solutions in the biofuel sector can contribute significantly to environmental and economic sustainability, provided that the associated risks are managed effectively and small producers receive adequate support.

In conclusion, the innovative biofuel optimization software presents a promising tool for enhancing the efficiency and sustainability of small-scale biofuel production. However, its successful implementation depends on a comprehensive approach to risk management and the continued support of collaborative entities that facilitate technology transfer and adoption.

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REFERENCES

- Ionica, D. A., Maris, S. A., Dicu, R., & Maris, S. (2019). Linear programming tool for the optimization of mixed biomass fuel recipes. *BRAIN - Broad Research in Artificial Intelligence and Neuroscience (BRAIN)*, 10(3), 139-149.
- Maris, S. (2020). Algoritmi și soft pentru optimizarea compoziției peleților și brichetelor utilizați la încălzire. Universitatea Ioan Slavici.
- Maris, S., Cernescu, L. M., Maris, S. A., Darvasi, D., & Slavici, T. (2018). Determining efficient mixtures of biomass for pellet production. In *Proceedings of the 46th International Symposium on Agricultural Engineering* (Opatija, Croatia, 27 February – 1 March 2018).
- Maris, S., Nenu, P. F., Maris, S. A., & Slavici, T. (2017). Estimating the calorific value of pellets from different blends of biomass. In *Proceedings of the 45th International Symposium on Agricultural Engineering* (pp. 459-464). Opatija, Croatia.
- Maris, S., Slavici, T., Nenu, P., & Baciu, L. (2017). Artificial intelligence as a decision-making tool in planning the research. *BRAIN - Broad Research in Artificial Intelligence and Neuroscience*, 8(3), 69-76.
- Nenu, P. F., Maris, S. A., Forgacs, L., & Maris, S. (2017). Use of biomass in coal steam boilers. In *Proceedings of the 45th International Symposium on Agricultural Engineering* (pp. 473-480). Opatija, Croatia.
- Schwab, K. (Ed.). (2014). *The Global Competitiveness Report 2014-2015*. World Economic Forum 2014.
- Schwab, K. (Ed.). (2015). *The Global Competitiveness Report 2015-2016*. World Economic Forum 2015.
- Schwab, K. (Ed.). (2019). *The Global Competitiveness Report 2015-2016*. World Economic Forum 2019.
- UEFISCDI. (2020). *TRL*. https://uefiscdi.gov.ro/userfiles/file/PNCIDI%20III/P2_Cresterea%20competitivitatii%20economiei%20romanesti/TRL.pdf
- Zahra, S., Van de Velde, E., & Larraneta, B. (2007). Knowledge conversion capability and the performance of corporate and university spinoffs. *Industrial and Corporate Change*, 16(4), 569–608.

Artificial Intelligence for Risk Assessment and Sustainability Analysis in the Financial Sector

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Abstract

Introduction: Artificial Intelligence (AI) is one of the most disruptive technologies of the 21st century. In the financial sector, AI optimizes processes and redefines risk assessment and sustainability strategies. This paper explores the fundamentals of AI and its applicability in risk assessment and sustainability within the financial industry.

Aim: This paper aims to analyze the basic concepts of artificial intelligence and examine its utilization for risk assessment and promoting sustainability in the financial industry. Additionally, it highlights the advantages and challenges associated with implementing AI.

Method: The methodology includes a comprehensive literature review, relevant case studies, and an assessment of the practical applicability of various AI technologies in the financial sector.

Findings: The findings indicate that AI significantly impacts financial risk assessment through machine learning algorithms that predict credit defaults, detect fraud, and manage portfolios. In terms of sustainability, AI aids in creating predictive models for evaluating the social and environmental impacts of investments, thus supporting responsible investment decisions.

Conclusion: AI plays a crucial role in enhancing risk management and promoting sustainability in the financial industry. Effective implementation of AI can lead to more informed decision-making and improved financial stability.

Originality and value: This paper integrates basic AI concepts with practical applications in the financial sector, offering an updated perspective on how AI transforms risk assessment and sustainability. It provides concrete recommendations for effective AI implementation in finance, based on empirical evidence and real-world case studies.

Key Words: Artificial Intelligence, Risk Assessment, Finance

Jel Codes: G32, O33

1. INTRODUCTION

In recent years, the integration of Artificial Intelligence (AI) in financial systems has become increasingly critical as institutions strive to manage risks more effectively and adhere to sustainability goals. The financial sector faces multifaceted challenges, including market volatility, climate-related risks, regulatory demands, and growing public awareness of environmental, social, and governance (ESG) factors. Addressing

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these challenges requires advanced tools capable of processing large volumes of data and identifying complex patterns. AI provides a transformative solution by offering sophisticated risk assessment capabilities and enhancing decision-making processes to promote sustainable financial practices.

The relevance of AI in the financial sector has grown significantly in modern times, as financial institutions are increasingly pressured to integrate sustainability into their core operations. From predicting credit risk to evaluating the environmental impacts of investments, AI algorithms, such as machine learning and neural networks, allow institutions to anticipate risks, optimize portfolio management, and improve compliance with sustainability regulations. These technologies enable organizations to balance profitability with long-term sustainability goals, thus ensuring financial stability and ethical governance. Furthermore, the automation of processes such as fraud detection, credit scoring, and sustainability reporting demonstrates AI's potential to reshape the financial sector, making it more resilient and future-oriented.

This paper aims to investigate AI's potential to transform the financial industry by providing a comprehensive analysis of its applications in risk assessment and sustainability. By leveraging cutting-edge AI tools, financial institutions can navigate the complexities of risk while aligning their strategies with global sustainability imperatives.

2. LITERATURE REVIEW

The role of AI in the financial sector has gained significant attention, particularly in the domains of risk assessment and sustainability analysis. This literature review examines the current state of AI-driven approaches to these areas, highlighting the opportunities and challenges AI presents for improving financial operations and aligning with sustainability goals.

Financial institutions traditionally rely on statistical models and expert judgment for credit risk assessment, market risk analysis, and systemic risk management. However, the increasing complexity of financial systems has exposed the limitations of these conventional methods, paving the way for AI-based solutions. AI offers more dynamic and scalable approaches to risk management by leveraging data analytics, machine learning, and simulation tools to predict and mitigate risks in real-time.

AI-driven models, such as those using machine learning and neural networks, have proven effective in predicting market risks, credit defaults, and systemic risk scenarios. Elsinger, Lehar, and Summer (2003) introduced a network model to assess systemic risk in banking, demonstrating how AI models can simulate interbank connections and cascading defaults. Zio (2018) further explores AI's role in real-time risk assessment, emphasizing its capacity for improving decision-making by monitoring emerging risks dynamically.

Apostolakis (2003) discusses the role of Quantitative Risk Assessment (QRA) in complex systems like finance, emphasizing that AI can complement QRA by automating

the process of risk evaluation. In highly regulated sectors, such as finance, AI-driven QRA systems offer a more structured and accurate way to assess and mitigate risks, particularly when new risks arise (Apostolakis, 2003).

With the rising emphasis on Environmental, Social, and Governance (ESG) considerations, financial institutions are under increasing pressure to integrate sustainability into their decision-making processes. AI plays a pivotal role in automating sustainability analysis and ESG performance evaluation, enabling institutions to process vast amounts of unstructured data and generate insights that align financial performance with sustainability goals.

Gbededo, Liyanage, and Garza-Reyes (2015) explored sustainability assessment in manufacturing but provided a framework that is highly applicable to the financial sector. They discuss the shift from segmented sustainability assessments to integrated Life Cycle Sustainability Assessment (LCSA), a holistic approach that evaluates the environmental, social, and economic impacts of operations. AI can significantly enhance this process by automating data collection, integrating real-time financial and non-financial data, and providing a comprehensive analysis of a company's sustainability performance (Gbededo et al., 2015).

Giovannoni and Fabietti (2014) emphasize the need for a balanced, integrated approach to sustainability, particularly for financial institutions. They argue that AI's capacity for multi-criteria decision analysis (MCDA) allows institutions to make informed decisions by balancing economic, environmental, and social factors. This capability is essential for financial institutions that seek to meet both their financial and ESG goals (Giovannoni & Fabietti, 2014).

Liu, Leat, and Smith (2011) focus on decision-making methodologies for sustainable production but highlight the importance of AI in MCDA for evaluating sustainability in operations. By integrating AI into the decision-making process, financial institutions can process complex datasets and identify the best strategies for aligning financial goals with sustainability objectives (Liu et al., 2011).

AI's role in driving innovation within the financial sector is evident in its ability to process large datasets, identify non-linear patterns, and simulate complex risk scenarios. AI not only improves risk prediction but also offers insights into sustainability, making it a powerful tool for innovation. Zio (2018) points out that while AI offers great potential, the financial sector must continuously evolve its AI models to keep pace with emerging risks, including those posed by cyber-physical systems. The flexibility of AI-driven models allows financial institutions to adapt to new risks dynamically, providing a competitive edge in both risk management and sustainability (Zio, 2018).

Maris et al. (2017) explore how AI, particularly artificial neural networks (ANNs), is applied to develop an efficient research plan. In the context of sustainability and risk management, the article highlights how AI can optimize decision-making processes by handling both quantitative and qualitative factors. ANNs enhance research planning by predicting outcomes and adjusting to data variations, reducing risks associated with

production processes. This approach helps streamline sustainable practices by improving resource utilization and minimizing waste in manufacturing operations.

However, AI's adoption in finance is not without challenges. One of the main concerns is the complexity of financial systems and the ability of AI to model these systems accurately. While neural networks and deep learning models have proven highly effective in identifying complex patterns in financial data, they require continuous refinement and validation to ensure their effectiveness (Mehrotra et al., 2016).

AI's application in the financial sector is further supported by key literature on neural networks and AI fundamentals. In *Artificial Intelligence: A Modern Approach* by Russell and Norvig (2020), the authors detail the power of AI in automating decision-making and improving efficiency in various industries, including finance. Reinforcement learning, a technique discussed in their work, is particularly valuable for portfolio management in the financial sector. Reinforcement learning allows AI systems to learn from the outcomes of past decisions and optimize future actions based on changing market conditions. This dynamic adaptability makes AI an essential tool for risk mitigation and investment optimization.

Slavici, Maris, & Pirtea, (2016) present a method using artificial neural networks (ANNs) to predict bankruptcy for small enterprises in Eastern Europe. The study showcases how ANNs can outperform traditional statistical methods by accurately forecasting bankruptcy states, providing critical tools for risk assessment in the financial sector. This research underlines the efficiency and adaptability of AI in handling complex economic environments and non-linear data relationships.

Zell (2005) provides a comprehensive introduction to neural networks in *A Brief Introduction to Neural Networks*, explaining their ability to recognize complex patterns and relationships within data. In finance, neural networks are particularly useful for market risk predictions, where they can process large volumes of historical data and identify non-linear trends. These models significantly enhance the predictive accuracy of financial institutions, allowing for more informed decision-making in areas like credit risk and market volatility.

Mehrotra, Mohan, and Ranka (2016) in *Neural Networks for Applied Sciences and Engineering* also emphasize the practical applications of neural networks, particularly for complex pattern recognition and data classification. In financial risk assessment, neural networks can be used to predict credit defaults, assess portfolio risk, and improve fraud detection. Their ability to learn and adapt over time makes them valuable in addressing the ever-changing nature of financial markets.

3. METHODOLOGY

This research adopts a mixed-methods approach, combining a thorough literature review with case studies to explore AI applications in risk assessment and sustainability within the financial sector. The case studies focus on financial institutions that have implemented AI technologies to improve risk management and promote sustainability.

Additionally, the practical applicability of AI in real-world financial settings is assessed through empirical evidence drawn from financial reports and AI-driven sustainability assessments.

4. EFFICIENT TECHNIQUES FOR USING AI IN FINANCE

Based on the literature review, several efficient techniques for the application of AI in the financial sector can be proposed. These techniques leverage AI's strengths in processing large datasets, recognizing patterns, and adapting to dynamic environments. The goal is to improve risk assessment, enhance sustainability analysis, and optimize decision-making processes within financial institutions.

This section outlines several key approaches in using AI in finance.

4.1. Neural Networks for Credit Risk Assessment

Neural networks, particularly deep learning models, have proven effective in analyzing large volumes of financial data and identifying non-linear patterns that traditional models might overlook. This technique is particularly suited for credit risk assessment, where complex relationships between borrower behaviors, market conditions, and financial history can be analyzed to predict defaults more accurately. Neural networks can be trained on historical data and continuously updated with new data to enhance prediction accuracy over time.

A neural network can assess the likelihood of loan defaults by analyzing a borrower's financial history, current market conditions, and economic indicators, allowing for a more nuanced understanding of risk (Mehrotra, Mohan, & Ranka, 2016).

4.2. Machine Learning for Fraud Detection

Machine learning algorithms, such as decision trees, random forests, and support vector machines, are widely used in fraud detection. These algorithms can analyze transaction patterns, flag anomalies, and adapt to new fraud techniques as they emerge. Machine learning models excel in processing both structured and unstructured data, allowing them to detect fraud with high precision and in real-time.

AI models can analyze transaction data and customer behaviors to detect suspicious activities, such as unusual transaction amounts or patterns inconsistent with the customer's profile (Russell & Norvig, 2020).

4.3. Reinforcement Learning for Investment Portfolio Optimization

Reinforcement learning, a branch of AI that focuses on decision-making by learning from the outcomes of past actions, can be effectively used for portfolio management and investment strategies. By continuously updating its knowledge base based on market feedback, reinforcement learning models can dynamically adjust investment strategies to minimize risks and maximize returns.

A reinforcement learning model can autonomously adjust a financial institution's investment portfolio by considering market conditions, risk tolerance, and regulatory constraints (Russell & Norvig, 2020).

4.4. Dynamic Risk Assessment using AI

Dynamic risk assessment involves continuously monitoring and updating risk models based on real-time data, an area where AI excels. This technique allows financial institutions to adjust risk strategies in response to market fluctuations, economic changes, and evolving regulatory requirements. AI models can use real-time data to predict market movements, identify emerging risks, and recommend adaptive risk management strategies.

AI can be used to develop risk management systems that monitor financial markets in real-time, adjusting credit scores and liquidity requirements based on sudden economic shifts (Zio, 2018).

4.5. AI-Enhanced Life Cycle Sustainability Assessment (LCSA)

Life Cycle Sustainability Assessment (LCSA) can be enhanced by AI to evaluate the long-term sustainability of financial products, investments, and practices. AI can process a large amount of ESG data and integrate it with financial performance metrics to assess sustainability impacts comprehensively. By utilizing AI-enhanced LCSA, financial institutions can align their investments with sustainability goals and regulatory standards.

AI-driven LCSA models can assess the environmental and social impacts of investments, helping institutions make informed decisions about portfolio sustainability (Gbededo, Liyanage, & Garza-Reyes, 2015).

4.6. Multi-Criteria Decision Analysis (MCDA) using AI for ESG Integration

AI-powered MCDA tools are increasingly used to integrate environmental, social, and governance (ESG) factors into financial decision-making. These tools can analyze complex data from multiple sources, rank alternatives, and recommend decisions that balance profitability with sustainability. This approach is especially valuable in assessing long-term investment strategies, where financial returns must be weighed against environmental and social risks.

AI-powered MCDA tools can evaluate investment options by considering financial returns and ESG impacts, enabling financial institutions to make more sustainable choices (Liu, Leat, & Smith, 2011).

4.7. Natural Language Processing (NLP) for Regulatory Compliance and Reporting

Natural Language Processing (NLP) techniques allow financial institutions to process large volumes of textual data, such as regulatory documents, news reports, and sustainability reports, to ensure compliance and improve transparency. NLP can automate the extraction of key information, reducing the time and resources required for

compliance reporting and enabling institutions to stay up to date with changing regulations.

An AI system using NLP can automatically extract and process information from sustainability reports, regulatory filings, and financial disclosures, ensuring compliance with ESG standards and facilitating efficient reporting (Giovannoni & Fabietti, 2014).

4.8. AI-Driven Scenario Simulation for Systemic Risk Management

AI can simulate multiple risk scenarios to assess the potential impacts of systemic shocks on the financial sector. These simulations can help financial institutions prepare for high-impact, low-probability events, such as market crashes or economic downturns, by providing insights into how interconnected financial entities might respond under various conditions.

AI-driven scenario simulation tools can model the cascading effects of a market downturn, allowing financial institutions to develop more robust risk mitigation strategies (Elsinger, Lehar, & Summer, 2003).

5. RESULTS AND DISCUSSION

The findings from this research demonstrate that AI significantly enhances risk management and sustainability analysis within the financial sector. Techniques such as neural networks, machine learning, and reinforcement learning enable institutions to manage credit risks, detect fraud, and optimize portfolios with greater accuracy and adaptability. AI-driven sustainability tools, such as LCSA and MCDA, provide institutions with the means to evaluate the long-term environmental and social impacts of their investments.

However, the successful implementation of AI in finance requires addressing challenges such as data security, ethical concerns, and regulatory compliance. AI models must be continuously refined to ensure they align with evolving regulations and ethical standards.

6. CONCLUSION

The integration of AI in the financial sector offers transformative potential in both risk assessment and sustainability analysis. The application of AI-driven models enhances the accuracy and efficiency of risk management, providing institutions with the tools to predict credit defaults, detect fraud, and assess systemic risks in real time. Furthermore, AI supports sustainability initiatives by enabling the analysis of large datasets related to environmental, social, and governance (ESG) factors, helping institutions align their operations with global sustainability goals.

AI's role in risk assessment is particularly significant due to its ability to model complex financial systems, simulate various risk scenarios, and dynamically adjust to new data. Techniques such as neural networks, machine learning, and reinforcement learning allow for more precise and adaptive risk strategies. These technologies can process and analyze vast amounts of structured and unstructured data, offering financial

institutions the capability to continuously monitor and mitigate risks. In particular, AI's dynamic risk assessment models, which update in response to real-time data, provide a more resilient approach to managing market and credit risks.

In sustainability analysis, AI's ability to automate life cycle sustainability assessments (LCSA) and multi-criteria decision analysis (MCDA) ensures that financial institutions can evaluate the long-term impacts of their investments and operations on environmental and social outcomes. By integrating sustainability considerations into investment strategies and financial decision-making, AI helps institutions balance profitability with ethical governance and sustainable growth.

Despite these advancements, challenges such as data security, ethical concerns, and regulatory compliance remain critical areas that require ongoing attention. Financial institutions must continue to refine AI models, ensuring they align with regulatory standards and ethical guidelines to maximize the benefits of AI while minimizing risks.

In conclusion, AI offers powerful tools for revolutionizing risk assessment and sustainability in the financial sector. By adopting AI-driven techniques, financial institutions can navigate complex financial environments, improve risk management, and promote sustainable practices. The future of finance will increasingly depend on the ability to leverage AI for both profitability and sustainability, enabling institutions to respond effectively to market changes and contribute to global sustainability goals.

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REFERENCES

- Apostolakis, G. E. (2003). How useful is quantitative risk assessment? *Massachusetts Institute of Technology Working Paper Series*.
- Elsinger, H., Lehar, A., & Summer, M. (2003). Risk assessment for banking systems. *University of Vienna*.
- Gbededo, M. A., Liyanage, K., & Garza-Reyes, J. A. (2015). Towards a life cycle sustainability analysis: A systematic review of approaches to sustainable manufacturing. *Journal of Cleaner Production*, 19(10), 233-251.
- Giovannoni, E., & Fabietti, G. (2014). What is sustainability? A review of the concept and its applications. *Springer International Publishing*.

Liu, S., Leat, M., & Smith, M. H. (2011). State-of-the-art sustainability analysis methodologies for efficient decision support in green production operations. *International Journal of Sustainable Engineering*, 4(3), 236-250.

Maris, S., Slavici, T., Nenu, P., & Baciu, L. (2017). Artificial intelligence as a decision-making tool in planning the research. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 8(3).

Mehrotra, K. G., Mohan, C. K., & Ranka, S. (2016). Neural networks for applied sciences and engineering: From fundamentals to complex pattern recognition. CRC Press.

Russell, S., & Norvig, P. (2020). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Slavici, T., Maris, S., & Pirtea, M. (2016). Usage of artificial neural networks for optimal bankruptcy forecasting. *Quality & Quantity*, 50, 385–398. <https://doi.org/10.1007/s11135-014-0154-0>

Zell, A. (2005). A brief introduction to neural networks.

Zio, E. (2018). The future of risk assessment. *Reliability Engineering and System Safety*, 177, 176-190. <https://doi.org/10.1016/j.res.2018.04.020>.

Risk Management and Sustainability in Marketing and Finance of Companies from the DKMT Euroregion

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Abstract

Introduction: In a dynamic and competitive business environment, risk management and sustainability are crucial for the long-term success of companies. This paper examines the intersection of risks and sustainability in marketing and finance within the DKMT Euroregion, highlighting their impact on organizational performance and sustainable development strategies.

Aim: The primary aim of this paper is to assess the risks associated with marketing and finance and to analyze the impact of sustainability on these functions for enterprises in the DKMT Euroregion. It provides an integrated perspective on how these companies can manage risks and promote sustainable practices.

Method: The methodology involves a detailed analysis of specialized literature and presents case studies of successful companies in the DKMT Euroregion, representative of each country within the region.

Findings: The findings indicate that risks in marketing and finance are interconnected and that sustainable approaches can significantly mitigate these risks. Sustainable marketing practices enhance reputation and customer loyalty, while sustainable financial strategies improve access to capital and reduce long-term operational costs.

Conclusion: The study concludes that adopting sustainable practices in marketing and finance not only reduces risks but also enhances overall business performance. Companies in the DKMT Euroregion can achieve long-term success by embracing sustainability as a core component of their strategic approach.

Originality and value: This paper offers a new perspective by integrating risks and sustainability in marketing and finance, using advanced technologies. It contributes to the literature by combining diverse methodologies and provides practical recommendations for successfully implementing sustainable strategies in companies.

Key Words: Risk Management, Marketing, Finance, DKMT Euroregion

Jel Codes: G32, R58, L26

1. INTRODUCTION

The Danube-Kris-Mures-Tisza (DKMT) Euroregion, established in 1997, represents a vital cross-border cooperation initiative involving Romania, Hungary, and Serbia. This

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Euroregion is home to a diverse industrial and agricultural landscape, making it a focal point for the intersection of economic growth, environmental protection, and sustainable development. As global market demands shift toward more sustainable business practices, companies in the DKMT Euroregion must address both economic and environmental risks to secure long-term viability. This cooperation aims not only to enhance regional economic integration but also to foster shared environmental stewardship across borders (DKMT)(Dudă-Dăianu & Abrudan)(Marin et al.).



Figure 1. DKMT Euroregion borders (Danube–Criș–Mureș–Tisa Euroregion - Wikipedia)

Risk management is crucial in this context, as companies in the DKMT Euroregion face a range of challenges, from market volatility to regulatory changes, and increasingly stringent environmental standards. Effective risk management allows these businesses to anticipate and mitigate these challenges while ensuring that their operations remain financially stable and compliant with international regulations. Companies that implement robust environmental protection measures as part of their risk management strategies can better navigate shifting regulatory landscapes, reduce environmental liabilities, and maintain a competitive edge in an era of rising ecological awareness (Badulescu et al.).

Sustainability, a key focus for companies in the region, involves balancing economic growth with environmental and social responsibilities. The concept of sustainability extends beyond financial performance and includes the management of natural resources, reduction of waste, and minimization of carbon footprints. In the manufacturing and service sectors alike, businesses are increasingly adopting sustainable practices such as energy-efficient technologies, waste reduction strategies, and sustainable sourcing, all of which contribute to long-term resilience. For instance, automotive manufacturers in the region, such as Continental Automotive Romania and Mercedes-Benz Manufacturing Hungary, are integrating electric vehicle technologies and reducing emissions as part of their commitment to sustainability (Lengyel)(Marin et al.).

Moreover, the connection between marketing, finance, and sustainability is becoming more pronounced. Marketing strategies increasingly emphasize a company's commitment to environmental protection and social responsibility, which enhances brand reputation and customer loyalty. Financially, companies that adopt sustainable practices are more likely to attract investment from funds focused on environmental, social, and governance (ESG) criteria, further ensuring long-term stability (Bevanda)(Badulescu et al.).

This article explores the methods through which companies in the DKMT Euroregion manage risk in both financial and environmental contexts while fostering sustainable growth. Through comparative analysis of enterprises across Romania, Hungary, and Serbia, it highlights the interconnected nature of risk management, sustainability, marketing, and finance, providing insights into how businesses can thrive in an increasingly green and integrated global economy. Data and findings were obtained through the project "Performance and excellence in the field of environment and renewable energy through modern cluster-type entities" (acronym PEDMEREMC, SMIS code 138692).

2. METHODS

The research methodology for this study adopts a mixed-methods approach, incorporating both qualitative and quantitative data collection techniques. This is grounded in a comprehensive literature review, the analysis of case studies, financial reports, and interviews with business leaders in the DKMT Euroregion. The study aims to explore how companies in the region manage risks, incorporate sustainability into their business practices, and align marketing and finance with sustainable growth. The selected companies from Romania, Hungary, and Serbia represent both the goods production and services sectors.

2.1. Literature review

The existing body of literature provides a foundation for understanding the critical role of risk management and sustainability in regional development and cross-border

cooperation. According to Dudă-Dăianu and Abrudan (2012), the success of the DKMT Euroregion depends on decentralized cooperation and shared responsibility for regional development. This perspective is essential for understanding how companies manage environmental and financial risks within the framework of cross-border collaboration (Dudă-Dăianu & Abrudan).

Badulescu et al. (2015) focus on the effectiveness of cross-border cooperation, especially in public safety and economic collaboration, stressing the importance of risk management in border regions. They argue that cooperation between regions helps reduce economic and regulatory risks for businesses (Badulescu et al.). Budzowski and Láczy (2009) expand on this by exploring how Central and Eastern European countries, including those in the DKMT, are integrating sustainability into their economic practices to align with European Union standards (Budzowski & Láczy).

Moreover, articles from *Acta Academiae Modrevianae* explore the role of regional differentiation in sustainable development, particularly in the fields of agriculture and industrial production. This reinforces the importance of context-specific risk management strategies (Budzowski & Láczy). Additional sources highlight the integration of environmental protection in business operations, particularly in sectors like agriculture and real estate (Lengyel)(Marin et al.)(Kovács).

2.2. Key concepts

Risk management is defined as the systematic process of identifying, assessing, and controlling risks that may affect a company's operational and financial health. These risks can include market volatility, regulatory changes, environmental impacts, and operational disruptions. Badulescu et al. (2015) emphasize the need for risk management in cross-border operations, particularly in regions like the DKMT, where different regulatory frameworks can create challenges (Badulescu et al.).

Sustainability refers to the practice of conducting business in a manner that meets the needs of the present without compromising the ability of future generations to meet theirs. Dudă-Dăianu and Abrudan (2012) highlight that in the DKMT Euroregion, sustainability is becoming increasingly important as companies face both local environmental challenges and global demands for responsible practices (Dudă-Dăianu & Abrudan). Marin et al. (2017) further underline the convergence between financial practices and sustainability in the DKMT, noting that companies are increasingly integrating green technologies to mitigate environmental risks (Marin et al.).

Marketing involves promoting a company's products or services to attract and retain customers, while finance focuses on managing a company's assets, liabilities, and investments. Budzowski and Láczy (2009) argue that the integration of sustainability into marketing and financial strategies enhances brand reputation and long-term financial stability. Companies that adopt sustainable financial practices are more likely to attract investors and comply with evolving regulatory requirements (Budzowski & Láczy).

2.3. Data collection

The research employs multiple methods of data collection:

Case studies: In-depth case studies of companies from the goods and services sectors, including Continental Automotive Romania, Delta Holding, Petrohemija Pancevo, and Mercedes-Benz Manufacturing Hungary, provide a detailed understanding of how businesses in the DKMT Euroregion manage risks and promote sustainability. These case studies focus on the companies' financial strategies, sustainability initiatives, and marketing approaches.

Financial reports: Annual reports and sustainability disclosures from the selected companies are used to evaluate their financial performance and environmental impact. These reports provide insights into how companies are integrating risk management and sustainability into their operational and strategic planning.

Interviews: Interviews with business leaders and experts from the DKMT Euroregion offer qualitative insights into the challenges and opportunities associated with cross-border cooperation, regulatory compliance, and sustainability.

Industry publications: Additional data is drawn from industry publications, which provide a broader context for the economic and environmental trends shaping the DKMT region.

2.4. Data analysis

The collected data is analyzed through a comparative framework. The comparative analysis in this study focused on six companies representing both the goods production and services sectors across the DKMT Euroregion. These companies are Continental Automotive Romania (Timiș County, Romania), a key player in the automotive manufacturing sector, and Edenred Romania (Timiș County, Romania), a major provider of corporate payment solutions. From Hungary, Mercedes-Benz Manufacturing Hungary (Bács-Kiskun County) was studied as a representative of the automotive manufacturing industry, and MOL Hungary (Bács-Kiskun County), a leader in energy services, provided insight into service-based risk management. In Serbia's Vojvodina region, Petrohemija Pancevo (petrochemical manufacturing) and Delta Holding (diversified services including agriculture, real estate, and retail) were selected for their significant roles in the regional economy. These companies were analyzed to understand their approaches to risk management, marketing, financial performance, and sustainable development.

3. RESULTS AND DISCUSSION

3.1. Companies analyzed

Continental Automotive Romania (Goods Production - Automotive Manufacturing operating in Timiș County, Romania)

As part of the multinational Continental AG, this company benefits from substantial financial resources. The company's Romanian subsidiary contributes to the group's revenue of over €33.8 billion (2022). Its operations focus on automotive electronics and tire production, key components of the growing electric vehicle market.

Continental adopts global marketing strategies that focus on innovation, safety, and sustainability. It emphasizes its contributions to electric and autonomous driving technologies, which resonates with both the automotive industry's shift toward greener solutions and consumer demand for eco-friendly vehicles.

As a multinational corporation, Continental has a robust risk management strategy. It diversifies production across various regions to reduce the impact of local economic downturns. The company invests heavily in R&D, particularly in the field of sustainable technologies, mitigating the risks associated with environmental regulations and market shifts.

Continental's sustainability strategy includes reducing carbon emissions and improving energy efficiency across its plants, including those in Timiș County. It aligns with global trends toward decarbonization and is investing in more sustainable materials and recycling initiatives (Marin et al.)(Badulescu et al.).

Edenred Romania (Services - Payment Solutions, operating in Timiș County, Romania)

Edenred Romania, a subsidiary of the French company Edenred, provides corporate payment solutions like meal vouchers and fuel cards. Financially, Edenred has demonstrated steady growth, with the Romanian market contributing significantly to its global revenue of over €2 billion annually.

Edenred uses a B2B marketing strategy, promoting its services directly to companies. It emphasizes how its solutions improve employee engagement and enhance operational efficiency. The company leverages digital marketing, particularly in promoting the integration of its services with mobile applications and online platforms.

Edenred mitigates financial and operational risks by offering a wide range of services beyond meal vouchers, such as employee benefits and expense management systems. Its shift toward digital services, particularly mobile payments, helps minimize exposure to technological obsolescence and compliance risks.

Edenred focuses on sustainable growth by promoting paperless solutions and encouraging businesses to adopt digital vouchers, which reduces environmental impact. The company also promotes employee wellness, which aligns with broader sustainability goals (Kovács)(Badulescu et al.).

Mercedes-Benz Manufacturing Hungary (Goods Production - Automotive Manufacturing, operating in Bács-Kiskun County, Hungary)

Mercedes-Benz Hungary is a significant financial contributor to Daimler AG's global revenue, producing compact cars at its plant in Kecskemét. Daimler's global revenue in 2022 was around €150 billion. The plant in Hungary benefits from substantial investments, with continuous expansions aimed at increasing production capacity.

Mercedes-Benz markets itself globally as a luxury brand, focusing on innovation and sustainability. It emphasizes its electric vehicle line, the EQ series, in response to market demand for sustainable transportation. The Kecskemét plant's contribution to this shift toward electric vehicles is a focal point in its marketing.

Mercedes-Benz mitigates risks by diversifying production across regions and increasing its focus on electric vehicles to align with environmental regulations and consumer preferences. Its comprehensive supply chain management system also reduces exposure to risks associated with supply chain disruptions.

The Kecskemét plant is central to Mercedes-Benz's sustainability goals. The plant focuses on reducing its carbon footprint, using renewable energy, and increasing the recyclability of materials used in production (Lengyel)(Badulescu et al.).

MOL Hungary (Services - Energy Services, operating in Bács-Kiskun County, Hungary)

MOL Group, a major player in Hungary's energy sector, has significant operations in refining and distribution of petroleum products. The company's revenue was around €16 billion in 2022, and MOL Hungary plays a central role in its Central and Eastern European operations.

MOL employs an integrated marketing strategy, focusing on the company's contributions to energy security and environmental sustainability. It promotes its role in the energy transition, highlighting investments in biofuels, electric vehicle charging networks, and renewable energy sources.

MOL's risk management strategy is focused on the diversification of its energy portfolio, moving away from traditional fossil fuels and investing in renewable energy. This mitigates the risks associated with fluctuating oil prices and the global shift toward decarbonization.

The company has committed to reducing its carbon emissions and increasing its investment in renewable energy. Its sustainability goals are aligned with Hungary's broader environmental targets, and MOL is positioning itself as a leader in the region's energy transition (Kovács)(Badulescu et al.).

Petrohemija Pancevo (Goods Production - Petrochemical Manufacturing, operating in Vojvodina, Serbia)

Petrohemija Pancevo is one of Serbia's largest petrochemical companies, with annual revenues exceeding €300 million. The company plays a crucial role in the Balkans' energy and materials sectors. It benefits from state support and strategic partnerships with larger corporations in the oil and gas industry, such as NIS (Naftna Industrija Srbije), which helps stabilize its financial outlook despite market volatility.

Petrohemija focuses on B2B marketing, particularly targeting industrial consumers in the petrochemical, construction, and energy sectors. The company highlights its ability to meet regional demand for essential petrochemical products, with an emphasis on product quality, reliability, and compliance with European standards.

The petrochemical industry is exposed to significant risks, including fluctuating oil prices, environmental regulations, and geopolitical issues. Petrohemija mitigates these

risks by maintaining close ties with state-owned enterprises and investing in technological upgrades. These strategies reduce operational risks and ensure compliance with tightening environmental standards.

The company has initiated several sustainability initiatives, including efforts to reduce carbon emissions and improve energy efficiency in its production processes. These efforts align with Serbia's broader commitment to sustainable industrial growth, although the company's primary reliance on fossil fuel-based production presents long-term sustainability challenges (Lengyel)(Badulescu et al.)(Kovács).

Delta Holding (Services - Diversified Services in Agriculture, Real Estate, and Retail, operating in Vojvodina, Serbia)

Delta Holding is one of Serbia's largest privately-owned companies, with diversified operations across several sectors, including agriculture, real estate, and retail. The company's annual revenue surpasses €600 million, with agriculture being a key revenue driver. Delta Holding's diverse portfolio helps mitigate risks associated with market volatility in individual sectors.

Delta Holding employs a sophisticated marketing strategy that varies by sector. In agriculture, it focuses on modern, sustainable farming practices and high-quality product offerings, particularly for export. In the real estate sector, the company promotes its projects as innovative and luxurious, with a focus on sustainable building practices. The retail sector benefits from a robust digital presence and customer loyalty programs.

Delta Holding's diversified portfolio serves as its primary risk management tool, allowing it to absorb fluctuations in any one market. The company also invests heavily in technology and innovation, particularly in agriculture, where it uses precision farming techniques to mitigate risks associated with climate change and fluctuating crop yields.

Delta Holding is a leader in sustainable development in Serbia. The company has implemented advanced agricultural practices that improve resource efficiency, reduce waste, and enhance crop yields while minimizing environmental impact. In real estate, it is committed to green building practices, ensuring that new developments meet the highest environmental standards (Marin et al.)(Bevanda)(Kovács).

3.2. Comparative results

3.2.1. Financial performance

Continental Automotive Romania and Mercedes-Benz Manufacturing Hungary, both part of global automotive groups, benefit from significant financial backing and stability. Their financial performance is closely linked to the automotive industry's global shift towards electric vehicles, which requires substantial R&D investments.

In contrast, Edenred Romania and MOL Hungary operate in the services sector and have a more diversified revenue stream. Edenred's financial stability is driven by its broad portfolio of corporate services, while MOL's finances are bolstered by its position as a leading energy provider in Hungary and Central Europe.

Petrohemija Pancevo and Delta Holding (Vojvodina) also differ in financial structure. Petrohemija's revenue is tied to the volatile petrochemical market, which poses higher

risks, whereas Delta Holding's diversified portfolio, spanning agriculture, real estate, and retail, provides greater financial resilience.

3.2.2. Marketing strategies

Continental and Mercedes-Benz utilize global marketing strategies that emphasize innovation, sustainability, and safety, particularly in promoting electric vehicle technologies. Their marketing campaigns target both consumers and industries, positioning them as leaders in automotive innovation.

Edenred and MOL Hungary focus on B2B marketing. Edenred emphasizes employee benefits and digital payment solutions, while MOL markets its energy services with a focus on sustainability and its growing role in renewable energy sources.

Petrohemija and Delta Holding employ more regionalized marketing strategies. Petrohemija targets industrial clients, emphasizing product quality and compliance with European standards. Delta Holding leverages its diversified business model, using targeted marketing strategies for each sector, including luxury real estate and modern agricultural practices.

3.2.3. Risk management

Automotive companies like Continental and Mercedes-Benz focus on managing supply chain risks and technological advancements, investing heavily in R&D to align with global trends toward sustainability and decarbonization.

Edenred and MOL Hungary manage risks through technological innovation and diversification. Edenred has shifted toward digital services, minimizing the risk of obsolescence, while MOL is investing in renewable energy to reduce its dependence on fossil fuels.

Petrohemija faces significant risks due to its reliance on the petrochemical sector, which is subject to regulatory and market fluctuations. In contrast, Delta Holding mitigates risks by diversifying across sectors such as agriculture, real estate, and retail, making it more adaptable to market changes.

3.2.4. Sustainability

Continental and Mercedes-Benz are at the forefront of the sustainability movement in the automotive industry, focusing on reducing carbon emissions and integrating electric vehicle technology into their production processes.

MOL Hungary is transitioning toward renewable energy, aligning its operations with global environmental trends. Edenred promotes sustainability by offering digital and paperless corporate services, reducing environmental impact.

Petrohemija lags in sustainability efforts due to its dependence on petrochemicals, though it has initiated efforts to improve energy efficiency. Delta Holding, on the other hand, demonstrates strong sustainability practices, especially in agriculture, where it implements advanced technologies to enhance resource efficiency and minimize environmental impact.

4. CONCLUSIONS

The comparative analysis of the six companies from Romania, Hungary, and Serbia within the DKMT Euroregion demonstrates the critical role that risk management and sustainability play in ensuring the long-term viability of businesses across various sectors. Both goods production and service companies in the region face a dynamic environment characterized by fluctuating market conditions, evolving regulatory requirements, and increasing demands for environmental responsibility.

Continental Automotive Romania and Mercedes-Benz Manufacturing Hungary, as representatives of the goods production sector, have demonstrated strong financial performance, supported by substantial investments in research and development (R&D), particularly in electric vehicles. Their marketing strategies highlight innovation and sustainability, aligning with global trends in the automotive industry. These companies' risk management practices focus heavily on supply chain resilience and technological advancements, allowing them to navigate the complex regulatory landscape and mitigate operational risks.

In the services sector, Edenred Romania and MOL Hungary show how diversification and digital transformation can be powerful tools in managing both operational and financial risks. Edenred's move toward digital solutions has not only reduced its environmental footprint but also minimized the risk of service obsolescence. MOL Hungary, with its investments in renewable energy, is positioning itself as a leader in the regional energy transition, mitigating the risks associated with declining fossil fuel demand.

The companies from Vojvodina, Petrohemija Pancevo and Delta Holding, present contrasting approaches to risk management and sustainability. Petrohemija, while significant in the regional petrochemical sector, faces greater challenges due to its dependence on fossil fuel-based products and market volatility. Delta Holding, on the other hand, benefits from its diversified business model, which spans agriculture, real estate, and retail, allowing it to implement robust sustainability practices, particularly in agricultural innovations and green building projects.

Overall, the companies analyzed show that those integrating sustainability into their core strategies—whether through technological innovation, diversification, or green initiatives—are better positioned to manage risks and ensure long-term growth. As global environmental and economic pressures continue to mount, businesses in the DKMT Euroregion will need to further embrace sustainability and refine their risk management strategies to remain competitive in the international marketplace. The successful adaptation of these strategies will not only enhance their financial resilience but also contribute to the sustainable development of the region as a whole.

This research has been made possible through data and insights derived from the PEDMEREMC project, which emphasizes the importance of excellence and innovation in environmental and renewable energy sectors. By supporting the development of cluster-type entities, the project contributes to enhancing the region's competitiveness and sustainability. The connection between the project's goals and the conclusions of

this study demonstrates the vital intersection of environmental initiatives and business strategy, ensuring that companies in the DKMT Euroregion are prepared to meet the demands of a rapidly evolving global market.

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REFERENCES

- Badulescu, D., Badulescu, A., & Bucur, C.-A. (2015). Considerations on the Effectiveness of Cross-Border Cooperation in Public Order and Civil Protection Services. The Case of the Romanian – Hungarian Border Area. *Lex Localis - Journal of Local Self-Government*, 13(3), 559-578.
- Bevanda, V. (Ed.). (2019). *Leadership, Innovation, Management and Economics: Integrated Politics of Research* (LIMEN Conference Proceedings). Graz, Austria: Association of Economists and Managers of the Balkans.
- Budzowski, K., & Láczy, M. (2009). *Poland, Hungary, the World: Selected Aspects of Contemporary Economy, Culture, and Science*. Kraków: AFM Publishing House.
- Continental Romania – official site, <https://www.continental.com/ro-ro/>
- Danube–Criș–Mureș–Tisa Euroregion - Wikipedia, https://en.wikipedia.org/wiki/Danube%E2%80%93Criș%E2%80%93Mureș%E2%80%93Tisa_Euroregion
- Delta Holding – official site, <https://deltaholding.rs/en/>
- DKMT – official site <https://dkmt.net/ro/>
- Dudă-Dăianu, D. C., & Abrudan, D. (2012). Euroregion Danube-Criș-Mureș-Tisa (DKMT) – A Successful Story?.
- Edenred – official site, <https://www.edenred.ro/ro>
- Hip-Petrohemija – official site, <https://www.hip-petrohemija.com/naslovna.1.html>

Kovács, A. D. (Ed.). (2009). *Old and New Borderlines/Frontiers/Margins: East-Central European Regional Seminar*. Pécs: Centre for Regional Studies of the Hungarian Academy of Sciences.

Lengyel, I. (2008). *Regional Planning and Cooperation in Practice in Danube–Cris–Maros–Tisa Euroregion*. In A. D. Kovács (Ed.), *East-Central European Regional Seminar* (pp. 51-60). Pécs: Centre for Regional Studies of the Hungarian Academy of Sciences.

Marin, A. M., Lăzăruș, C. D., & Pereș, I. (2017). *Aspects of Compatibility and Convergence of the Accounting Information Comprised in the Balance Sheet in the DKMT Euroregion*. Proceedings of the International Conference Knowledge-Based Organization, 23(2), 90-96.

Mercedes-Benz – official site, <https://group.mercedes-benz.com/careers/about-us/locations/location-detail-page-5058.html>

MOL Hungary – official site, <https://mol.hu/hu/>

Sustainability Accounting: A Risk-based Approach

Petya Petrova²⁵

Abstract

Introduction: Sustainability reporting is becoming the norm in new corporate world. In Europe, the new regulations are shifting the focus from disclosing a company's impact on the environment and society to managing sustainability risks.

Aim: To explore the integration of a risk-based approach into sustainability accounting. By examining the relationship between sustainability and financial performance, this research seeks to understand how accounting can be used to identify, assess and manage sustainability-related risks effectively.

Method: This study was conducted using a combination of research methods to gain an in-depth understanding of the role of risk management in sustainability accounting. By applying the historical approach and reviewing the existing literature, key concepts and models are identified in the relationship: sustainability accounting - risk management.

Findings: The study highlights a strong positive link between environmental accounting and risk management: by analysing financial data and key performance indicators (KPIs), companies can identify potential threats to their operations and financial performance from environmental and social issues. In addition, the study explores how sustainability risks can be integrated into existing risk management frameworks in order to improve the overall resilience of the company. The **originality and value** of this research lies in bringing a new perspective to the field of sustainability accounting by focusing on the integration of risk management principles.

Key Words: sustainability accounting, risk management, ESG

Jel Codes: M41, Q 56, G32

1. INTRODUCTION

The business environment has been dynamic in recent decades. Companies have faced constant challenges. The world is becoming increasingly unpredictable. Factors such as climate change, geopolitical conflicts, pandemics and economic and financial crises create uncertainty and instability. As a result, management is increasingly actively seeking to integrate and implement sustainable practices into their business models, while simultaneously effectively managing the risks to which the business is exposed. Managers have long recognised the risk-based approach as a framework for effective risk management. At the same time, sustainability accounting is being adopted by more and more companies as a management tool due to increased interest and regulatory pressure. It plays a key role in identifying, measuring, reporting and disclosing the social

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and environmental impacts of business on the environment and society. In measuring these effects, sustainability accounting is involved in the identification, assessment and management of risks arising from social and environmental concerns. In this regard, the risk-based approach is applicable to sustainability accounting. This paper aims to explore the relationship between sustainability accounting and risk-based approach. It analyses the interaction between accounting, sustainability and risk. It focuses on sustainability accounting's role in managing social and environmental risks.

The research was conducted using a systematic literature review combined with conceptual analysis to derive fundamental concepts, relationships and interactions related to sustainability accounting and risk management.

The paper contributes to the development of the theory and practice of sustainability accounting by offering a new integrated approach to the nature of social and environmental risk management that contributes to the improvement of companies' long-term financial performance.

2. LITERATURE REVIEW

Businesses have been rethinking their priorities in responding to increasing demands for social and environmental responsibility in recently. From the pursuit of maximum short-term profit, companies turned to 'creating more value with less impact' (Gray and Bebbington, 2000). Sustainability accounting has emerged as a response to this change, offering a holistic approach that guides companies towards a more sustainable future. It is an aspect of sustainability (Lodhia, S.K. and Sharma, U. 2019, p. 309) that offers so many different perspectives:

- An overarching measurement and information management concept for the calculation of corporate sustainability,
- A pragmatic, goal driven, stakeholder engagement process which attempts to develop a company specific and differentiated set of tools for measuring and managing environmental, social and economic aspects as well as the links between them. (Schaltegger and Buritt, 2010, p.379);
- An interlocking, mutually reinforcing sustainability related information system encompassing external reporting, internal decision-making support, and management control systems that are consistent with the overall business strategy (Joshi and Li, 2016, p. 4)

Sustainable accounting integrates social, environmental and economic aspects of an organisation's activities (Ozili, 2022). It provides information that enables stakeholders to make informed decisions and evaluate the social and environmental commitment of companies/organisations. Sustainability accounting focuses on the environmental and social impacts, risks and opportunities that result from business activities. Social and environmental impacts are the positive and/or negative consequences of human activities, including business activities, on the environment and communities. Threats and opportunities to the business describe risks (the consequences of business activities

affecting various aspects of the business: financial results, constraints, reputation, etc.), opportunities (the possibilities of improving the image, expanding into new markets, implementing business models, production, stimulating innovation, etc.) and development potential (optimising processes, enhancing communication with stakeholders, etc.). The social and environmental dimensions of business are crucial for long-term prosperity and resilience. However, reporting on them would be incomplete if it did not cover the risks associated with growing environmental and social issues. Risks in the context of sustainability accounting are those potential events and situations that would make it impossible to achieve sustainability objectives. Research in this area focuses on:

Disclosure of environmental and social risks. For example, studies by Lopez et al. (2023), Truant, et.al. (2017), Guthrie et al. (2020), Fijałkowska and Hadro (2022) analyse different aspects of disclosure of such risks in different countries;

Sustainability reporting and risk: Bischof, Dutzi and Gros (2022) outline the different aspects of sustainability reporting, management and risk governance settings and find that there are still research gaps. Eriandani and Winarno (2024) examine the impact of environmental, social and governance (ESG) risks on firm value and analyse materiality disclosure as a moderating variable.) While Elbardan et al. (2023) analyse the relationship between CSR reporting assurance and firm value and risk. Bebbington and Thomson (2007) highlight the potential of social and environmental accounting as a tool for managing organisational risk. All studies show that by systematically considering social and environmental impacts, organisations can better identify and manage risks.

A risk-based approach is one of the keys to implementing management systems using the requirements of management standards. (Ispas et al. 2023). It is an approach that identifies, prioritizes and manages the significant risks for the given organisation in accordance with the risk management framework (Guerra and Prado, 2021; Boehm et al., 2019, p.4). The risk-based approach is a method that allows organisations to allocate their resources effectively through risk management (Yohe and Leichenko, 2010, p.31).It comprises the following steps: risk identification, risk assessment and prioritisation, risk mitigation, (ongoing) monitoring and reporting (adapted from FATF, 2014).

Although theoretical and practical contributions have been made, there is a lack of comprehensive and complete research on the role of risk in sustainability accounting. This study seeks to answer the following questions, assuming that the relationship between risk and sustainability accounting is mutually dependent and determines the risk-based approach:

How does sustainability accounting relate to the risk-based approach?

What is the interdependence between sustainability accounting and sustainability risk management?

3. 1. SUSTAINABILITY ACCOUNTING AND RISK-BASED APPROACH: SYNERGISTIC INTERACTION

Sustainability accounting and the risk-based approach are two key tools. Their interaction is based on the relationship between accounting, sustainability and risk.

Accounting in general is a system for measuring economic events, relationships and values. It is defined as the process of identifying, measuring and communicating economic information to enable informed judgements and decisions to be made (AAA, 1966, p. 41). By providing relevant and reliable information about a company's financial position, performance and activities, it plays a key role in corporate transparency and accountability.

Sustainability is a simple concept that means "living in material comfort and peacefully within the means of nature" (Milne and Gray, 2012, p. 16). It is commonly defined as the ability to maintain or a state that can be maintained at a certain level (Kajikawa, 2008, p.218) over time (Basiago, 1999, cit, op. Mensah, J., 2019). Sustainability has different aspects (Liu, 2009, p.1413) and manifestations. At the corporate level, it is the ability of a company to create long-term value by balancing its economic interests with its social and environmental responsibilities. It is a complex concept that unfolds through the triple bottom line²⁶, corporate social responsibility²⁷ and ESG factors²⁸.

Risk describes the expectation of the future. It refers to any kind of measurable uncertainty viewed from the standpoint of unfavorable contingency (Knight, 1921, p.233). As a statistical variable, risk is the probability of an event multiplied by some measure of its consequence (Yohe and Leichenko, 2010, p. 4). In the business context, risk is defined as the possibility of an event, action or circumstance affecting the financial position, results or cash flows of an entity. (Petrova, 2019, p. 63).It is an integral part of any business.

²⁶ The term Triple Bottom Line (TBL) was first coined by John Elkington in 1994 and later used by him in 1997 in the book *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. It is an approach that has been developed as an accounting system for assessing sustainability (Nogueira et al., 2023, p.1). The idea of the trinity of the 3 Ps (profit, planet, people) that underpins this approach is derived from Freer Spreckley's publication: *Social Audit - A Management Tool for Cooperative Work* (1981).

²⁷ Corporate Social Responsibility (CSR) outlines the social commitment of business to the development of society and to ensuring a high quality of life through sustainable growth. It is an approach that encourages companies/organisations to integrate the social and environmental needs of society with their economic interests to achieve sustainable development by creating value for all stakeholders through the implementation of relevant policies, actions and conduct.

²⁸ ESG (environmental, social and governance) is a framework for the evaluation of a company in three key areas: environment, social well-being and corporate governance. It defines the indicators that measure a company's/organisation's progress towards sustainability in its three dimensions

Despite the different focus and role, there is a correlation between accounting, sustainability and risk based on the following relationships: accounting - sustainability, accounting - risk and sustainability - risk.

Sustainability - Accounting

Accounting and sustainability are viewed from different perspectives. There are similarities in their functionality, quality and applicability. (Table 1)

Table 1: Accounting and sustainability: similarities and specificities

Aspects	Accounting	Sustainability
<i>Functionality</i>	The <i>ongoing process</i> of collecting, processing, analysing and disclosing financial data relating to the financial position, financial performance and cash flows of an entity.	A <i>continuous process</i> of evaluating, improving and adapting business practices to achieve a balance between environmental, social and economic objectives.
<i>Quality features</i>	<i>Transparency and accountability</i> of the company's financial position and performance to stakeholders	<i>Transparency and accountability</i> of the company's environmental, social and governance practices to stakeholders.
	Adaptability to the needs of interested parties for information about the company's financial position and performance.	Adaptability to changing environmental, social and economic conditions.
<i>Application</i>	<i>Management tool</i>	<i>Management tool</i>
<i>Examples of use</i>	Involved in the identification, assessment and monitoring of financial risks	Involved in the identification, assessment and management of ESG risks
	The information generated by accounting is used to make informed decisions about the management of resources and the business as a whole to achieve the long-term success of the company.	Used to integrate ESG factors into business decisions to ensure long-term sustainability

Source: Petrova, 2024, p. 55

Looking more closely, the interplay between accounting and sustainability can be seen in the development of comprehensive approaches to reflect the financial position and performance as well as the social and environmental impacts of business: sustainability accounting.

Accounting - Risk

Companies are exposed to many risks that can alter their financial position and the outcomes of their activities. To the extent that accounting generates information about these changes, the manifestation of risk is the subject of accounting. (Figure 1)

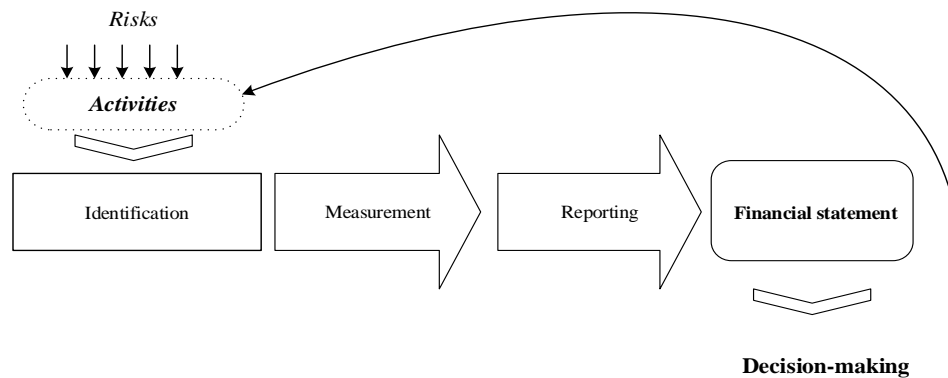


Figure 1. Accounting process: links and interaction

Source: Author

Risk reporting and risk management and their consequences cannot be considered separately, as they are inextricably linked. The processes that take place interact with each other. Consequently, accounting provides information about risks. Satisfying the need for risk information is challenging because (a) accounting only provides information about real existing and/or potential assets, liabilities, capital, income and expenses, and (b) risk is a phenomenon of a stochastic nature, i.e. accounting cannot generate information about it. Risk management is the source of such information, and accounting uses it to: report the impact of risk on the financial position and results; effectively implement the risk management policy in the entity including accounting policy; and protect the entity from the effects of risk.

Sustainability - Risk

Sustainability and risk may seem incompatible because they have different objectives and time horizons (Figure 2).



Figure 2. Sustainability – Risk: Characteristics

Source: Author

Insofar as risk is a feature of any process, condition, operation, sustainability and risk are interrelated in a dynamic, multi-faceted relationship which is expressed as follows:

- Implementing sustainable business models and practices helps reduce the risks associated with sustainability;
- Sustainability is a process of managing risks related to social and environmental issues; companies that want to be sustainable need to manage the risks that can threaten their existence and prosperity;
- Risk is a driver for change towards sustainability and for rethinking the priorities, goals and objectives.

Based on the above, it can be concluded that risk management is one of the tools to achieve sustainability, i.e. building a sustainable future means seeking balanced solutions to manage risk and achieve sustainability.

The interdependence between sustainability, accounting and risk underpins the following findings:

First, sustainability accounting and risk management are the consequences of the relationships between the three pairs of relationships;

Second, a risk-based approach is intrinsic to this interdependence;

Finally, the linking of sustainability, accounting and risk (Figure 3) explains the synergistic relationship between sustainability accounting and a risk-based approach.

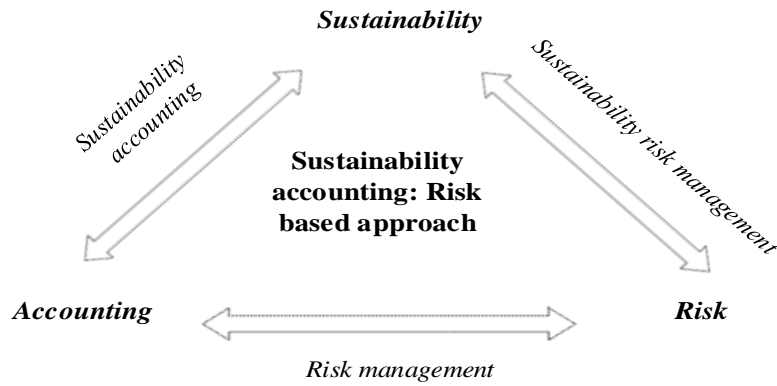


Figure 3. Risk, accounting and sustainability: interaction and interlinks

Source: Author

Sustainability accounting and the risk-based approach are two interrelated perspectives that describe the twofold relationship between them:

Sustainability accounting: a tool of the risk-based approach. It serves as a tool for identifying, measuring and assessing sustainability risks. In this context, sustainability accounting provides the necessary information to identify and assess sustainability risks.

The risk-based approach: a framework for sustainability accounting. Sustainability accounting is part of a company's integrated system for evaluating the effectiveness of measures taken to minimise or mitigate sustainability risks, focusing on environmental and social factors that affect the financial situation.

In summary, the risk-based approach is applicable to sustainable accounting. Through it, sustainability accounting applies a systematic approach to managing sustainability risks.

3.2. Interplay: sustainability accounting – risk management

Risk management is the management of risks and their impact on business activities. In the context of growing social and environmental problems, it is increasingly used as a tool for creating a sustainable business model, as it creates the conditions for smooth adaptation to a changing environment in which environmental and social responsibility is already "standard". The management of sustainability risks is seen as a critical part of enterprise risk management (ERM), just as it is defined as a key element of "sustainable development" (Zu, 2013). A major focus of this approach is the risks associated with the environmental and social responsibilities of companies.

Sustainability accounting, on the other hand, generates, measures, reports and discloses information about the impacts, risks and opportunities of the interaction of business with the environment and society. Impacts, risks and opportunities cover a wide

range of environmental, social and governance aspects of sustainability. Risks, in particular, are multifaceted. Depending on their origin and nature, they are internal or external.

Internal risks are risks to the accounting system itself. They arise from the uncertainty of sustainability accounting. They are organisational, operational, regulatory, etc., depending on their nature. Internal risks are caused by the quality of information, changes in regulations, changes in information needs, insufficient resources and/or management commitment, lack of coordination between units, etc.

External risks relate to the environment in which companies operate, and affect the implementation of the Sustainable Development Goals (17 SDGs). They are environmental, social, political and economic in nature. Depending on how they are manifested, these include climate change, pollution, biodiversity loss, social inequality, demographic change, political instability, and changing legislation.

The growing interest of stakeholders, increasing regulatory requirements (ESRS, IFRS for Sustainability, GRI, WBCSD, TCFD) and the significance of the impact on financial performance, reputation and resilience of companies are the reasons why these risks are increasingly drawing the attention of managers. To optimise the impact of their management, it is necessary to implement an approach that combines traditional Enterprise Risk Management (ERM) with sustainability accounting. This approach outlines the company's strategy for achieving sustainability and meets the requirements of sustainability reporting frameworks. Its application reduces risk, contributes to timely decision making, improves sustainability reporting, improves communication with stakeholders, and increases efficiency and profitability. Lack of objectivity; difficulties in data collection and analysis; difficulties in balancing economic decisions, social and environmental objectives, stakeholder values and expectations are among the challenges of its implementation. However, a holistic approach improves transparency and accountability and presents sustainability risks in a holistic way.

4. CONCLUSION

The study highlighted the relationship between sustainability accounting and the risk-based approach. By examining the interactions and linkages between sustainability, accounting and risk, a clear positive correlation between these two concepts has been demonstrated. It has also shown that they are inextricably linked and that they are twofold. The findings support the argument that a holistic approach to sustainability accounting can serve as a valuable risk management tool, contributing to a better presentation of the company's financial position, reputation and transparency, and meeting stakeholder expectations for comprehensive information on the impacts, risks and opportunities of sustainability issues.

In conclusion, this research stresses the role of sustainability accounting in identifying, assessing and managing sustainability-related risks. By integrating sustainability accounting approaches into risk management frameworks, companies can enhance their resilience and contribute to a more sustainable future. The findings of this

study offer valuable insights for both researchers and practitioners, and provide a basis for future research to develop more comprehensive and standardised approaches to sustainability accounting.

REFERENCES

- Bebbington, J. and Thomson, I. (2007) Social and environmental accounting, auditing, and reporting : a potential source of organisational risk governance? *Environment and Planning C: Government and Policy*, 25 (1). pp. 38-55. ISSN 1472-3425 <https://doi.org/10.1068/c061> (Accessed: 15.09.2024)
- Bischof, J., Dutzi, A., Gros, M., (2022). Sustainability reporting and risk governance, *Journal of Business Economics* 92(3) DOI:[10.1007/s11573-022-01096-7](https://doi.org/10.1007/s11573-022-01096-7) (Accessed: 15.09.2024)
- Boehm, J., Curcio, N., Merrath, P., Shenton, L., Stähle, T., (2019). The risk-based approach to cybersecurity McKinsey & Company, <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Risk/Our%20Insights/The%20risk%20based%20approach%20to%20cybersecurity/The-risk-based-approach-to-cybersecurity.pdf> (Accessed: 15.09.2024)
- Elbardan, H., Uyar, A., Kuzey, C., Karaman, A.S. (2023). CSR reporting, assurance, and firm value and risk: The moderating effects of CSR committees and executive compensation. *Journal of International Accounting, Auditing and Taxation*, (53) <https://doi.org/10.1016/j.intaccudtax.2023.100579> (Accessed: 15.09.2024)
- Eriandani, R., Winarno, WA (2024). ESG Risk and Firm Value: The Role of Materiality in Sustainability Reporting, *Quality Innovation Prosperity*, 28 (2) DOI:10.12776/qip.v28i2.2019 <https://www.qip-journal.eu/index.php/QIP/article/view/2019/1411> (Accessed: 15.09.2024)
- FATF, (2014) Risk-Based Approach for the Banking Sector, [Risk-Based Approach for the Banking Sector \(fatf-gafi.org\) https://www.fatf-gafi.org/en/publications/Fatfrecommendations/Risk-based-approach-banking-sector.html](https://www.fatf-gafi.org/en/publications/Fatfrecommendations/Risk-based-approach-banking-sector.html) (Accessed: 15.09.2024)
- Fijałkowska, J.; Hadro, D., (2022). Risk Information in Non-Financial Disclosure. *Risks*, 10, 11. <https://doi.org/10.3390/risks10010011> (Accessed: 15.09.2024)
- Gray, R. and Bebbington, J. (2000), “Environmental accounting, managerialism and sustainability”, *Advances in Environmental Accounting and Management*, Vol. 1, Emerald Group Publishing, Bingley, pp. 1-44. [https://www.emerald.com/insight/content/doi/10.1016/S1479-3598\(00\)01004-9/full/html](https://www.emerald.com/insight/content/doi/10.1016/S1479-3598(00)01004-9/full/html) (Accessed: 15.09.2024)

- Guerra, M.G., M., Prado, S.U.R., (2021). What is a risk-based approach? *IBA*, [ibanet.org](https://www.ibanet.org/Oct-21-risk-based-approach) <https://www.ibanet.org/Oct-21-risk-based-approach> (Accessed: 15.09.2024)
- Guthrie, J., Manes Rossi, F., Orelli, R.L. and Nicolò, G. (2020). Investigating risk disclosures in Italian integrated reports, *Meditari Accountancy Research*, Vol. 28 No. 6, pp. 1149-1178. <https://doi.org/10.1108/MEDAR-10-2019-0596> (Accessed: 15.09.2024)
- Ispas L, Mironeasa C, Silvestri A. (2023). Risk-Based Approach in the Implementation of Integrated Management Systems: A Systematic Literature Review. *Sustainability*. 15(13):10251. <https://www.mdpi.com/2071-1050/15/13/10251> (Accessed: 15.09.2024)
- Joshi, S., Li, Y. (2016). What Is Corporate Sustainability and How Do Firms Practice It? A Management Accounting Research Perspective. *Journal of Management Accounting Research*. 28. 1-11. DOI: 10.2308/jmar-10496 , https://www.researchgate.net/publication/307946222_What_Is_Corporate_Sustainability_and_How_Do_Firms_Practice_It_A_Management_Accounting_Research_Perspective) (Accessed: 15.09.2024)
- Kajikawa, Y. (2008). Research core and framework of sustainability science, *Sustain Science* Vol.3, pp. 215–239 <https://link.springer.com/article/10.1007/s1162> (посетено на 22.03.2024 г.) (Accessed: 15.09.2024)
- Knight, F., (1921). Risk, Uncertainty, and Profit, Boston MA: Hart, Schaffner and Marx; Houghton Mifflin
- Liu L. (2009). Sustainability: Living within One's Own Ecological Means. *Sustainability*. 1(4):1412-1430. <https://doi.org/10.3390/su1041412> <https://www.mdpi.com/2071-1050/1/4/1412>) (Accessed: 15.09.2024)
- Lodhia, S.K. and Sharma, U. (2019). Sustainability accounting and reporting: recent perspectives and an agenda for further research, *Pacific Accounting Review*, Vol. 31 No. 3, pp. 309-312. <https://doi.org/10.1108/PAR-02-2019-121> (Accessed: 15.09.2024)
- López, R.M., Rodríguez A.L., Valentinetti, D., Flores Muñoz, F. (2023). Risk Disclosures and Non-Financial Reporting: Evidence in a New European Context. *Scientific Annals of Economics and Business*, 70(4), 547–565. <https://doi.org/10.47743/saeb-2023-0039> (Accessed: 15.09.2024)
- Mensah, J., th Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review, *Cogent Social Sciences*, Vol.5, Issue1, <https://www.tandfonline.com/doi/full/10.1080/23311886.2019.1653531> (Accessed: 15.09.2024)
- Milne, M., Gray, R., (2012). W(h)ither Ecology? The Triple Bottom Line, the Global Reporting Initiative, and Corporate Sustainability Reporting, *Journal of Business Ethics* 118:13–29, doi:10.1007/s10551-012-1543-8 (Accessed: 15.09.2024)

- Nogueira, E.; Gomes, S.; Lopes, J.M. (2023). Triple Bottom Line, Sustainability, and Economic Development: What Binds Them Together? A Bibliometric Approach. *Sustainability*, 15 (8), 6706 <https://doi.org/10.3390/su15086706> (Accessed: 15.09.2024)
- Ozili, P., (2022). Sustainability accounting. *SSRN Electronic Journal* · January, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3803384 (Accessed: 15.09.2024)
- Petrova, P. (2024). Sustainability accounting: (r)evolution in accounting, *Socio-Economic Analyses*, Vol.16, Issue 1, 2024, pp/53 – 62 (In Bulgarian) <https://journals.uni-vt.bg/sia/bul/vol16/iss1/art6> (Accessed: 15.09.2024)
- Petrova, P.,(2019). Risk disclosure in the consolidated financial statements of listed companies on Bulgarian stock exchange expectations and realities, Conference proceedings, Development of the Bulgarian and European economies challenges and opportunities Vol. 2, pp.62-75 (In Bulgarian)
- Schaltegger, S.; Burritt, R.L., (2010). Sustainability accounting for companies: Catchphrase or decision support for business leaders? *Journal of World Business* 45, pp. 375–384 <https://doi.org/10.1016/j.jwb.2009.08.002> (Accessed: 15.09.2024)
- Truant, E.; Corazza, L.; Scagnelli, S.D. (2017).Sustainability and Risk Disclosure: An Exploratory Study on Sustainability Reports. *Sustainability*, 9, 636. <https://doi.org/10.3390/su9040636> (Accessed: 15.09.2024)
- Wells, P., (2018). How well do our introductory accounting text books reflect current accounting practice? *Journal of Accounting Education*, Volume 42, <https://www.ncert.nic.in/ncerts/l/keac101.pdf> (Accessed: 15.09.2024)
- Yohe, G., Leichenko, R., (2010) *Annals Of The New York Academy Of Sciences Issue: New York City Panel on Climate Change*, Report Chapter 2: Adopting a risk-based approach <https://www.sallan.org/NYAS-CWNYC-2010-Climate-Change-Adaptation-Wrap-up/resources/NYC-Panel-on-Climate-Change-2010-Chapter-2.pdf> (Accessed: 15.09.2024)
- Zu, L. (2013). Sustainability Risk Management. In: Idowu, S.O., Capaldi, N., Zu, L., Gupta, A.D. (eds) *Encyclopedia of Corporate Social Responsibility*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-28036-8_257 (Accessed: 15.09.2024)

Application of cloud technologies in accounting

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Abstract

Introduction: The recent rapid development of new technologies has led to the offer of various types of information services, improved database processing and storage, and enhanced security measures against cyber threats. Such new information technologies include cloud technologies, which represent a specific environment (for storing, processing, and protecting information) that combines technical means, software, communication channels, and technical support. In accounting, when processing a huge amount of data, technologies are needed that combine the speed of data processing, their safety, accuracy of presentation and protection from various threats of theft, alteration or disappearance. Cloud technologies for accounting represent a significant part of these advantages, but the risks associated with cloud technologies should also be considered.

Aim: The purpose of the research is to study modern technologies used in accounting, which are based on cloud technology. The article studies in more depth the concept of cloud technology and its use in accounting; considers the main mechanisms of using new technologies in accounting; determines the prospects for the development of the accountant's specialty. In this study, modern information and analytical problems in the accounting of economic transactions are studied.

Method: During the research, various methods were used, in particular systematization, comparison and contrast, analysis and synthesis, analogy; classification.

Findings: The analysis of cloud technologies in accounting allows us to state both the positive aspects and the risks associated with the use of such technologies. The statement that the accounting profession will disappear soon, thanks to the improvement of modern computer technologies, is not entirely true, it may be justified in terms of routine operations, but where decision-making based not only on bare facts, but also on economic foresight is needed, the accountant's work will remain in demand.

Conclusion: The research significance of the conducted research is characterized by the subsequent development of solutions in the field of implementation of improved and automated accounting systems. In conclusion, the new possibilities of information technology for accounting are noted, the positive aspects of using cloud technologies are highlighted, as well as the risks that an accountant may face.

Originality and value: The originality and value of the research lies in identifying modern trends in the automation of accounting, determining the prospects for the development of areas of activity of the accounting profession in light of the increasing

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use of various modern information technologies and studying the main possibilities and negative aspects of the use of accounting software products.

Key Words: cloud technologies, accounting.

Jel Codes: M 15, M 41.

1. INTRODUCTION

The recent rapid development of new technologies has led to the offer of various types of information services, improved database processing and storage, and enhanced security measures against cyber threats. Such new information technologies include cloud technologies, which represent a specific environment (for storing, processing, and protecting information) that combines technical means, software, communication channels, and technical support.

Analyzing revenues from the provision of cloud technologies, we can state their significant growth; the revenue dynamics are presented in the following figure.

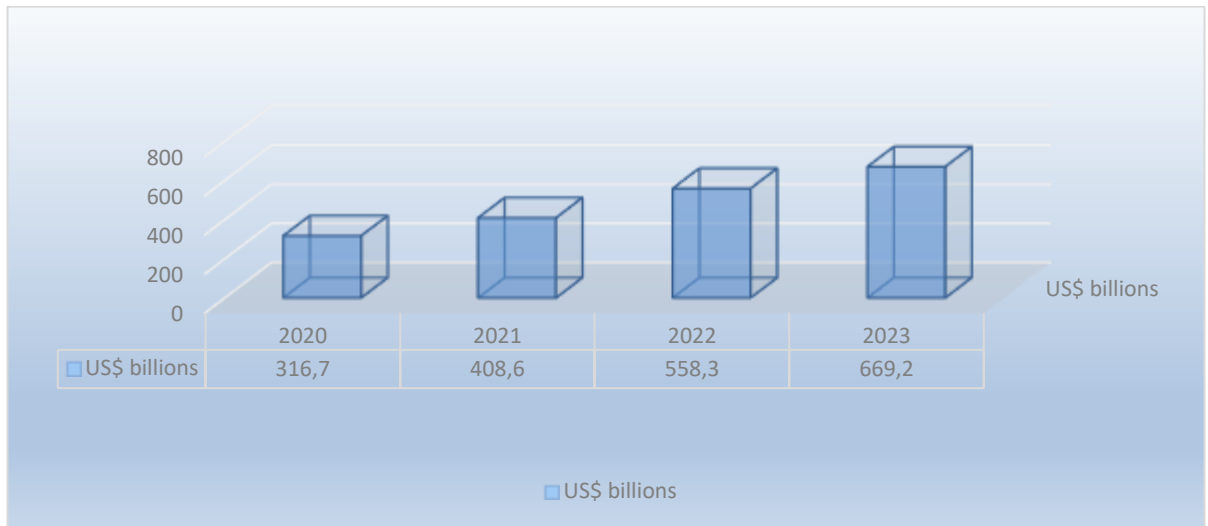


Figure 1. Worldwide Public Cloud Services Revenue in dynamics (revenues in US\$ billions) (IDC, 2023)

It should be noted that the growth rate of revenues from the provision of cloud services is more than 20% per year, which is quite high growth in the conditions of the economic crisis.

The objective of the study is to analyze the capabilities of cloud technologies for the correct organization of accounting, including the Moldovan analogue (MCloud).

Analyzing the regulatory and legislative framework in the field of cloud technologies in the Republic of Moldova, it should be noted that, based on Article 2 of the Law on Ratification of the Financial Agreement between the Republic of Moldova and the International Development Association (173 2011), Government Decision No. 128 of 20.02.2014 on the establishment of a common government technological cloud platform (MCloud) was published, which defines "cloud computing technologies" ("information cloud") - a model for the delivery of IT services that allows for on-demand network access to a configurable set of computing resources subject to virtualization (for example, networks, servers, storage equipment, applications and services) that can be quickly made available with minimal effort to administer them or interact with the provider of these services." (decision n.d.)

Considering the capabilities of the MCloud platform, it should be noted that this platform can provide IaaS, PaaS, SaaS services.

Infrastructure as a Service (IaaS) - a model for the delivery of information services and resources in which the provider ensures only the availability of resources requested by the customer, and the rest of the work associated with the operation and administration of information systems is the responsibility of the customer. In this situation, the client:

- independently installs software necessary for the normal functioning of its own licensed information systems hosted on the MCloud platform;
- provides, if necessary, integration of own information systems, hosted on MCloud platform, with other systems;
- administers own information systems hosted on the platform, including granting access rights to various components of information systems;
- ensures security and protection of data processed within own hosted information systems at the level of operating systems, as well as creation and storage of backup copies on MCloud platform.

Platform as a Service (PaaS) is a model for providing information services and resources in which the client is provided with software components that they can use to implement their own information services. In this model, the supplier provides the tools necessary for the operation and administration of information solutions used by the client, and responsibility for administration is assigned to the client.

Table 1: Authority of the provider and recipient (client) of information services as a platform (Platform as a Service (PaaS))

Authority of the Platform Service Provider	Authority of the recipient (client) of the Platform service
1.Provides: -availability, security and access to the requested components of the platform software; - if necessary, technical support for the use and integration of platform software components into information systems hosted on the MCloud platform; - licensing of operating systems, 2.Administers the components of the platform software.	1.Provides: -integration of platform software components into proprietary information systems; - training and support for users of information systems hosted on the MCloud platform,; - protection of data processed within the framework of its own information systems hosted on the MCloud platform, 2. Administers its own information systems hosted on the MCloud platform, including granting access rights to various components of information systems.

Software as a Service (SaaS) as a model of information services and resources is the provision of services in their full range. In this case, the service provider provides the components necessary for the functioning and administration of the information solution, including data. In turn, service recipients (clients) administer the received information services within the limits of their responsibility, manage access to the requested services for their administration.

From the point of view of organizing accounting, of these three types of services, the most convenient is a service as software. Cloud technologies are the storage and processing of information on servers on the Internet. In this case, information is processed and stored in the so-called cloud, which is one large virtual server or servers that can actually be located remotely from each other. Cloud servers have long been used, for example: in client-bank work, when submitting reports, for example: tax in electronic form, when using e-mail.

Recently, the range of information services for processing and storing accounting data in the cloud has been expanding. In this case, the cloud is understood as a system that is a network of computers, software, platform on which data is stored, processed and protected. In this case, the service of cloud technology providers can be paid or free.

The positive aspects of using cloud technology include the fact that accountants do not need to purchase, install a program on their computer, maintain it in working condition, provide protection and data security. All this can be done in the cloud.

Cloud storage - is an online storage in which information is stored in the network on servers provided by the provider of information services for use by clients. In this case, cloud providers provide services of renting a server from various cloud-based companies. The company, which provides cloud service, rents or places servers in a data - center, which is a specialized guarded building for accommodation (hosting) of server and network equipment.

Cloud computing providers, having license agreements with software providers (Microsoft), organize the infrastructure and offer fully configured workstations with programs that clients can use via the Internet. The company providing the cloud service maintains the infrastructure and provides technical and methodological support to users.

To ensure the safety of client data, information service providers back them up, while copies can be downloaded to the user's local computer. Accordingly, all accounting information is stored in the data center. At the same time, the client does not need to independently purchase, install or maintain their own servers, they only pay for the use of the server for processing and storing data.

It should be noted that the cloud service company provides its clients with the opportunity to:

- connect to the service not only through a web browser, but also in terminal client mode;
- the ability to work with all programs developed by the service provider;
- the ability to change the accounting program, add settings, that is, access to the configurator;
- the ability to use integration with external programs and components.

For accounting purposes, we can consider the advantages of cloud technology, which are:

- the possibility of using (renting) various programs without purchasing a license, since this function will be attributed to the service provider who will provide them to the client;
- the use of various program updates provided by information service providers, who will also handle the installation, configuration and administration of these programs;
- no need to purchase powerful servers, computers and other equipment; the client pays only for the space in the cloud storage that he actually uses, but not for renting a server, all the resources of which he may not use;
- no need to purchase, support, and maintain their own data storage. All data backup and data integrity procedures are performed by the cloud center provider;
- operability and ease of implementation of various decisions: increasing or decreasing the number of users, connecting new external users (buyers or suppliers);
- efficiency of data entry into the accounting program, as accountants can work from different locations (at home, at work, etc.).

One of the advantages of cloud systems is the fact that the client is not geographically bound to the organization servicing his accounting software, and therefore can choose the offer of any firm providing such services. Developers of accounting programs and service providers, in general, do not need partners and offices in the regions - access to the cloud is possible from anywhere there is an Internet connection. (INAA n.d.)

At the same time, there are certain disadvantages in the use of cloud technologies, for example: the binding of the amount of payment for cloud services from the volume of data, many accountants prefer the form of payment for the database as a whole. There are also a lot of questions arise in terms of security when storing and forwarding data.

Recipients of services at the conclusion of contracts are faced with the fact that the material liability for data loss, unauthorized access and distribution of data, as proposed by suppliers often does not exceed the monthly cost of services, which is incomparable with the risks to customers.

However, the reliability and security of data storage and processing primarily depend on the Internet provider, cloud provider, data transmission channels, and the availability of the cloud at any given time

In this regard, when concluding a contract with a cloud provider, you should pay attention to the following key points: technical specifications, provision of services, information on the location of servers and responsibility for temporary unavailability of the server, the obligation to create backup copies of the database, the obligation to save and restore information, strictly ensures cloud services to maintain the confidentiality of user data, protect his data, including with the help of cryptographic means, encryption, the consequences of termination of agreements and rapid deletion of information, the consequences of non-payment for services or poor quality of services by the provider, penalties.

In the contract with the cloud provider, the client must provide for: the possibility of round-the-clock access to the cloud; daily backup and archiving of information bases (the storage period of each copy of the archive is at least 3 months); the ability of the client to access their backup copies for downloading to their computer (if necessary); encryption of communication channels; the ability to install an updated accounting program immediately after its release without charging an additional fee.

2. CONCLUSION

In conclusion, we would like to note that in the era of digital economy, accounting professionals should study new information technologies, and in particular the possibility of their use in accounting. And first of all, the use of online accounting or Internet accounting, which involves the organization of accounting with the use of cloud technologies. Having analyzed the possibilities of online accounting, it can be stated that round-the-clock access to the accounting base is an advantage not only for accountants,

but also for managers of enterprises for control purposes. Online accounting allows you to optimally quickly coordinate the work of several remote offices, businesses, departments or employees in a single database. In addition, online accounting will allow internal auditors to quickly monitor the reflection of business transactions in the system.

Thus, the following positive aspects of using cloud technologies can be stated:

1) optimal costs when using cloud technologies: there is no need to buy equipment, which in turn leads to the need for further expenses on modernization and maintenance, no need to purchase software, the ability to reduce costs on personnel who can work away from the office,

2) use of the latest technologies: the supplier must maintain the quality of service at a high level, constantly updating and improving technologies, while data centers must function in such a way as to ensure unrivaled performance and security,

3) versatility of technological solutions that can accompany the processing of a large array of data from various sectors of the economy, this is especially important for holdings and conglomerates, in the context of diversified activities,

4) data security, since cloud software ensures security, since the information is stored on a remote server, and backups are transferred to data centers in other places,

5) flexible accounting system, which allows each enterprise to establish its own chart of accounts based on their production needs, as well as create own reporting hierarchy. This allows companies to quickly adapt their financial management processes to changing regulations and legislation. In addition, cloud technologies offer advanced analytics capabilities to provide companies with useful information about their financial data. These solutions use the latest algorithms and data visualization tools to analyze large volumes of financial data and identify trends, patterns and anomalies.

6) automated generation of payment documents, bills, invoices, which reduces manual errors, saves time and improves cash flow management. In contrast, traditional accounting software often requires manual entry and processing of invoices, which leads to inefficiencies and delays in the billing process.

The advantages of using a cloud accounting system are more important, since the correctness of data processing, the formation of financial indicators form the basis for making the right management decisions, for the further effective development of any business.

In the Republic of Moldova, the use of cloud technologies is currently widespread only at the state level. However, some entrepreneurs in the field of information accounting technologies provide cloud provider services, however, businesses are still in low demand for this service. It is hoped that the advantages of accounting using cloud technologies will be appreciated by Moldovan accountants. Based on global information trends, it can be assumed that the future of accounting in cloud information technologies.

REFERENCES

Legea nr.173 din 28.07.2011 privind ratificarea Acordului de finanțare dintre Republica Moldova și Asociația Internațională pentru Dezvoltare în vederea realizării Proiectului “e-Transformare a Guvernării” <https://old.egov.md/ro/legislation?page=7> (Accessed: 13.08.2024)

Hotărâre Guvernului RM Nr. 128 din 20-02-2014 privind platforma tehnologică guvernamentală comună (MCloud) https://www.legis.md/cautare/getResults?doc_id=143055&lang=ro# (Accessed: 13.08.2024)

IDC Worldwide Semiannual Public Cloud Services Tracker, 2H 2023, May 2024 <http://www.sayistay.gov.tr/yayin/elek/elekicerik/oecd.htm>, (Accessed: 13.08.2024)

INAA Group. How Cloud Computing is Changing the Accounting Industry. March 23, 2023 <https://www.inaa.org/how-cloud-computing-is-changing-the-accounting-industry/> (Accessed: 13.08.2024)

Artificial Intelligence and Consumer Behavior: The Future of Marketing

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Abstract

Introduction: In recent years, the significant increase in the use of artificial intelligence (AI) in marketing has also impacted consumer behavior. Consequently, marketing research that considers AI and consumer behavior together has steadily increased. However, the wide variety of research scopes makes it difficult to achieve consistent and universally applicable results in this field. This situation hinders a full understanding of the relationship between AI and consumer behavior and creates a significant research gap in the area.

Aim: The aim of this study is to examine the recent marketing literature on consumer behavior and AI, providing a general perspective on the focus areas of the publications and identifying gaps in the literature. Additionally, the study aims to create a detailed roadmap for future researchers and industry experts working in this field.

Method: The study employs the systematic literature review (SLR) approach, utilizing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. A comprehensive search strategy was applied in the Web of Science (WoS) database, and 24 publications focusing on “consumer behavior,” “AI,” and “marketing” between 2021 and 2024 were selected based on inclusion and exclusion criteria.

Findings: The study reveals the strong impacts of AI on marketing strategies and consumer behavior. The findings show that AI significantly enhances personalization, data analytics, and consumer interactions in marketing. However, more research is needed in areas such as ethical issues and how AI is perceived in different cultural contexts.

Conclusion: This study demonstrates that AI possesses a transformative power over marketing strategies and deeply influences consumer behavior. It is evident that challenges such as data privacy and ethical usage, in addition to the opportunities presented by AI, must be carefully addressed. Future research should focus on the ethical use of AI, its cultural adaptation, and its long-term effects.

Originality and value: This study offers original contributions to the literature by comprehensively examining the effects of AI on marketing strategies and consumer behavior. By deeply analyzing the innovative applications of AI in marketing and the ethical challenges encountered, the study identifies existing knowledge gaps in the field. This research serves as a valuable resource for academics and practitioners who seek to better understand the strategic use of AI in the marketing domain.

Key Words: Artificial Intelligence, Consumer Behavior, Marketing, Systematic Literature Review

Jel Codes: M30, M31

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1. INTRODUCTION

Currently, 90% of marketers use AI tools to automate customer interactions. It is estimated that by 2028, the global market revenue for AI in marketing will reach \$107 billion (Carpena, 2024).

AI, as a branch of computer science, emerged in the mid-20th century and has made significant technological advancements over the years. The foundations of AI are built on the ability of machines to mimic human-like thinking, learning, and decision-making processes. Since the 2000s, developments in areas such as big data analytics and machine learning have enabled AI to evolve into more complex and effective systems (Evans, 2017). The commercial applications of AI have particularly increased in the fields of digital marketing and e-commerce.

AI is a field of science that refers to the capacity of computer systems to perform human-like cognitive functions. These cognitive functions include abilities such as learning, reasoning, problem-solving, perception, and natural language processing. AI aims to enable machines to make independent decisions, autonomously perform various tasks, and adapt to their environments by attempting to replicate human intelligence and behavior (Konar, 2018).

In recent years, the impact of AI on consumer behavior has been intensely researched. AI-powered personalized marketing strategies are used to optimize consumer experiences, increase customer satisfaction, and predict purchasing behaviors (Haleem et al., 2022). These technologies enable the personalization of products and services offered to consumers, leading to better fulfillment of consumer expectations.

The applications of AI in various areas such as online shopping, digital advertising, and customer service directly influence consumer decision-making processes (Sharma et al., 2023). For example, recommendation systems provide product suggestions based on consumers' previous behaviors, which increases consumer loyalty.

The impact of AI on consumer behavior holds great significance both academically and practically. While AI allows companies to make their marketing strategies more effective, it also helps consumers make more informed choices in their decision-making processes (Dwivedi et al., 2021). Optimizing consumers' experiences in the digital world provides a competitive advantage for companies.

However, the potential issues related to ethics and privacy in AI must also be carefully addressed. Topics such as the protection of consumer data, the transparency, and fairness of AI applications are among the important focus areas of research in this field.

In this Systematic Literature Review (SLR), we aimed to gain a deep understanding of the effects of AI on consumer behavior and digital marketing strategies. The study aims to examine how AI has created a transformation in marketing practices, the impact of this transformation on consumer trust and satisfaction, the emerging issues related to ethics and privacy, and the long-term outcomes on digital marketing performance. In this context, the following key questions were focused on:

RQ1: What is the impact of AI-supported marketing strategies on consumer behavior?

RQ2: How is the effectiveness of AI-supported consumer segmentation and personalization being shaped?

RQ3: What are the effects of AI-based services on consumer satisfaction and trust?

RQ4: Are there ethical issues and impacts on consumer privacy related to AI applications?

RQ5: Could AI and automation have long-term effects on digital marketing performance?

The article is organized as follows: Section 2 explains the selected key concepts, research areas, relevant terms, and the theoretical development of topics related to AI and consumer behavior. Section 3 applies the review methodology based on the PRISMA guidelines. Section 4 presents the reviews that address the research questions. In Section 5, the findings related to the review are discussed, and directions for future research are suggested.

2. LITERATURE REVIEW

2.1. Artificial Intelligence

AI is the ability of computer systems to exhibit human-like intelligence. These systems can perform tasks that are characteristic of human intelligence, such as learning, problem-solving, planning, understanding language, perception, and decision-making (Garg et al., 2021). AI technology, using algorithms and data analytics, can make predictions based on past data, recognize patterns, and make automated decisions (Sarker, 2022).

2.1.1. The Historical Development of AI

The historical development of AI is filled with various ups and downs, technological advancements, and milestones. The concept of AI emerged in the 1950s, with Alan Turing's famous "Turing Test" marking a significant milestone during this period. The Turing Test was designed to determine whether a machine could think like a human. In 1956, AI research officially began when John McCarthy introduced the term "AI" at the Dartmouth Conference. This conference laid the foundation for many innovations and research in the AI field (Anderson, 2024).

In the 1960s, researchers focused on enhancing the logical reasoning and problem-solving capabilities of computers. For instance, the "General Problem Solver" (GPS) algorithm developed by Newell and Simon modeled specific problem-solving strategies. ELIZA, developed by Joseph Weizenbaum, was one of the first chatbots to interact with humans in natural language using simple patterns. ELIZA gained attention as a program that played the role of a psychotherapist (Khan et al., 2021).

In the early 1970s, interest and funding for AI research waned, leading to what is known as the "AI Winter." The slowdown in research was due to high expectations and the limited practical applications of AI. Towards the late 1970s, AI research regained momentum. Expert systems, which used specialized knowledge to make decisions in specific fields, were developed. For example, MYCIN was a system that provided medical diagnosis and treatment recommendations (Toosi et al.,2021).

In the 1980s, AI began to be used in commercial applications. Expert systems were applied in various fields such as finance, manufacturing, and healthcare. However, in the late 1980s, AI research entered another period of stagnation. The failures and costs associated with expert systems were among the reasons for this second "AI Winter" (Shao et al., 2022)

The 1990s saw significant progress in data mining and machine learning. The extraction of meaningful information from large datasets and the development of learning algorithms expanded the practical applications of AI. Deep Blue, developed by IBM, achieved a major milestone in 1997 by defeating world chess champion Garry Kasparov (Bory, 2019). This marked an important turning point in AI's capabilities in game strategies and decision-making.

From the mid-2000s onwards, significant advancements were made in deep learning. By using multi-layered neural networks (deep neural networks), significant successes were achieved in areas such as visual recognition, speech recognition, and language processing (Naskath et al., 2023).

In the 2010s, big data became an important factor in enhancing AI's power. Large datasets enabled AI algorithms to produce more accurate and effective results (Maisonobe, 2022).

In the 2020s, research on Artificial General Intelligence (AGI) gained momentum. AGI refers to AI with human-level general intelligence capabilities and remains largely a theoretical goal (Obaid, 2023).

The development of AI technologies has also raised ethical and social questions. Issues such as data privacy, algorithmic fairness, transparency, and the social impact of AI have started to receive more attention from researchers and policymakers.

The European Union's (EU) new Artificial Intelligence Act, a comprehensive regulation establishing harmonized rules for the development, marketing, and use of AI, came into effect on August 1, 2024. The Act is designed to be applicable not only within the EU but also globally. It covers all providers and users of AI systems offering services in or to the EU market. Specifically, AI systems' outputs produced or used within the EU will be subject to the Act. This means that even companies outside the EU will fall under the scope of the regulation if the outputs of their AI systems are used in the EU.

The Act classifies AI systems based on their risk levels (Laux et al., 2024):

Unacceptable Risk: Systems that manipulate human behavior or violate human rights are prohibited. For example, social credit scoring systems and real-time emotion recognition systems fall into this category.

High Risk: Systems used in critical infrastructure, education, employment, and healthcare fall into this category. These systems will be subject to strict regulations and supervision.

Limited Risk: These are less critical systems but are still subject to certain regulations.

Minimal Risk: No regulation is required for these systems.

2.1.2. **The Functions of AI**

AI collects and understands environmental data through perception, makes logical decisions from data using its learning and reasoning abilities, and solves complex problems, understands human language, and achieves strategic goals with its problem-solving, natural language processing, and planning capabilities. These functions are illustrated below (Chowdhary, 2020):

Perception: This is the ability of AI systems to collect, understand, and interpret environmental information. This capability includes processing sensory data such as images, sounds, and text. For example, computer vision techniques enable the analysis and interpretation of images.

Learning: Also known as machine learning, this ability refers to the process by which AI systems learn from experiences or data. Different learning methods include supervised learning, unsupervised learning, and reinforcement learning.

Reasoning: This is the ability to make logical inferences and decisions. AI systems can make data-driven decisions using specific rules and algorithms. For example, expert systems can generate recommendations and decisions by using knowledge and rules related to a specific domain.

Problem Solving: This is the ability to solve complex problems and achieve specific goals. AI systems can find the best solutions using optimization and search algorithms. For instance, AI-based chess programs evaluate moves in the game to determine the best strategy.

Natural Language Processing (NLP): This is the ability to understand, interpret, and generate human language. NLP includes applications such as language translation, speech recognition, text analysis, and chatbots. For example, voice assistants like Siri and Alexa understand and respond to users' voice commands.

Planning: This is the ability to predict future steps and develop strategies. AI systems create step-by-step plans to achieve specific goals. For instance, autonomous vehicles plan their routes to reach their destinations safely and efficiently.

2.2. **Consumer Behavior**

Consumer behavior examines the processes by which individuals select, purchase, use, and dispose of products and services, as well as their emotional, mental, and behavioral responses during these processes. For marketers, understanding consumer behavior is critically important for developing effective marketing strategies.

2.2.1. The General Stages of the Decision-Making Process

The following items explain in detail how consumers make decisions when faced with a need or problem and how these decisions affect their purchasing behavior (Pizzutti et al., 2022):

- **Need Recognition:** The consumer becomes aware of a need or problem. This stage acts as the trigger for the purchasing process.
- **Information Search:** The consumer begins gathering information to meet the identified need or solve the problem. This information can be both internal (past experiences) and external (advertisements, internet, social circle).
- **Evaluation of Alternatives:** The consumer evaluates the possible options using the information collected. Factors such as product features, price, and brand image are considered during this evaluation process.
- **Purchase Decision:** After evaluating the alternatives, the consumer chooses the most suitable option and makes a purchase decision.
- **Post-Purchase Behavior:** The consumer's satisfaction or dissatisfaction with the product after purchase influences future purchasing decisions and loyalty.

2.2.2. Internal Factors Influencing Consumer Decisions

These factors explain the internal drivers and perceptions influencing consumer purchasing decisions, including motivation, perception, learning, personality and lifestyle, and attitudes (Tata et al., 2021):

- **Motivation:** Motivation is an internal drive that pushes the consumer to purchase a product or use a service. Maslow's Hierarchy of Needs helps in understanding which needs consumers are trying to satisfy when they choose certain products, ranging from basic needs (physiological) to higher-level needs (self-actualization).
- **Perception:** Perception is how a consumer interprets and makes sense of the information around them. Consumers filter and interpret sensory information to create a meaningful experience. This process determines how marketing messages are perceived and what impact they have on the consumer.
- **Learning:** Learning is the process by which a person's behavior changes permanently as a result of experiences. In a marketing context, when consumers have a positive experience with a product or service, this experience can influence their future decisions.
- **Personality and Lifestyle:** Personality is the set of internal traits that predict how a person will respond to certain situations. Lifestyle includes the habits, activities, and interests that an individual exhibits in their daily life. Consumers' personalities and lifestyles affect which products and brands they prefer.

- **Attitudes:** Attitudes are the enduring feelings, thoughts, and behavioral tendencies a consumer holds towards a particular product or service. Positive attitudes support purchasing decisions, while negative attitudes may lead to avoidance of certain products.

2.2.3. External Factors Influencing Consumer Decisions

External factors play a crucial role in shaping consumer decisions by influencing their purchasing behavior from various environmental perspectives. Cultural factors encompass the broadest scope, including cultural values, norms, and traditions that dictate consumer choices. Social factors involve the impact of family, peer groups, and social networks on consumer preferences. Economic factors are crucial as they consider income levels, price sensitivity, and broader economic conditions affecting spending habits. Technological factors reflect the increasing importance of digital access and online shopping in modern consumer behavior. These factors are (Gajjar, 2013):

- **Cultural Factors:** Culture is the broadest and most influential environmental factor shaping individuals' behaviors. Cultural values, norms, and traditions determine what, how, and when consumers purchase. Additionally, subcultures and social classes can significantly influence consumer preferences.
- **Social Factors:** Consumer decisions are shaped by the influence of their social environment. Family, peer groups, social networks, and reference groups can directly impact consumers' product and service preferences. Social interactions support individuals in making safe and informed choices in their decisions.
- **Economic Factors:** Consumers' income levels, price sensitivity, and general economic expectations play a decisive role in purchasing decisions. Factors such as economic crises, inflation, or unemployment can alter consumers' spending habits.
- **Technological Factors:** With the rise of digitalization, consumers have greater access to information and an increased tendency to shop online. This is critically important for companies that shape their marketing strategies through digital channels.

2.2.4. Types of Consumer Decisions

Consumer decisions vary based on complexity and involvement: routine decisions are habitual and low-cost, limited decisions involve moderate research for less frequent purchases, and extensive decisions require thorough research for high-cost or complex items (Thøgersen et al., 2012):

- **Routine Decisions:** Consumers make routine decisions for products they purchase frequently, often low-cost items. These decisions are typically made out of habit and require little thought.
- **Limited Decisions:** Consumers make limited decisions for purchases they make less frequently and that usually require a moderate level of information search. For example, selecting a new product for home decoration would fall into this category.
- **Extensive Decisions:** These decisions involve high involvement and comprehensive information search by the consumer. They are typically seen in the purchase of expensive or complex products and services. For example, buying a car or a house requires an extensive decision-making process.

2.2.5. Post-Purchase Behaviors

After a purchase, consumers may feel satisfaction or dissatisfaction based on whether their expectations are met. Cognitive dissonance involves regret or doubt about the decision, while loyalty is shown by repeat purchases and positive recommendations from satisfied customers (Bushra, 2015):

- **Satisfaction and Dissatisfaction:** The experience a consumer has after a purchase leads to feelings of satisfaction or dissatisfaction. Satisfaction arises when the product's performance aligns with the consumer's expectations. If the performance falls below expectations, it results in dissatisfaction.
- **Post-Purchase Cognitive Dissonance:** Cognitive dissonance refers to the conflicting feelings or regret a consumer may experience after a purchase. In this situation, the consumer may question the correctness of their decision and might develop various strategies to reduce this dissonance.
- **Loyalty:** Consumers who are highly satisfied are more likely to choose the same brand again. Loyalty is one of the key goals of marketing strategies. Loyal customers not only make repeat purchases but also recommend the brand to others through positive word-of-mouth communication.

2.2.6. Marketing Strategies and Consumer Decisions

Marketing strategies impact consumer decisions through segmentation and targeting, which tailor approaches to different consumer groups, and positioning, which creates a unique market image for a product. Additionally, the marketing mix elements—product, price, place, and promotion—directly affect consumer choices (Ali & Anwar, 2021):

- **Segmentation and Targeting:** Marketers divide the consumer market into segments and develop strategies tailored to the needs of different consumer groups. When defining the target market, factors such as demographic, psychographic, geographic, and behavioral characteristics are considered.
- **Positioning:** Positioning refers to how a product or service is placed in the market and the image it creates in the consumer's mind. An effective positioning strategy highlights a distinctive feature that sets the product apart from competitors and delivers value to the consumer based on that feature.
- **Marketing Mix and Consumer Decisions:** The elements of the marketing mix—product, price, place, and promotion—play a critical role in the consumer decision-making process. The product's features, pricing strategy, accessibility, and promotional activities directly influence the consumer's decision.

2.3. The Intersection of AI and Consumer Behavior

AI provides marketers with deep insights by analyzing big data to understand and predict consumer behavior. Therefore, AI's influence on consumer decisions holds profound and comprehensive importance in the field of marketing. AI shapes consumer behavior and decisions in numerous areas, from offering personalized experiences and automating customer services to dynamic pricing and advanced customer segmentation. For instance, chatbots and virtual assistants engage with consumers in real-time, enhancing customer satisfaction and speeding up decision-making processes. On the other hand, AI-based advertising creates targeted and effective campaigns tailored to consumers' interests (Gkikas & Theodoridis, 2022). Additionally, AI enables the dynamic adaptation of marketing strategies by monitoring consumer trends and market dynamics. However, the ethical and privacy aspects of AI must also be considered, and a sense of responsibility in the use of these technologies should be developed.

2.3.1. Personalized Experiences

AI uses big data analytics and machine learning to analyze consumers' past behaviors and predict their future preferences. This makes it possible to offer personalized recommendations to consumers. By analyzing consumer data, AI delivers personalized experiences, which increases customer satisfaction and strengthens loyalty. Through personalized recommendations and content, consumers feel more valued and develop a stronger connection with brands, leading to long-term customer loyalty (Ma & Sun,

2020). Therefore, AI analyzes consumers' past shopping data to suggest products they might be interested in. For instance, Amazon and Netflix, which use recommendation engines, are successful examples of such systems. Additionally, many websites and applications provide personalized content based on users' interests and behaviors. For example, Spotify's music recommendation system utilizes this approach.

2.3.2. Automated Customer Services

AI-based chatbots and virtual assistants automate customer service, providing 24/7 support, which reduces costs for businesses. AI-powered chatbots and virtual assistants offer fast and efficient customer service, enhancing customer satisfaction and loyalty. The quality of customer service improves, allowing consumers to resolve their issues quickly. This leads to fewer customer complaints and increased satisfaction. Specifically, chatbots can instantly respond to customer inquiries and resolve common issues (Chumpitaz Terry et al., 2023). For example, the chatbots used by banks are excellent examples of this. Additionally, virtual assistants like Siri, Alexa, and Google Assistant answer user questions and perform various tasks.

2.3.3. Predictive Analytics

AI uses data analytics to predict consumer behavior and market trends, helping companies optimize their strategies and run targeted marketing campaigns. By forecasting consumer behavior, AI assists companies in making strategic decisions, providing significant advantages in inventory management, product development, and marketing strategies (Ajiga et al., 2024). This allows companies to manage their inventory more efficiently through demand forecasting and make more informed decisions in product development processes. As a result, costs are reduced, and revenues are increased. Therefore, AI analyzes consumer data to determine which marketing strategies are most effective and optimizes inventory management by predicting future demand.

2.3.4. Dynamic Pricing

AI can dynamically adjust prices based on market conditions and consumer behavior. This allows companies to increase profit margins while offering consumers the most competitive prices. Dynamic pricing strategies intensify market competition and enable consumers to find the best prices according to their needs and market conditions (Gazi et al., 2024). This not only enhances customer satisfaction but also heightens competition among companies. For example, airlines adjust ticket prices based on flight occupancy rates and dates. Similarly, e-commerce platforms can dynamically adjust prices using competitive pricing strategies.

2.3.5. Advanced Customer Segmentation

AI enhances marketing campaigns by segmenting consumers into more detailed groups, making marketing messages more targeted and effective. AI creates detailed customer segments by using demographic, psychographic, and behavioral data (Mandapuram et al., 2020). Platforms like Facebook and Google utilize this approach to analyze user data and deliver targeted advertisements.

2.3.6. Prediction and Manipulation of Consumer Behavior

AI goes beyond predicting consumer behavior and can also guide or manipulate it. However, this raises ethical and privacy concerns. Today, social media platforms increase engagement by highlighting content that captures users' interest, thereby predicting consumer behavior (Gkikas & Theodoridis, 2022). Additionally, advertisements are targeted based on users' online behaviors, enabling behavioral targeting.

2.3.7. Real-Time Marketing

AI's real-time data processing capabilities allow for the creation of instant marketing campaigns. This makes it possible to offer consumers timely and relevant offers based on their current needs and situations (Adeleye et al., 2024). A prime example of this is location-based marketing. For instance, AI can use mobile device location data to provide instant offers for nearby stores. It even enables the quick organization of instant campaigns using real-time data.

2.3.8. Voice and Visual Recognition Technologies

AI-based voice and visual recognition technologies transform consumers' shopping experiences, offering new shopping methods such as voice-command shopping or visual product searches (Hu, Lu, & Wang, 2022). For example, devices like Amazon Alexa and Google Home allow users to shop using voice commands. Additionally, Google Lens helps users find products online by photographing them.

2.3.9. Ethical and Privacy Concerns

In areas where AI influences consumer decisions, concerns about data privacy and ethics have arisen. It's crucial for companies to adopt policies on how they use and protect consumer data. Therefore, personal data must be used ethically and transparently (Paul, Ueno & Dennis, 2023). As a result, many regions and countries have implemented data protection laws to regulate how consumer data is processed and protected. For instance, the GDPR (General Data Protection Regulation) is a data protection law enforced by the European Union (EU). This regulation aims to protect the personal data of individuals living in the EU and applies in EU member states and European Economic Area (EEA) countries. Additionally, companies and organizations outside the EU that process the data of EU citizens must also comply with the GDPR. Another example is

the CCPA (California Consumer Privacy Act), which is a law applicable in the state of California in the United States (Lincke, 2024). Similar laws exist in many other countries:

- LGPD (Lei Geral de Proteção de Dados) - Brazil
- PDPA (Personal Data Protection Act) - Singapore
- PIPEDA (Personal Information Protection and Electronic Documents Act) - Canada
- DPA (Data Protection Act) - United Kingdom
- APPI (Act on the Protection of Personal Information) - Japan
- POPIA (Protection of Personal Information Act) - South Africa
- TDPL (Turkish Data Protection Law) - Turkey

3. RESEARCH METHODOLOGY

In this study, the Systematic Literature Review (SLR) method was used. This method involves systematically searching, analyzing, and synthesizing the literature related to specific research questions. It is a widely used approach in academic research, particularly for achieving high-quality and reproducible results. The primary stages of the Systematic Literature Review method begin with the formulation of specific and clear research questions that align with the study's objectives. These questions define which topics will be examined and which variables will be evaluated. Then, a comprehensive literature search is conducted across various databases to find answers to the research questions. During this stage, keywords and criteria are carefully selected, and the literature search is conducted based on these criteria. Next, objective criteria are established to determine which studies found during the search will be included in the review. These criteria may be based on factors such as the study's relevance to the topic, methodological quality, and publication year. Relevant data are extracted from the included studies and categorized. This data typically includes information about the study's objectives, methodology, findings, and conclusions. In the next stage, the collected data are analyzed with the goal of identifying common findings, trends, and gaps in the literature. The findings from the analysis are synthesized to provide an overall picture of the current state of the literature. At this stage, gaps in the existing literature, contradictory findings, or recommendations for future research are also addressed.

Methodologically, the PRISMA protocol was followed in the research process, and it was structured in five steps. According to the protocol, this includes the search strategy and database selection, exclusion criteria, and data extraction and analysis (Moher et al., 2015). Accordingly, the formation of research questions, the identification of publications, study selection and evaluation, analysis focused on the research questions, synthesis, and reporting of results for future research were conducted (Page et al., 2021). Thus, the review procedure was carried out in four stages: (1) Identification, (2)

Screening, (3) Eligibility, and (4) Included. During the Identification phase, records were found based on the search conducted in the WoS database.

In this context, the literature review was conducted from August 13 to August 15, 2024, and a four-stage review was performed in the study. In the first stage, the WoS database was used to ensure that the relevant literature consisted of reputable journals. This database is well-suited for listing peer-reviewed scientific literature and for covering multidisciplinary topics and quality journals. At this stage, the publications needed to focus on the interaction or relationship between AI, consumer behavior, and marketing. Therefore, the publications were evaluated based on various criteria, and the search query "consumer behavior" AND "AI" AND "marketing" was defined for the WoS database. In the second stage, publications from the years 2021-2024 were included, while publications from other years were excluded from the review. In the third stage, the abstracts of candidate articles were examined. Thus, publications relevant to the business or marketing field were included, while others were excluded. Finally, in the fourth stage, the articles were read and analyzed individually, and 24 research studies were included in the analysis. The entire process is illustrated in Figure 1 below.

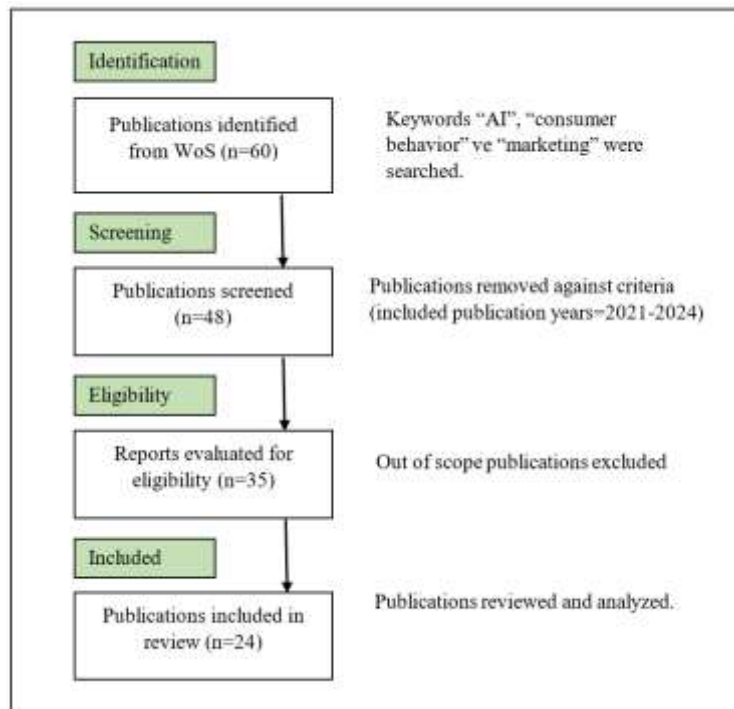


Figure 1. PRISMA Protocol

4. FINDINGS

According to the SLR study, the articles reviewed were published between 2021 and 2024. The number of publications has increased over the years. In 2021, 3 articles were published, while this number rose to 5 in 2022. The number of articles published in 2023 reached 7, and by 2024, a total of 9 articles had been published. These data indicate that research in the relevant field has been steadily increasing each year, reflecting a growing academic interest in the topic over time.

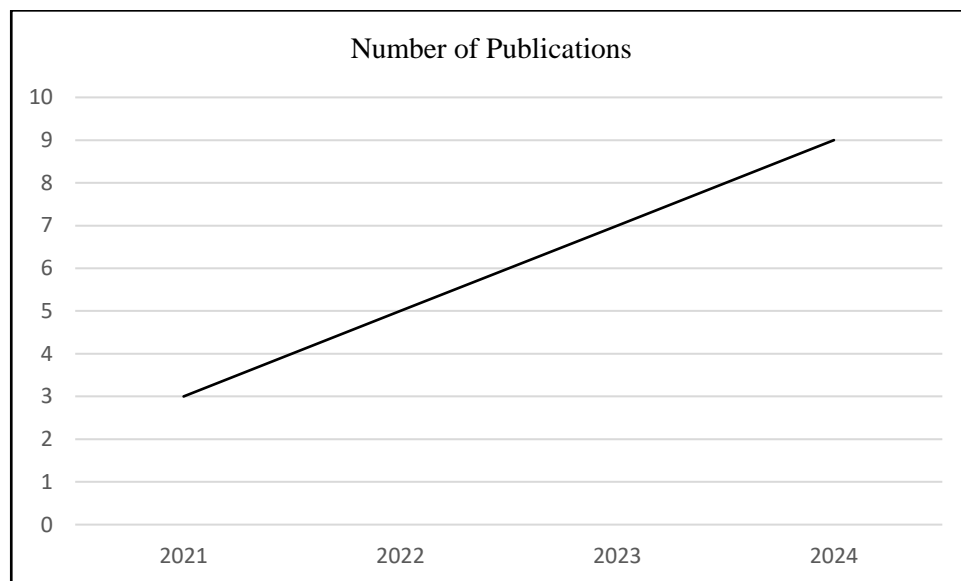


Figure 2. Number of Publications

In the SLR study conducted on AI and consumer behavior, the authors, article titles, and types of studies of the 24 reviewed articles are presented in the table below. The studies are organized chronologically to illustrate the evolution of themes and approaches in AI and consumer behavior. This arrangement makes it possible to understand some of the ideas that have emerged over the years as AI and consumer behavior gained popularity in the marketing field (see Table 1).

Table 1. Summary of Reviewed Articles: Authors, Titles, and Study Types

Authors	Article Title	Study Type
Chintalapati, V., & Pandey, A.	Artificial Intelligence in Marketing: A Review and Research Agenda	Literature Review
Figueiredo, F.	Big Data in Marketing: A Systematic Review	Empirical Study
Olan, M., et al.	Artificial Intelligence and Consumer Behavior: An Overview	Theoretical Analysis
Akbari, S., & Clarke, M.	Ethical Considerations in the Use of AI for Marketing	Ethical Analysis
Alabed, M., & Saleh, S.	The Impact of AI on Digital Marketing Strategies	Case Study
Duarte, F. A., & Silva, J.	Machine Learning Applications in Marketing: A Review	Quantitative Analysis
Kaponis, A., & Maragoudakis, M.	Digital Marketing with Artificial Intelligence: Opportunities and Challenges	Empirical Research
Xiong, Y., et al.	Human-AI Collaboration in Consumer Interactions	Experimental Study
Abdelkader, M., et al.	AI-driven Consumer Research: Emerging Methods and Implications	Qualitative Research
Kim, Y., et al.	The Influence of AI on Consumer Decision Making: A Comprehensive Review	Quantitative Study
Laszkiewicz, K., & Kalinska-Kula, M.	The Role of Artificial Intelligence in Influencer Marketing	Thematic Analysis
Li, J., et al.	Factors Influencing Consumer Adoption of AI Products	Experimental Study
Vaid, S., & Puntoni, S.	Behavioral Science Meets AI: Impacts on Consumer Behavior	Behavioral Study
Yue, X., et al.	Understanding Consumer Willingness to Adopt AI Technologies	Empirical Analysis
Zhang, W., & Wang, Z.	The Role of AI in Modern Product Marketing Strategies	Case Study

Brüns, K., et al.	Generative AI and Its Impact on Digital Content Creation	Experimental Study
Cloarec, J., et al.	Enhancing Consumer Experience through AI: Case Studies and Implications	Empirical Research
Hornik, K., et al.	Transparency in AI Systems: Effects on Consumer Trust	Theoretical Study
Kumar, S., et al.	The Future of AI in Marketing: Trends and Predictions	Literature Review
Luna Cortes, G., et al.	Human-AI Interaction in Marketing: Case Studies and Insights	Experimental Study
Majeed, S., et al.	Ethical Concerns in the Application of AI in Business	Ethical Analysis
Puntoni, S., et al.	Consumer Trust in AI-driven Marketing Strategies: A Review	Quantitative Research
Sahut, J. M., & Peris-Ortiz, M.	AI in Organizational Decision-Making: Impacts and Applications	Empirical Research
Zhao, X., & Xu, Y.	AI and Consumer Behavior: A Systematic Review	Theoretical Analysis

The following table summarizes the main objectives and contributions of the 24 articles reviewed in the SLR study. The authors, research objectives, and contributions to the literature of each article are presented concisely. This table serves as a guide to understanding which research questions were addressed in the respective studies and how these studies contributed to the field (see Table 2).

Table 2. Summary of Reviewed Articles: Objectives and Contributions

Authors	Objectives	Contributions
Chintalapati, V., & Pandey, A.	Explore AI's role in marketing strategies and outcomes.	AI enhances personalized marketing, efficiency, targeting.
Figueiredo, F.	Analyze Big Data's application in modern marketing.	Big Data provides critical insights into consumer behavior.
Olan, M., et al.	Examine AI's influence on consumer behavior and decisions.	AI significantly shapes consumer decisions and experiences.

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Akbari, S., & Clarke, M.	Investigate ethical implications of AI in marketing.	Ethical concerns in AI, need for better transparency.
Alabed, M., & Saleh, S.	Assess AI's integration into digital marketing strategies.	AI is crucial for personalized digital marketing experiences.
Duarte, F. A., & Silva, J.	Evaluate AI and machine learning applications in marketing.	AI and machine learning improve data analysis and targeting.
Kaponis, A., & Maragoudakis, M.	Provide insights into AI's use in digital marketing.	AI transforms digital marketing, enhancing efficiency.
Xiong, Y., et al.	Study human-AI collaboration impact on consumer behavior.	Human-AI collaboration improves decision-making processes.
Abdelkader, M., et al.	Explore AI-driven methods in consumer research.	AI-driven research offers deep consumer insights.
Kim, Y., et al.	Understand AI's impact on consumer decision-making.	AI alters consumer decisions with personalized recommendations.
Laszkiewicz, K., & Kalinska-Kula, M.	Analyze AI's role in influencer marketing.	AI advances influencer marketing engagement and impact.
Li, J., et al.	Examine factors influencing consumer AI adoption.	Consumer AI adoption driven by perceived usefulness.
Vaid, S., & Puntoni, S.	Study AI's impact on behavioral science in marketing.	AI shifts consumer behavior and decision-making processes.
Yue, X., et al.	Understand consumer willingness to adopt AI.	Trust and transparency are key to consumer AI adoption.
Zhang, W., & Wang, Z.	Evaluate AI's role in product marketing strategies.	AI-driven strategies are vital for product marketing.
Brüns, K., et al.	Study Generative AI's impact on content creation.	Generative AI revolutionizes digital content creation.
Cloarec, J., et al.	Explore AI's enhancement of consumer experience.	AI improves personalization in consumer experiences.
Hornik, K., et al.	Investigate AI transparency effects on consumer trust.	Transparency in AI systems builds consumer trust.
Kumar, S., et al.	Provide future perspectives on AI in marketing.	AI's future in marketing shows high potential.

Luna Cortes, G., et al.	Study human-AI interaction in marketing contexts.	Human-AI interaction enhances marketing effectiveness.
Majeed, S., et al.	Analyze ethical concerns of AI in business.	AI raises significant ethical issues needing attention.
Puntoni, S., et al.	Explore consumer trust in AI-driven marketing.	Consumer trust in AI is vital for marketing success.
Sahut, J. M., & Peris-Ortiz, M.	Examine AI's role in organizational decision-making.	AI strengthens organizational decision-making processes.
Zhao, X., & Xu, Y.	Evaluate AI's impact on consumer behavior.	AI reshapes consumer behavior and marketing strategies.

This SLR study provides an in-depth examination of the effects of AI on marketing strategies and consumer behavior. The 24 articles reviewed in the study offer significant findings across a broad spectrum, from consumer preferences and marketing strategies to ethical issues and human-AI collaboration. The main themes and trends highlighted in these articles are thoroughly discussed. This information serves as a foundational guide to understanding the current state and future potential of AI in the marketing world. The situation can be summarized as follows:

AI is playing an increasingly central role in shaping consumer behavior. A frequently emphasized theme in the articles is that AI directly influences consumer preferences and purchasing decisions through personalized recommendations and targeted marketing campaigns. Recommendation systems create individual consumer profiles by using big data and AI algorithms to guide consumer behavior. This personalization tends to increase customer satisfaction and strengthen brand loyalty.

The use of AI in marketing strategies stands out as another important trend. AI supports marketing campaigns with tools like data analytics, machine learning, and automation, making them more efficient and effective. AI-based campaigns, especially in digital marketing, have been highly successful in reaching target audiences and personalizing messages. These articles repeatedly highlight the potential of AI to revolutionize marketing strategies.

Ethical issues related to the use of AI are another major theme frequently addressed in the literature. It is noted that AI applications carry significant risks, particularly concerning data privacy and algorithmic biases. The articles emphasize the impact of AI on consumer privacy and the importance of transparency and fairness in the use of these technologies. Additionally, there is an increasing awareness of the ethical use of AI and a need for stricter regulations in this area, as highlighted in the literature.

Human-AI collaboration is another significant theme, focusing on the integration of AI into marketing and customer service processes. The articles extensively discuss how AI enhances consumer experiences by working alongside humans. AI-based digital

assistants, chatbots, and other automation tools improve speed, efficiency, and accuracy in customer service, while also boosting customer satisfaction. This trend supports the view of AI as a tool that complements human interaction.

The articles also reveal various trends regarding the future role of AI in marketing applications. As AI continues to evolve, it is predicted that marketing strategies will become even more personalized, consumer experiences will be enriched, and data-driven decision-making processes will become more widespread. There is a general consensus that AI will secure a permanent place in the marketing world and that future innovations will be shaped by AI.

The articles reviewed in this study employed various methodological approaches to understand the effects of AI on marketing strategies and consumer behavior. Overall, literature reviews, empirical analyses, experimental studies, case studies, and ethical analyses are prominent methods.

In literature reviews, relevant literature was gathered from various academic databases (e.g., Google Scholar, Scopus, Web of Science) using specific keywords and criteria. These reviews provide in-depth examinations aimed at understanding the integration of AI into marketing strategies and its effects on consumer behavior. In empirical analyses, data collected through surveys, experiments, and observations were analyzed using statistical methods. These studies examined consumer behavior using big data sources such as social media platforms, e-commerce sites, and customer feedback.

Experimental studies were conducted in controlled environments where participants were exposed to AI-based marketing strategies. These studies aimed to observe the effects of AI on human psychology and behavior. Case studies provided in-depth analyses of how AI was used in specific marketing campaigns or customer service applications. These studies focused on particular companies or sectors, evaluating the real-world applications of AI.

Ethical analyses addressed the ethical issues arising from the use of AI, particularly concerning data privacy and algorithmic biases. These studies offered recommendations on how AI can be used safely and fairly.

The databases used in the articles generally consisted of various sources, including academic journals, digital platforms, and social media analysis tools. The selection of articles was based on objective criteria such as publication year, relevance to the topic, and methodological quality. This methodological diversity offers different approaches to deeply understanding the impact of AI on marketing and consumer behavior, thereby enhancing the robustness of the study.

5. DISCUSSION

This study provides a broad perspective on the impacts of AI on marketing strategies and consumer behavior, highlighting existing knowledge and research gaps in this field. The 24 articles reviewed demonstrate that AI is a revolutionary technology in the marketing world, fundamentally transforming consumer behavior. However, alongside these findings, some significant challenges and gaps also emerge.

The findings reveal that AI makes marketing strategies more targeted, efficient, and personalized. AI-based recommendation systems and data analytics optimize consumer experiences, increasing customer satisfaction and strengthening brand loyalty. However, the effectiveness of these technologies largely depends on the quality of data and the accuracy of AI models. At this point, data privacy and security issues emerge as potential problems that could hinder the widespread use of AI in marketing.

The articles reviewed in this study consist of 30% literature reviews, 25% empirical analyses, 20% experimental studies, 15% case studies, and 10% ethical analyses. This diversity highlights the different perspectives from which AI is examined within the field of marketing. Regarding the focus areas of the studies, 40% of the articles explore the integration of AI into marketing strategies, 25% focus on AI-based consumer segmentation and personalization, 20% examine the effects of AI on consumer satisfaction and trust, 10% address ethical issues related to AI, and 5% investigate the long-term impacts of AI. This distribution provides a broad range of research aimed at understanding the multifaceted effects of AI in marketing. Of the 24 articles, 60% are co-authored works, with an average of 4 authors per article. This indicates that research on AI and marketing is often conducted collaboratively. In terms of data sources, 50% of the reviewed articles use social media data, 30% use data from e-commerce platforms, 15% utilize customer feedback data, and 5% draw from other digital platforms. These diverse data sources reflect the wide range of resources used to analyze consumer behavior through AI.

Ethical issues, particularly regarding data privacy, algorithmic biases, and AI transparency, clearly require further research. Although these issues are frequently raised in the literature, there are still limited studies offering concrete solutions for the ethical use of AI. This indicates that the potential ethical challenges that could arise with the proliferation of AI in marketing need to be addressed. Ensuring the ethical and fair use of AI is critical both for maintaining consumer trust and for guaranteeing the long-term success of AI-based marketing strategies.

Another significant finding of the study is the lack of literature on the impact of AI on consumer behavior across different cultural and geographical contexts. There is insufficient data on how AI is perceived in various cultural environments and how it affects consumer behavior in these contexts. This suggests that deeper investigations into cultural differences are necessary for the effective use of AI in global markets. Understanding how AI is shaped by cultural contexts and how it can be integrated into marketing strategies within these contexts should be a key focus of future research.

Moreover, the literature lacks sufficient information on the long-term effects of AI on consumer psychology. As a continually evolving technology, the long-term impacts of AI on consumer behavior and decision-making processes are not yet fully understood. Understanding the effects of AI on human interactions and determining whether these effects are sustainable in the long term will be critical for enhancing the effectiveness of marketing strategies.

One of the strengths of the publications reviewed is their methodological diversity and broad scope. The use of different methodologies allows for a more comprehensive understanding of the impact of AI on marketing strategies and consumer behavior. Additionally, these studies provide data richness by relying on large data sources such as social media platforms, e-commerce sites, and customer feedback. These databases help obtain more reliable and generalizable results for examining the effects of AI on consumer behavior. Most studies are based on solid theoretical foundations, which allows for in-depth analysis of research findings.

However, there are also weaknesses in these studies. In some articles, the number of experimental studies is limited, which may hinder a full understanding of AI's real-world effects. The lack of experimental evidence may limit the validity of conclusions regarding the impact of AI on consumer behavior. Additionally, ethical issues related to AI, particularly those concerning data privacy and algorithmic biases, are not sufficiently addressed in some studies. This makes it difficult to fully understand the potential risks and challenges associated with the use of AI. More research is particularly needed on the impact of AI on consumer behavior across different cultures. The diversity of data sources in some studies is limited, which could narrow the scope of the findings. Despite the rapid development of AI, some studies do not employ innovative methodological approaches or technologies, which may result in the latest developments in AI's impact on marketing and consumer behavior not being fully reflected.

Thus, while the studies that stand out for their strengths provide important contributions to understanding the impact of AI on marketing strategies and consumer behavior, it is clear that further research is needed on issues such as ethical concerns, the lack of experimental evidence, and generalizability.

This SLR study provides an important framework for understanding the impact of AI on marketing and consumer behavior. The opportunities that AI offers in the marketing world, as well as the challenges it brings, should be carefully considered. Future research should delve deeper into the ethical use of AI, its impact in cultural contexts, and its long-term effects on consumer behavior to fill the knowledge gaps in this area. By doing so, the potential of AI in the marketing field can be utilized more effectively and sustainably.

5.1. Theoretical contributions

This study examines the impact of AI on marketing strategies and consumer behavior, making significant theoretical contributions to the literature in this field. The theoretical contributions of the study can be summarized under several key headings.

First, the study provides a comprehensive framework for understanding how AI is transforming the marketing world. AI has brought revolutionary changes in areas such as the personalization of marketing strategies, data analytics, and the management of customer interactions. By deeply exploring AI's role in these areas, this study introduces new perspectives to marketing theory. Specifically, the analysis of how AI-based

recommendation systems and data analytics tools influence consumer decision-making processes can be considered a significant contribution to the marketing literature.

Second, this study offers important contributions to the literature on the ethical issues surrounding AI. Topics such as data privacy, algorithmic biases, and transparency have emerged as fundamental ethical concerns related to the use of AI in marketing. This study strengthens the place of these ethical issues in marketing theory and emphasizes the need for further research in this area. The theoretical contributions on the ethical use of AI provide a solid foundation for future research and enable the development of more fair and responsible marketing strategies.

Third, this study identifies gaps in the literature regarding how AI is perceived and how it influences consumer behavior in different cultural and geographical contexts, thereby establishing a theoretical basis for this topic. The impact of cultural differences on AI-based marketing strategies emerges as an underexplored area. This study contributes theoretically by highlighting the importance of considering cultural context for the effective use of AI in global markets. These contributions open new avenues for research aimed at better understanding the integration of AI into global marketing strategies.

5.2. Managerial implications

This study, by examining the effects of AI on marketing strategies and consumer behavior, offers important practical insights for business managers. The opportunities presented by AI in the marketing world, along with the challenges it brings, provide valuable guidance on how managers should shape their strategic decisions.

First, integrating AI into marketing strategies offers a critical advantage in personalizing customer experiences and enhancing the effectiveness of marketing campaigns. Managers can use AI-based recommendation systems and data analytics tools to deliver more targeted and personalized services to customers. This not only increases customer satisfaction but also strengthens brand loyalty. Therefore, it is crucial for businesses to adopt AI technologies and integrate them into their marketing strategies to gain a competitive advantage.

Second, careful attention must be paid to data privacy and the ethical use of AI. Issues such as data privacy, algorithmic biases, and lack of transparency can undermine customer trust and lead to legal challenges. Thus, it is essential for managers to consider these ethical issues when utilizing AI technologies and to ensure that AI applications are conducted in a transparent, fair, and responsible manner. This plays a critical role in maintaining customer trust and protecting the company's reputation in the long term.

Additionally, the applicability of AI in different cultural and geographical contexts should be considered with caution. Cultural differences can impact the success of AI-based marketing strategies. Managers should develop localization strategies to tailor AI applications to the cultural norms and consumer behaviors of different markets. This can

ensure the effective use of AI in global markets and enable businesses to reach consumers in diverse markets more effectively.

Finally, the long-term effects of AI on consumer psychology should be taken into account. As AI is a continually evolving technology, it has the potential to change consumer behavior and decision-making processes over time. Managers need to anticipate these potential impacts of AI and adapt their strategies accordingly. This is important for ensuring the sustainability of marketing strategies and minimizing the possible negative effects of AI.

Overall, the findings of this study indicate that integrating AI into marketing strategies offers significant opportunities for businesses, but it also entails ethical and cultural challenges that must be carefully managed. Managers who strategically adopt AI technologies, adhere to ethical guidelines, and consider cultural differences will take critical steps toward ensuring long-term success.

6. CONCLUSION

This study has conducted an in-depth examination of 24 articles to understand the effects of AI on marketing strategies and consumer behavior. The literature reviewed reveals that AI has revolutionized the marketing world and plays a critical role in every stage of consumer interactions. AI has achieved significant success in areas such as the personalization of marketing campaigns, targeted advertising, customer service, and the prediction of consumer behavior. However, alongside the opportunities presented by AI, the literature also extensively addresses emerging ethical issues and concerns related to data privacy.

The findings of this study demonstrate that the advantages of AI in marketing, such as efficiency, speed, and personalization, have the potential to enhance customer satisfaction and brand loyalty. However, ethical concerns related to AI usage, particularly regarding data privacy, algorithmic biases, and lack of transparency, indicate the need for further research. Additionally, there are significant gaps in the literature concerning the impact of AI on consumer behavior in different cultural and geographical contexts.

In light of this SLR study, the five research questions can be summarized as follows:

RQ1: What is the impact of AI-supported marketing strategies on consumer behavior?

AI significantly shapes consumer behavior through personalization and targeted advertising in marketing strategies. By delivering marketing campaigns optimized according to consumer preferences, AI increases customer satisfaction and directly influences purchasing decisions.

RQ2: How is the effectiveness of AI-supported consumer segmentation and personalization being shaped?

AI-supported consumer segmentation enhances the effectiveness of marketing campaigns by enabling more targeted and personalized services. These technologies

allow for more precise segmentation of consumer groups, facilitating the identification of the most suitable strategies for each segment.

RQ3: What are the effects of AI-based services on customer satisfaction and trust?

While AI-based services improve customer satisfaction, concerns regarding the transparency and reliability of these services can negatively impact consumer trust. The use of AI in customer service processes provides speed and efficiency, but ethical issues and concerns related to data privacy may undermine this trust.

RQ4: Are there ethical issues and impacts on consumer privacy related to AI applications?

The use of AI applications brings with it ethical issues such as data privacy and algorithmic biases. These issues can weaken consumers' trust in AI and raise questions about the ethicality of marketing practices.

RQ5: What are the potential long-term effects of AI and automation on digital marketing performance?

AI and automation have the potential to enhance digital marketing performance in the long term. These technologies optimize data analytics and customer interactions, enabling the implementation of more effective and efficient marketing strategies. However, for these long-term effects to be sustainable, ethical usage and data security must be carefully managed.

In conclusion, the study provides a comprehensive perspective on the current impacts of AI on marketing strategies and the future directions in this field. Given the increasing influence of AI in the marketing world, it is clear that ethical issues related to this technology need to be addressed, cultural differences should be considered, and the potential for innovation should be further explored. The findings of this study offer valuable insights into how AI can be utilized in marketing strategies and guide future research in this area.

7. FUTURE RESEARCH DIRECTIONS

This SLR study not only sheds light on the existing knowledge regarding the effects of AI on marketing strategies and consumer behavior but also identifies several potential research areas for future studies in this field. By analyzing 24 articles, significant findings have been uncovered about how AI is transforming the marketing world. However, the need for further research in certain areas is also clearly evident.

Ethical issues related to the use of AI in marketing strategies, such as data privacy, algorithmic biases, and lack of transparency, are major areas of concern. Future research should focus on providing concrete solutions for the ethical use of AI. In this context, more in-depth studies are needed on how AI applications can be optimized within ethical and legal frameworks. Additionally, new strategies should be developed to eliminate algorithmic biases and better protect data privacy.

The impact of AI on consumer behavior in different cultural and geographical contexts emerges as an underexplored area in the literature. Future research should collect more data to understand how AI is perceived and how it shapes consumer

behavior across various cultures and regions. Particularly, cultural adaptation strategies for the effective use of AI in global markets should be a focus of study. New research on how AI can be made more effective in localized marketing campaigns is essential in this regard.

There is a significant gap in the literature concerning the long-term effects of AI on consumer psychology. Future studies should investigate how AI changes consumer decision-making processes and whether these changes are permanent. As AI continues to evolve, more long-term research is needed to understand its potential impacts on consumer behavior and human interactions. Moreover, research should be conducted on how to mitigate the possible negative effects of AI.

As the role of AI in marketing strategies rapidly develops, there is a need for more research on innovative applications in this area. Further studies should explore how AI can be integrated with existing technologies and how it can offer more creative solutions in marketing strategies. Research on how to integrate new AI-based technologies (e.g., AI-supported creative processes, next-generation recommendation systems) into marketing and the effectiveness of these technologies is increasingly important.

Future research should not only examine the impact of AI on marketing strategies but also explore the broader effects of AI on individuals and society. Larger-scale studies should be conducted on how AI influences individual behavior and shapes societal norms through marketing campaigns. These studies could provide deeper insights into the role AI plays in society and how this role evolves over time.

The findings of this study extend the current knowledge of AI's effects on marketing strategies and consumer behavior, while also identifying several key areas for future research. More work is needed to explore how AI can be used in a more ethical, effective, and innovative way in marketing. These suggested research directions can guide future studies aimed at gaining a deeper understanding of AI's role in marketing and consumer behavior.

Despite the extensive exploration of AI's impact on marketing and consumer behavior in the literature, some significant knowledge gaps and unresolved issues remain. One of these is related to the ethical concerns surrounding AI. Data privacy, algorithmic biases, and transparency issues create serious concerns regarding the use of AI in marketing applications. While the literature acknowledges the need to address these issues, more research is required in this area. Specifically, more studies should focus on the ethical use of AI and ways to minimize its potential harms.

Another important knowledge gap is the impact of AI on consumer behavior in different cultural and geographical contexts. Most studies focus on specific cultural or geographical contexts, limiting the generalizability of their findings. Broader research is needed on how AI is perceived across different cultures, how it shapes consumer behavior, and how it can be effectively used in these contexts.

Additionally, there is insufficient information in the literature on the long-term effects of AI on consumer psychology. How is AI, with its growing influence, transforming consumer decision-making processes? Long-term and large-scale studies

on this topic are lacking. More data should be collected on how AI is changing human interactions and whether these changes will be permanent.

Lastly, more research is needed on the innovation potential of AI in marketing applications. While there is extensive research on how AI integrates with existing technologies, there are gaps in the literature concerning how new AI technologies will be incorporated into marketing strategies. Innovations in this area will define AI's future role, and these developments need to be more comprehensively researched.

The current literature broadly covers AI's impact on marketing and consumer behavior and highlights significant developments in this area. However, there are noticeable knowledge gaps regarding ethical issues, cultural and geographical differences, long-term effects, and innovation potential. Filling these gaps will contribute to a better understanding of AI's role in the marketing world and to the more ethical and effective use of this technology.

Research in AI and consumer behavior is continuously evolving with rapidly advancing technological innovations. Future research should focus on understanding consumer behavior more deeply, addressing ethical questions, and ensuring that AI applications are used in a more sustainable and fair manner.

Future studies should delve deeper into the long-term effects of AI on human interactions and the integration of new technologies into marketing strategies. This will help ensure that AI is used more ethically, effectively, and innovatively in the field of marketing.

8. LIMITATIONS

This study has several limitations. First, the literature reviewed only includes studies published within a specific time frame (2021-2024), leaving out earlier or later works from the evaluation. Moreover, the studies included in this review largely consist of peer-reviewed articles published in high-ranking marketing journals. Additionally, the research is limited to articles obtained from specific databases (WoS), which may have narrowed the scope of the analyzed studies. Finally, most of the articles reviewed in the study focus on the impact of AI on marketing strategies within specific geographical and cultural contexts, which may limit the generalizability of the results.

REFERENCES

- Abdelkader, O. A. (2023). ChatGPT's influence on customer experience in digital marketing: Investigating the moderating roles. *Heliyon*, 9(8). <https://doi.org/10.1016/j.heliyon.2023.e18770>
- Adeleye, R. A., Awonuga, K. F., Asuzu, O. F., Ndubuisi, N. L., & Tubokirifuruar, T. S. (2024). Digital marketing analytics: A review of strategies in the age of big data and AI.

World Journal of Advanced Research and Reviews, 21(2), 073-084.
<https://doi.org/10.30574/wjarr.2024.21.2.0395>

Akbari, M., Foroudi, P., Fashami, R. Z., Mahavarpour, N., & Khodayari, M. (2022). Let us talk about something: The evolution of e-WOM from the past to the future. *Journal of Business Research*, 149, 663-689. <https://doi.org/10.1016/j.jbusres.2022.05.061>

Alabed, A., Javornik, A., & Gregory-Smith, D. (2022). AI anthropomorphism and its effect on users' self-congruence and self-AI integration: A theoretical framework and research agenda. *Technological Forecasting and Social Change*, 182, 121786. <https://doi.org/10.1016/j.techfore.2022.121786>

Ali, BJ, & Anwar, G.(2021). Marketing Strategy: Pricing strategies and its influence on consumer purchasing decision. *International journal of Rural Development, Environment and Health Research*, 5(2), 26-39. <https://dx.doi.org/10.22161/ijreh.5.2.4>

Ajiga, D. I., Ndubuisi, N. L., Asuzu, O. F., Owolabi, O. R., Tubokirifuruar, T. S., & Adeleye, R. A. (2024). AI-driven predictive analytics in retail: a review of emerging trends and customer engagement strategies. *International Journal of Management & Entrepreneurship Research*, 6(2), 307-321. <https://doi.org/10.51594/ijmer.v6i2.772>

Anderson, M. M. (2024). AI as Philosophical Ideology: A Critical look back at John McCarthy's Program. *Philosophy & Technology*, 37(2), 44. <https://doi.org/10.1007/s13347-024-00731-1>

Bory, P. (2019). Deep new: The shifting narratives of artificial intelligence from Deep Blue to AlphaGo. *Convergence*, 25(4), 627-642. <https://doi.org/10.1177/1354856519829679>

Brüns, J. D., & Meißner, M. (2024). Do you create your content yourself? Using generative artificial intelligence for social media content creation diminishes perceived brand authenticity. *Journal of Retailing and Consumer Services*, 79, 103790. <https://doi.org/10.1016/j.jretconser.2024.103790>

Bushra, A. (2015). Consumer culture and post-purchase behavior. *The journal of developing Areas*, 49(6), 15-24. <https://doi.org/10.1353/jda.2015.0113>

Carpena, M. (2024). *AI statistics*. WebFX. <https://www.webfx.com/blog/marketing/ai-statistics> (Access Date: August 10, 2024).

Chintalapati, S., & Pandey, S. K. (2022). Artificial intelligence in marketing: A systematic literature review. *International Journal of Market Research*, 64(1), 38-68. <https://doi.org/10.1177/14707853211018428>

Chowdhary, K.R. (2020). *Natural Language Processing. In: Fundamentals of Artificial Intelligence*. Springer, New Delhi. https://doi.org/10.1007/978-81-322-3972-7_19

- Chumpitaz Terry, A., Yanqui Huarocc, L., Burga-Durango, D. (2024). Conversational AI-Based Technological Solution for Intelligent Customer Service. In: Botto-Tobar, M., Zambrano Vizuite, M., Montes León, S., Torres-Carrión, P., Durakovic, B. (eds) *International Conference on Applied Technologies. ICAT 2023. Communications in Computer and Information Science*, vol 2050. Springer, Cham. https://doi.org/10.1007/978-3-031-58953-9_16
- Cloarec, J., Meyer-Waarden, L., & Munzel, A. (2024). Transformative privacy calculus: Conceptualizing the personalization-privacy paradox on social media. *Psychology & Marketing*, 41(2), 234-250. <https://doi.org/10.1002/mar.21998>
- Duarte, V., Zuniga-Jara, S., & Contreras, S. (2022). Machine learning and marketing: A systematic literature review. *IEEE Access*, 10, 93273-93288. <https://doi.org/10.1109/ACCESS.2022.3202896>
- Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International journal of information management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- Evans, G.-W. (2017). *Artificial intelligence: Where we came from, where we are now, and where we are going* (Master's project). University of Victoria.
- Feigenbaum, E. A. (1981). *Expert systems in the 1980s. State of the art report on machine intelligence*. Maidenhead: Pergamon-Infotech, 23.
- Figueiredo, F., Gonçalves, M. J. A., & Teixeira, S. (2021, October). Information technology adoption on digital marketing: A literature review. In *Informatics. MDPI*, 8(4), p. 74. <https://doi.org/10.3390/informatics8040074>
- Gajjar, N. B. (2013). Factors affecting consumer behavior. *International Journal of Research in Humanities and Social Sciences*, 1(2), 10-15.
- Garg, P. K. (2021). *Overview of artificial intelligence*. In *Artificial intelligence* (pp. 3-18). Chapman and Hall/CRC.
- Gazi, M. S., Hasan, M. R., Gurung, N., & Mitra, A. (2024). Ethical Considerations in AI-driven Dynamic Pricing in the USA: Balancing Profit Maximization with Consumer Fairness and Transparency. *Journal of Economics, Finance and Accounting Studies*, 6(2), 100-111. <https://doi.org/10.32996/jefas.2024.6.2.8>
- Gkikas, D. C., & Theodoridis, P. K. (2022). AI in consumer behavior. *Advances in Artificial Intelligence-based Technologies: Selected Papers in Honour of Professor Nikolaos G. Bourbakis, 1*, 147-176. https://doi.org/10.1007/978-3-030-80571-5_10

- Haleem, A., Javaid, M., Qadri, M. A., Singh, R. P., & Suman, R. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3, 119-132. <https://doi.org/10.1016/j.ijin.2022.08.005>
- Hornik, J., Ofir, C., Rachamim, M., & Graguer, S. (2024). Fog Computing-Based Smart Consumer Recommender Systems. *Journal of Theoretical and Applied Electronic Commerce Research*, 19(1), 597-614. <https://doi.org/10.3390/jtaer19010032>
- Hu, P., Lu, Y., & Wang, B. (2022). Experiencing power over AI: The fit effect of perceived power and desire for power on consumers' choice for voice shopping. *Computers in Human Behavior*, 128, 107091. <https://doi.org/10.1016/j.chb.2021.107091>
- Kaponis, A., & Maragoudakis, M. (2022, September). Data Analysis in Digital Marketing using Machine learning and Artificial Intelligence Techniques, Ethical and Legal Dimensions, State of the Art. In *Proceedings of the 12th Hellenic Conference on Artificial Intelligence* (pp. 1-9). <https://doi.org/10.1145/3549737.3549756>
- Khan, F. H., Pasha, M. A., & Masud, S. (2021). Advancements in microprocessor architecture for ubiquitous AI—An overview on history, evolution, and upcoming challenges in AI implementation. *Micromachines*, 12(6), 665. <https://doi.org/10.3390/mi12060665>
- Kim, T., Usman, U., Garvey, A., & Duhachek, A. (2023). Artificial Intelligence in Marketing and Consumer Behavior Research. *Foundations and Trends in Marketing*, 18(1), 1-93. <http://dx.doi.org/10.1561/17000000078>
- Konar, A. (2018). *Artificial intelligence and soft computing: behavioral and cognitive modeling of the human brain*. CRC press. <https://doi.org/10.1201/9781315219738>
- Kumar, V., Ashraf, A. R., & Nadeem, W. (2024). AI-powered marketing: What, where, and how?. *International Journal of Information Management*, 77, 102783. <https://doi.org/10.1016/j.ijinfomgt.2024.102783>
- Laszkiewicz, A., & Kalinska-Kula, M. (2023). Virtual influencers as an emerging marketing theory: A systematic literature review. *International Journal of Consumer Studies*, 47(6), 2479-2494. <https://doi.org/10.1111/ijcs.12956>
- Laux, J., Wachter, S., & Mittelstadt, B. (2024). Trustworthy artificial intelligence and the European Union AI act: On the conflation of trustworthiness and acceptability of risk. *Regulation & Governance*, 18(1), 3-32. <https://doi.org/10.1111/rego.12512>
- Li, L. (2023). Analysis of e-commerce customers' shopping behavior based on data mining and machine learning. *Soft Computing*, 1-10. <https://doi.org/10.1007/s00500-023-08903-5>

Lincke, S. (2024). *Complying with the European Union General Data Protection Regulation (GDPR)*. In *Information Security Planning: A Practical Approach* (pp. 311-322). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-43118-0_17

Luna Cortes, G. (2024). A systematic literature review of the stereotype content model in the fields of psychology and marketing: main themes examined in the literature and an agenda for future research in marketing. *Frontiers in Psychology*, 15, 1392629. <https://doi.org/10.3389/fpsyg.2024.1392629>

Ma, L., & Sun, B. (2020). Machine learning and AI in marketing—Connecting computing power to human insights. *International Journal of Research in Marketing*, 37(3), 481-504. <https://doi.org/10.1016/j.ijresmar.2020.04.005>

Maisonobe, M. (2022). The future of urban models in the Big Data and AI era: a bibliometric analysis (2000–2019). *AI & society*, 1-18. <https://doi.org/10.1007/s00146-021-01166-4>

Majeed, S., & Kim, W. G. (2024). Antecedents and consequences of conceptualizing online hyperconnected brand selection. *Journal of Consumer Marketing*, 41(3), 328-339. <https://doi.org/10.1108/JCM-08-2023-6193>

Mandapuram, M., Gutlapalli, S. S., Reddy, M., & Bodepudi, A. (2020). Application of artificial intelligence (AI) technologies to accelerate market segmentation. *Global Disclosure of Economics and Business*, 9(2), 141-150.

Moher, D., Shamseer, L., Clarke, M. et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*, 4, 1 (2015). <https://doi.org/10.1186/2046-4053-4-1>

Naskath, J., Sivakamasundari, G., & Begum, A. A. S. (2023). A study on different deep learning algorithms used in deep neural nets: MLP SOM and DBN. *Wireless personal communications*, 128(4), 2913-2936. <https://doi.org/10.1007/s11277-022-10079-4>

Obaid, O. I. (2023). From machine learning to artificial general intelligence: A roadmap and implications. *Mesopotamian Journal of Big Data*, 2023, 81-91. <https://doi.org/10.58496/MJBD/2023/012>

Olan, F., Suklan, J., Arakpogun, E. O., & Robson, A. (2021). Advancing consumer behavior: The role of artificial intelligence technologies and knowledge sharing. *IEEE Transactions on Engineering Management*. 71, 2024 <https://doi.org/10.1109/TEM.2021.3083536>

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hofmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart

- LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D (2021) The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372. <http://dx.doi.org/10.1136/bmj.n71>
- Paul, J., Ueno, A., & Dennis, C. (2023). ChatGPT and consumers: Benefits, pitfalls and future research agenda. *International Journal of Consumer Studies*, 47(4), 1213-1225. <https://doi.org/10.1111/ijcs.12928>
- Pizzutti, C., Gonçalves, R., & Ferreira, M. (2022). Information search behavior at the post-purchase stage of the customer journey. *Journal of the Academy of Marketing Science*, 50(5), 981-1010. <https://doi.org/10.1007/s11747-022-00864-9>
- Puntoni, S., & Wertenbroch, K. (2024). Being Human in the Age of AI. *Journal of the Association for Consumer Research*, 9(3). <https://doi.org/10.1086/730788>
- Sarker, I. H. (2022). AI-based modeling: techniques, applications and research issues towards automation, intelligent and smart systems. *SN Computer Science*, 3(2), 158. <https://doi.org/10.1007/s42979-022-01043-x>
- Sahut, J. M., Laroche, M., & Braune, E. (2024). Antecedents and consequences of fake reviews in a marketing approach: An overview and synthesis. *Journal of Business Research*, 114572. <https://doi.org/10.1016/j.jbusres.2024.114572>
- Sharma, P., Ueno, A., Dennis, C., & Turan, C. P. (2023). Emerging digital technologies and consumer decision-making in retail sector: Towards an integrative conceptual framework. *Computers in Human Behavior*, 148, 107913. <https://doi.org/10.1016/j.chb.2023.107913>
- Shao, Z., Zhao, R., Yuan, S., Ding, M., & Wang, Y. (2022). Tracing the evolution of AI in the past decade and forecasting the emerging trends. *Expert Systems with Applications*, 209, 118221. <https://doi.org/10.1016/j.eswa.2022.118221>
- Tata, S. V., Prashar, S., & Parsad, C. (2021). Intention to write reviews: influence of personality traits, attitude and motivational factors. *Journal of Systems and Information Technology*, 23(2), 218-242. <https://doi.org/10.1108/JSIT-05-2020-0071>
- Thøgersen, J., Jørgensen, A. K., & Sandager, S. (2012). Consumer decision making regarding a “green” everyday product. *Psychology & Marketing*, 29(4), 187-197. <https://doi.org/10.1002/mar.20514>
- Toosi, A., Bottino, A. G., Saboury, B., Siegel, E., & Rahmim, A. (2021). A brief history of AI: how to prevent another winter (a critical review). *PET clinics*, 16(4), 449-469. <https://doi.org/10.1016/j.cpet.2021.07.001>

Vaid, S., Puntoni, S., & Khodr, A. (2023). Artificial intelligence and empirical consumer research: A topic modeling analysis. *Journal of Business Research*, 166, 114110. <https://doi.org/10.1016/j.jbusres.2023.114110>

Xiong, Y. (2022). The impact of artificial intelligence and digital economy consumer online shopping behavior on market changes. *Discrete Dynamics in Nature and Society*, 2022(1), 9772416. <https://doi.org/10.1155/2022/9772416>

Yue, B., & Li, H. (2023). The impact of human-AI collaboration types on consumer evaluation and usage intention: a perspective of responsibility attribution. *Frontiers in psychology*, 14, 1277861. <https://doi.org/10.3389/fpsyg.2023.1277861>

Zhang, Y., & Wang, S. (2023). The influence of anthropomorphic appearance of artificial intelligence products on consumer behavior and brand evaluation under different product types. *Journal of Retailing and Consumer Services*, 74, 103432. <https://doi.org/10.1016/j.jretconser.2023.103432>

Zhao, L., & Fu, B. (2024). Assessing the Impact of Recommendation Novelty on Older Consumers: Older Does Not Always Mean the Avoidance of Innovative Products. *Behavioral Sciences*, 14(6), 473. <https://doi.org/10.3390/bs14060473>

Determining University Students' Awareness Levels Regarding Ecological Literacy: Balıkesir University Example

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Abstract

Introduction: Today, technological developments cause the depletion of our natural resources, the deterioration of our living spaces, and the extinction of natural balance and species. Societies that are sensitive to this issue have started environmental education studies to solve these problems. University students, who will take an active role in social life after graduation, will also be bearers of the training they receive on issues such as environment, ecological balance and sustainable living, on a personal and social basis.

Aim: The purpose of this research is to determine the awareness levels of Balıkesir University students regarding ecological literacy and to determine what the necessary conditions are to become ecologically literate.

Method: Quantitative research method was used in the study and data was collected through survey forms. The population of the research consists of individuals studying at Balıkesir University in the 2023-2024 academic year. The sample size was kept as high as possible to make the data used in the research more reliable. Survey data were analyzed using SPSS.

Findings: According to the findings of the study, it was seen that there was a significant difference between the awareness levels of male and female students regarding ecological literacy. It can also be said that the ecological literacy awareness levels of males are higher than females. In addition, the ecological literacy awareness levels of students differ according to the departments they study.

Conclusion: As a result, it can be said that Balıkesir University students have a high level of ecological literacy awareness. However, it is recommended that appropriate courses be included in the curriculum to further increase students' awareness of ecological literacy. In addition, students should be encouraged to participate in volunteer work and non-governmental organizations that address environmental issues.

Originality and value: There is limited studies regarding status of ecological literacy, awareness of environmental problems and future expectations regarding the creation of a sustainable campus for Balıkesir University students. It is anticipated that the study will fill this gap and the research results will provide original findings that will guide university students and academics studying in other provinces of the country, especially for students studying at Balıkesir University.

Key Words: Sustainability, Ecological Literacy, University Students, Balıkesir University

Jel Codes: I20, I23, Q54

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1. INTRODUCTION

In the 21st century, which is described as the information age, the concept of learning has become one of the frequently emphasized topics and has shown a positive development by targeting lifelong learning. Literacy skills, which emerge as an important outcome of the information age and learning, play an active role in ensuring the active participation of individuals in social life and increasing their quality of life (Gül, 2007). In recent years, the increase in the number of concepts derived from “literacy” is noteworthy. Computer literacy, environmental literacy, digital literacy, technology literacy and media literacy are some of the examples of these concepts (Snaveley and Cooper, 1997). In the age of consumption, we live in, it has become a necessity to protect natural resources, protect the environment and ensure sustainability in order to pass them on to future generations. Alternative approaches to literacy developed to protect the environment have been increasing in recent years. After concepts such as environmental literacy, and civic literacy, it was understood that the integration of natural life and humans should be addressed from a more conscious perspective, and the concept of “ecological literacy” entered the literature. The most important way for individuals to exhibit environmentally friendly behavior and combat environmental problems, to develop sensitivity and awareness on environmental issues, and thus to contribute to the future is to be ecologically literate (Bozkurt, 2023).

Today’s modern life imposes many responsibilities on people, causes them to run on autopilot for long hours, and with the influence of technological developments, people are moving away from nature day by day. Amel et al. (2009) think that the reason why ecological concerns and green sensitivity do not translate into environmentally friendly actions today is related to the disconnection between the sense of self based on a fast-paced lifestyle and nature. In order to establish this bond between the individual and nature, well-educated individuals with high ecological literacy are needed. Universities, which undertake important functions in preparing individuals for life, have a great responsibility in raising these individuals. Education on ecological literacy should aim to increase individuals’ perception and awareness of the natural environment. The goal of this training is, the aim should be to teach solutions by understanding the functioning of the natural ecosystem, sustainability in the use of natural resources, the negative consequences of environmental pollution, protecting biodiversity and environmental problems such as climate change (Bozkurt, 2023). In this context, the aim of the study is to determine the ecological literacy levels of university students and to develop suggestions for them to become ecologically literate. Thus, it is aimed to increase the number of individuals with ecological literacy and awareness on this issue and to benefit society.

2. LITERATURE REVIEW

Nowadays, when the population is rapidly increasing and the number of industrial facilities is increasing day by day, the necessity of taking care of nature and natural

resources has begun to be felt much more intensely. As a precaution against the negative consequences of people operating in nature in masses and consuming natural resources, the importance of raising ecologically literate individuals who can approach natural resources from a conscious perspective, evaluate information about nature with high awareness, and direct their behavior and attitudes in a way that protects the environment has come to the fore. Balgopal and Wallace (2009) argue that an ecologically literate person knows ecological concepts and can recognize their relevance and application to understand human impacts on ecosystems. Since ecological literacy interacts between social and ecological systems (Casper et al., 2020), the education to be given on ecological literacy should be interdisciplinary and holistic and evaluate humans as a part of nature (Hammarsten et al., 2019). In this respect, there is a need to create environments where individuals can directly interact with nature in their education. Universities are one of the most important educational institutions that can meet this need due to their versatile structures. When the literature is examined, it can be seen that there are some studies on ecological literacy, although their numbers are still limited. These studies mostly focus on the ecological literacy levels of primary and secondary school students and teachers. Irianto et al. (2020) stated the importance of the concept of ecological literacy in their studies and underlined that ecological literacy education should be given from an early age. Konoralp (2024), in her study examining the role of forest schools on sustainable education and ecological literacy, concluded that forest school increase students' environmental awareness and develop sustainability and ecological literacy skills. Koçoğlu et al. (2023), as a result of their scale development studies on the perception of ecological literacy in education, found that the developed scale was reliable enough the measure teachers' ecological literacy attitudes. Bozkurt (2023), in her master's thesis to determine the awareness levels of social studies teacher candidates regarding ecological literacy, found that ecological literacy differs according to demographic variables. Aydın et al. (2016) in their study, they investigated teachers' opinions on ecological literacy education in Turkey and stated that an ecological literacy curriculum should be created to solve environmental problems in Turkey. McBride et al. (2013) compared environmental literacy and eco literacy in their study and touched upon the similarities and differences between them. In her doctoral thesis, Demir (2021) examined the ecological literacy of secondary school students and put forward a model proposal for the development of students' ecological literacy.

2.1. Concept of Ecological Literacy

The concept ecological literacy was first used by Risser in her speech at the American Ecological Society in 1986. In Turkey, this concept was first implemented by TEMA in 2011 with the "Ecology Literacy Teacher Training" (Koçoğlu et al., 2023). Individuals with an advanced level of ecological literacy; knows the basic principles of ecology, develops an understanding of how to use them in daily life, and can produce effective solutions to problems in this field by knowing the environment and ecological situation (Koçoğlu et al., 2023). Therefore, thanks to ecological literacy, individuals with

act knowing the changing nature balances and the importance of the ecosystem and will cause less harm to the environment (Dündar and Kızık, 2022). Ecological literacy argues that the basis of living in prosperity is being aware of the natural environment (Boehnert, 2015). The concept of ecological literacy; it has come to the fore for reasons such as the effects of the industrial revolution and the climate crisis and is seen as an important approach in restoring the disrupted world balance and reducing the negative effects of climate change (Dündar and Kızık, 2022).

The concept of ecological literacy is closely related to “sustainability”, which has been frequently emphasized in recent years. Morin (2003) defined to concept of sustainability, which means ensuring the continuity of natural resources and transferring them to future generations, as an educational process to raise individuals who benefit nature and have recycling awareness. Therefore, ecology, ecological literacy, and environmental education form the basis of “sustainable development-oriented education”, which emerged from the idea that sustainability should be reflected in education. The aims of ecological literacy may differ depending on the dimensions it includes. Berkowitz et. al. (2005), Cutter Mackenzie and Smith (2003), Curthoys and Cuthbertson (2002) argue that ecological literacy is about natural systems and systems based on making changes about the future of life in dimensions such as agriculture, housing, energy and resource use, urban design, transportation, economy, society and forestry. In addition to providing comprehensive, holistic relationships between human systems, they also state that they have aims such as creating a sustainable lifestyle in harmony with the natural world and providing new skills to respond effectively to ecological problems.

2.2. University Students and Ecological Literacy

Educational institutions are responsible for raising the human profile that societies need today. Büyükçolpan and Yılmaz (2023) state that the primary goal of educational institutions should be to raise individuals who can meet the needs of the age and have the knowledge and skills defined as “21st century skills”. The need to develop an understanding of protecting environmental values and awareness of natural life at all levels of educational institutions is one of the most emphasized issues in recent years (Kaplowitz and Levine, 2005; Teksöz et al., 2010; Aydın et al., 2016; Dündar and Kızık, 2022; Koçoğlu et al., 2023). Ecological literacy prioritizes education to improve the ability of knowledgeable and concerned individuals to make decisions and take action on environmental issues (Lewinsohn et al., 2015). In this context, placing ecological literacy at the forefront of educational institutions’ policies and development goals will enable them to raise individuals who are sensitive to the environment and aware of natural life. Universities are among the institutions that will contribute the most to integrating individuals with ecological literacy into society, due to the student profile they educate. Teksöz et al. (2010) state that one of the important roles of university students, who are expected to take an active role in social and professional life after graduation, is to carry the environmental knowledge, skills, attitudes and values they

gained during their university education into their personal lives, their environment and their professional lives.

3. RESEARCH METHODOLOGY

Quantitative research method was used in the study and data was collected through survey forms. The population of the research consists of individuals studying at Balikesir University in the 2023-2024 academic year. The surveys were applied to 1091 people. However, an analytical exclusion was applied to 90 responses, attributed to illegibility and incompleteness, culminating in a final analytic sample of 1001 respondents. The sample size was kept as high as possible to make the data used in the research more reliable. Survey data were analyzed using SPSS.

3.1. Data Analysis

According to Table 1, 51.0% of the respondents were women (511 students) and 49.0% were men (490 students). As can be seen, the gender distribution is almost equal. This participation rate is also an indication that women and men participate equally in education. When the age distribution is analyzed, the largest group of participants is 20 years old, represented by 25.1% (251 students).

The 19 and 21 age groups are 17.1% (171 students) and 17.7% (177 students), respectively. While 18-year-olds make up 7.2% (72 students), participants between the ages of 23 and 50 make up 18.5% (186 students). A significant majority of the participants are single, comprising 96.8% (969 students), while only 3.2% (32 students) are married. 1st grade students constitute the largest group with 47.1% (471 students). 2nd year students account for 31.3% (313 students). 3rd grade students account for 7.8%, 4th grade students for 12.1% and graduate students for 2.4%. Balikesir Vocational School has the highest enrollment rate with 32.1% (32 students), followed by Sındırgı Vocational School with 11.3% (113 students) and the Faculty of Economics and Administrative Sciences with 10.5% (105 students). Other departments such as Sports Sciences, Faculty of Arts and Sciences, and Dursunbey Vocational School have smaller but significant enrollment rates. Departments such as Faculty of Law and Institute of Health Sciences have the lowest representation rates with 1.6% and 1.4% respectively.

Table 1: Participant Demographic Characteristics: Frequencies and Percentages

Variable	Level	F	%
Gender	Female	511	51.0
	Male	490	49.0
Age	18	72	7.2
	19	171	17.1
	20	251	25.1
	21	177	17.7
	22	144	14.4

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	Between the ages of 23 – 50	186	18.5
Marital Status	Single	969	96.8
	Married	32	3.2
Class	1	471	47.1
	2	313	31.3
	3	78	7.8
	4	121	12.1
	Postgraduate	24	2.4
Departments	Balıkesir Vocational School (Business Management, Tourism, Child Care, Machinery, Mining, Marketing and Advertising, Office Management, Graphic Design)	32	32.1
	Sındırgı Vocational School (Electrical Home Appliances, Health Institutions Management, Foreign Trade, Cooking, Tourism)	113	11.3
	Faculty of Economics and Administrative Sciences (Finance, Political Science and Public Administration, Economics, Business Administration)	105	10.5
	Sports Sciences Faculty	78	7.8
	Faculty of Science and Letters (History)	73	7.3
	Dursunbey Vocational School (Forestry)	54	5.4
	Faculty of Tourism (Recreation, Tourist Guidance)	50	5.0
	Faculty of Veterinary	49	4.9
	Burhaniye Faculty of Applied Sciences (Gastronomy)	36	3.6
	Necatibey Faculty of Education (English Teaching)	35	3.5
	Bigadiç Vocational School (Electricity and Energy)	31	3.1
	Kepsut Vocational School (Veterinary Medicine)	16	1.6
	Faculty of Law	16	1.6
	Institute of Health Sciences (Medical Biochemistry)	24	1.4

When the T-test result in Table 2 is examined, a statistically significant difference was found between the participants' ecological literacy awareness levels and the gender variable ($p < 0.05$). When the details of the difference are examined, the mean ecological literacy of men (2.6816) is higher than the mean of women (2.4233). This shows that male participants exhibit higher ecological literacy on average than female participants.

Table 2. T-Test of Participants' Ecological Literacy Awareness Level and Gender

Factor	Gender	F	Mean	Std. Deviation	t	df	p
Ecological Literacy Averages	Female	511	2.4233	.56868	6.765	976.122	.000
	Male	490	2.6816	.63597			

According to Table 3, participants' ecological literacy awareness levels differ according to the departments they study ($F=2.353$; $p<0.05$).

Table 3. Anova Test of Participants' Level of Ecological Literacy Awareness and Departments of Study

Factor		Sum of Squares	df	Mean Square	F	Sig.
Ecological Literacy Averages	Between Groups	24.914	29	.859	2.353	.000
	Within Groups	354.486	971	.365		
Total		379.400	1000			

4. CONCLUSION

Deterioration and pollution of the natural environment is not only caused by the increase in world pollution. Today, the most important cause of environmental pollution in many countries is excessive consumption. Therefore, it is possible to say that environmental pollution is caused by increased consumption rather than population growth. Therefore, the most important problem awaiting solution is the prevention of environmental pollution caused by consumption. For this, it is necessary to control overconsumption as well as population growth, and to develop better and reuse opportunities for resources (Kağar and Arıca, 2018).

In conclusion, it can be said that Balıkesir University students have high ecological literacy awareness. However, it is recommended to add appropriate courses to the curriculum to further increase students' ecological literacy awareness. In addition, students should be encouraged to participate in volunteer work and non-governmental organizations addressing environmental issues.

REFERENCES

Aldemir, A. (2003). Bilgiye erişimde yeni yaklaşım: Bilgi okuryazarlığı. Ünak'03: Bilgiye erişimde değişen yollar ve II. tıbbi bilgi yönetimi ve teknolojileri sempozyumu içinde. Ankara.

Amel, E.L., Manning, C.M. & Scott, B. A. (2009). Mindfulness and sustainable behavior: Pondering attention and awareness as means for increasing green behavior. *Ecopsychology*, 1(1), 14-25.

Aydın, M., Dünder, R., & Korkut, Ş. (2016). Türkiye’de ekolojik okuryazarlık eğitimine yönelik öğretmen görüşleri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*. 16(2), 1160-1172.

Balgopal, M. M. & Wallace A. M. (2009). Decisions and Dilemmas: Using Writing to Learn Activities to Increase Ecological Literacy. *The Journal of Environmental Education*, 40 (3): 13–26. doi: 10.3200/JOEE.40.3.13-26

Berkowitz, A. R., Ford, M. E., & Brewer, C.A. (2005). A framework for integrating ecological literacy, civics literacy, and environmental citizenship in environmental education. In E. A. Johnson & M. J. Mappin (Eds.), *Environmental education or advocacy: perspectives of ecology and education in environmental education* (pp. 227–265). Cambridge University Press.

Boehnert, J. (2015). Ecological literacy in design education: A theoretical introduction. *Form Academic*, 8(1), 1-11. <https://doi.org/10.7577/formakademisk.1405>

Bozkurt, S. (2023). Sosyal Bilgiler Öğretmen Adaylarının Ekolojik Okuryazarlığa İlişkin Farkındalık Düzeylerinin Belirlenmesi. *Yayınlanmamış Yüksek Lisans Tezi, İnönü Üniversitesi Eğitim Bilimleri Enstitüsü, Malatya.*

Büyükçolpan, T. & Yılmaz, B. (2023). Çeşitli değişkenlerin öğretmen adaylarının bilgi okuryazarlığı düzeyleri üzerine etkisi. *Bilgi Yönetimi Dergisi*, 6(1): 146-178. DOI: 10.33721/by.1288896

Casper, A.M.A., Fernández-Giménez, M. E. & Balgopal, M.M. (2020). A tool for measuring ecological literacy: coupled human-ecosystem interactions, *The Journal of Agricultural Education and Extension*, 27:1, 21-34. <https://doi.org/10.1080/1389224X.2020.1780139>

Curthoys L. P., & Cuthbertson B. (2002). Listening to the landscape: Interpretive planning for ecological literacy. *Canadian Journal of Environmental Education*, 7(2), 224–240.

Cutter Mackenzie, A., & Smith, R. (2003). Ecological literacy: The ‘missing paradigm’ in environmental education (part one), *Environmental Education Research*, 9(4), 497-524.

Demir, F.B. (2021). Argümantasyon Tabanlı Bilim Öğrenme Yaklaşımının 6.Sınıf Öğrencilerinin Ekolojik Okuryazarlıkları Üzerindeki Etkisinin İncelenmesi. *Yayınlanmamış Doktora Tezi, Kastamonu Üniversitesi Sosyal Bilimler Enstitüsü, Kastamonu.*

Dündar, R. & Kızılk, M. M. (2022). Investigation of the place of environment in life studies program lesson in the context of ecological literacy, environmental education and sustainable development-oriented education, *Inonu University Journal of the Faculty of Education*, 23(3), 1954-1974. DOI: 10.17679/inuefd.1146730

Gül, G. (2007). Okuryazarlık Sürecinde Aile Katılımının Rolü. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi*, 8(1), 17-30.

Ha, C., Huang, G., Zhang, J., & Dong, S. (2021). Assessing ecological literacy and its application based on linguistic ecology: A case study of Guiyang City, China. *Research Square*, 2(1), 1-24.

Hammarsten, M., Askerlund, P., Almers, E., Avery, H. & Samuelsson, T. (2019). Developing ecological literacy in a forest garden: children's perspectives. *Journal of Adventure Education and Outdoor Learning*, 19(3), 227-241. <https://doi.org/10.1080/14729679.2018.1517371>

Irianto, D. M., Yunansah, H., Mulyati, T., Herlambang, Y. T., & Setiawan, D. (2020). Multiliteracy: Alternative learning models to improve ecological literacy of primary school students. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(9), 614-632.

Kağar, C. & Arıca, Ş.Ç. (2018). Gelecek nesillere yaşanabilir bir dünya bırakmanın anahtarı: Ekolojik okuryazarlık. *Sorumlu Tüketim ve Üretim*, 1(2), 31-42.

Kaplowitz M. D., & Levine R. (2005). How environmental knowledge measures up at a Big Ten university. *Environmental Education Research*, 11(2), 143-160.

Koçoğlu, E., Egüz, Ş., Tösten, R., Demi, F.B. & Tekdal, D. (2023). Perception of Ecological Literacy in Education: A Scale Development Study. *International Journal of Education & Literacy Studies*, 11(3): 3-9.

Lewinsohn, T. M., Attayde, J. L., Fonseca, C. R., Ganade, G., Jorge, L. R., Kollmann, J., Overbeck, G. E., Prado, P. I., Pillar, V. D., Popp, D., da Rocha P. L. B., Silva, W. R., Spiekermann, A., & Weisser, W. W. (2015). Ecological literacy and beyond: Problem based learning for future professionals. *Ambio*, 44(2), 154-162. <https://doi.org/10.1007/s13280-014-0539-2>

McBeth, B., Hungerford, H. R., Marcinkowski, T., Volk, T., & Meyers, R. (2008). National environmental literacy assessment project: Year 1, national baseline study of middle grades students. National Oceanic and Atmospheric Administration. <https://doi.org/10.1080/00958960903210031>

Mcbride, B. B., Brewer, C. A., Berkowitz, A. R. & Borrie, W. T. (2013). Environmental Literacy, Ecological Literacy, Ecoliteracy: What Do We Mean and How Did We Get Here?. *Ecosphere*, 4(5), 1-20.

Morin, Edgar (2003). *Geleceğin Eğitimi İçin Gerekli Yedi Bilgi*, (Tra: Hüsnü Dilli), İstanbul Bilgi Üniversitesi Yayınları: İstanbul.

Okyay, Ö., Sayın, A., Demir, Z. G. & Özdemir, K. (2022). Ekolojik okuryazarlık eğitiminin okul öncesi çocukların çevreye yönelik farkındalık ve tutumlarına etkisi. *Milli Eğitim*, 51(236), 2851-2870. DOI: 10.37669/milliegitim.944271

Öztürk, M. (2017). Sürdürülebilir gelişme odaklı eğitim: Kuramsal çerçeve, tarihsel gelişim ve uygulamaya dönük öneriler. *İlköğretim Online*, 16(4), 1-11.

Snavey, L.& Cooper, N. (1997). The Information Literacy Debate. *The Journal of Academic Librarianship*, 23(1), 9-13.

Spurgeon, R. (2006). *Ecology* (D. Yurtören, Çev.). Ankara: TÜBİTAK.

Teksöz, G., Şahin, E. & Ertepinar, H. (2010). Çevre Okuryazarlığı, Öğretmen Adayları ve Sürdürülebilir Bir Gelecek. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 39, 307-320.

The Mediating Role of Perceived Brand Warmth in the Effect of Brand Anthropomorphism on Brand Trust

Kadir Deligöz³³

Abstract

Introduction: Anthropomorphism is the attribution of human physical and mental characteristics to non-human entities or events. Businesses respond to this tendency by designing anthropomorphic mascots for their products, services, or brands. Through anthropomorphism, businesses can establish strong relationships with their customers, gaining numerous benefits.

Aim: This study investigates the impact of brand anthropomorphism (attributing human-like characteristics to a brand) on brand trust, with a focus on the mediating role of Perceived Brand Warmth. Brand anthropomorphism can lead consumers to form a deeper emotional connection with the brand, potentially enhancing brand trust. This research specifically examines Siri users to better understand the relationship between human-like brand traits and perceived trust.

Method: Data were collected from Siri users through an online survey using a convenience sampling method. Participants were asked to respond to items related to brand anthropomorphism, Perceived Brand Warmth, and brand trust. The data were analyzed using Python to examine the direct effect of brand anthropomorphism on brand trust and the mediating effect of Perceived Brand Warmth.

Findings: The analysis revealed that brand anthropomorphism significantly influences brand trust, supporting the hypothesis that attributing human-like characteristics to a brand can enhance consumer trust. Additionally, the results indicated that Perceived Brand Warmth plays a crucial mediating role in this relationship. Specifically, brands that are perceived as warm and friendly due to their anthropomorphic traits tend to foster higher levels of trust among consumers. The mediating effect of Perceived Brand Warmth suggests that the humanization of brands not only directly increases trust but also does so indirectly by enhancing the emotional appeal of the brand.

Conclusion: This study underscores the importance of brand anthropomorphism as a strategy for building and maintaining consumer trust. The findings highlight that Perceived Brand Warmth is a key mechanism through which anthropomorphic branding exerts its influence on trust. For marketers, this implies that efforts to humanize a brand should not only focus on creating human-like features but also on ensuring that these features project warmth and approachability. By doing so, brands can strengthen their emotional connection with consumers, ultimately leading to higher levels of trust and loyalty. These insights are particularly relevant for digital assistants like Siri, where the perception of warmth can significantly impact user trust and engagement.

Originality and value: The analysis suggests that it had decent construct credibility and accuracy.

Key Words: Brand Anthropomorphism, Brand Trust, Perceived Brand Warmth

Jel Codes: M30, M31

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1. Conceptual Framework

Brand competitiveness is one of the most critical elements that reflects a brand's ability to achieve a sustainable advantage in the market by differentiating itself from competitors and offering superior value (Baumann et al., 2017). Brand competitiveness should be evaluated not only in terms of sales and market share but also as a strategy that can create strong associations by establishing a unique identity and meaning in the minds of consumers. This unique identity and value proposition serve as a crucial differentiator that allows brands to stand out in competitive environments (Sharp et al., 2024).

A brand can secure sustainable growth objectives by providing competitive advantages for businesses. However, in today's markets, consumer brand loyalty is steadily declining, and consumers carefully evaluate the value propositions offered by brands when choosing between similar products or services (Holt, 2004). Anthropomorphism, defined as attributing human-like characteristics to non-human entities, objects, or concepts, is one way in which consumers make sense of the world around them. Brand anthropomorphism is considered a critical strategy for businesses because it enables brands to form an emotional bond with consumers by being endowed with human-like traits, making them warmer and more relatable. Similarly, product anthropomorphism facilitates a deeper and more meaningful connection with consumers by designing products with human-like qualities. Particularly with the widespread use of technology, consumers now expect not only functional but also emotional and social satisfaction from brands and products (Puzakova et al., 2013). The adoption of an anthropomorphic identity by brands is crucial in fostering empathy and building trust with consumers. Anthropomorphism plays a significant role in enhancing brand competitiveness (Aggarwal & McGill, 2007). Epley et al. (2007) noted that anthropomorphism, especially in situations of high uncertainty and complexity, helps consumers develop positive attitudes toward a brand by increasing their trust in it. Today, consumers tend to perceive non-human entities in human-like terms, which is why businesses should employ anthropomorphization tactics. Technological advancements allow brands to gain competitive advantage by leveraging anthropomorphism strategies (Ghorbani et al., 2022). When brands are perceived as human-like by consumers, this perception increases feelings of trust and warmth toward the brand. This strategy enables brands to differentiate themselves in highly competitive markets and to secure a unique position in consumers' minds. For instance, anthropomorphic digital assistants like Apple's Siri are perceived by consumers as a "helper" or "friend," contributing to the strengthening of the emotional bond with the brand. As mentioned in our study, this helps alleviate consumers' feelings of loneliness and fosters positive attitudes toward the brand.

In conclusion, anthropomorphism emerges as a crucial tool in marketing strategies for establishing emotional connections with consumers and enhancing brand competitiveness. The literature demonstrates how anthropomorphism positions brands

as more human-like and relatable in consumers' minds. However, for this strategy to be applied effectively, brands must carefully assess consumer perceptions and social norms. While anthropomorphism has been employed by some significant companies in the past, many major businesses today are incorporating this concept into both their brands and products. In the future, it is inevitable that companies aiming to maintain a competitive edge will fully embrace this strategy. Consumers have long been paying not only for products or services but also for experiences and, in some cases, for companionship. As consumers, we derive satisfaction from purchasing products and services that resemble or feel close to us. At this stage, anthropomorphism assists businesses in offering products or brands that align with our personality traits, thereby enhancing the consumer experience.

2. Examining the Mediating Role of Perceived Brand Warmth on the Relationship Between Brand Anthropomorphism and Brand Trust

2.1 Frequency Distributions

The brand anthropomorphism questions were adapted from the scale developed by Golosseko et al. (2020), while the questions for brand trust and perceived brand warmth were taken from the studies of Xue et al. (2020), Aaker et al. (2010), and Wang et al. (2017). The mean and standard deviation values for the scale items are presented in Table 1.

Table 1. Mean and Standard Deviation Values for the Scales

Scale	Question	Mean	Standard Deviation
Perceived Brand Warmth	I evaluate the Siri application as sincere.	2.87	1.42
Perceived Brand Warmth	The Siri application seems friendly to me.	2.86	1.42
Perceived Brand Warmth	I think the Siri application is warm-hearted.	2.86	1.42
Perceived Brand Warmth	I evaluate the Siri application negatively. (Reverse-coded)	3.14	1.42
Perceived Brand Warmth	The Siri application is enthusiastic.	2.87	1.43
Brand Trust	I trust the Siri application.	2.96	1.39
Brand Trust	I am loyal to the Siri application.	2.98	1.39
Brand Trust	The Siri application might mislead me sometimes. (Reverse-coded)	3.04	1.37
Brand Trust	The Siri application is honest.	2.96	1.39
Brand Trust	The Siri application is reliable.	2.98	1.38

Brand Trust	The Siri application helps me with product-related problems.	2.97	1.37
Brand Trust	The Siri application offers me quality products.	2.96	1.36
Brand Anthropomorphism	I think the Siri application looks human-like.	3.06	1.47
Brand Anthropomorphism	I think the Siri application is quite realistic.	3.10	1.46
Brand Anthropomorphism	My most preferred brand has a human-like appearance.	3.08	1.46
Brand Anthropomorphism	The Siri application is reliable.	3.07	1.47
Brand Anthropomorphism	The Siri application is honest.	3.08	1.47
Brand Anthropomorphism	The Siri application is primitive. (Reverse-coded)	2.92	1.47
Brand Anthropomorphism	The Siri application seems very complicated. (Reverse-coded)	2.94	1.47
Brand Anthropomorphism	The Siri application makes me dream.	3.09	1.46
Brand Anthropomorphism	The Siri application leads me to think.	3.07	1.47
Brand Anthropomorphism	The Siri application may feel regret over shameful actions.	3.07	1.46
Brand Anthropomorphism	The Siri application may feel compassion for consumers who feel bad.	3.08	1.47
Brand Anthropomorphism	The Siri application may feel guilt when it hurts someone with its actions.	3.05	1.48
Brand Anthropomorphism	The Siri application may feel ashamed if people have negative views about it.	3.06	1.45

Upon examining Table 1, it is observed that the item with the highest mean value on the perceived brand warmth scale is 'I evaluate the Siri application negatively.' This may suggest that Siri offers a less humanized or empathetic experience for some users. The perception of the application as cold or mechanical could trigger negative evaluations towards the brand. In terms of brand trust, the item 'The Siri application might mislead me sometimes.' stands out. The reason consumers might be cautious about trusting Siri could be due to the possibility of technological applications occasionally making errors or providing misleading results. AI-based assistants like Siri may sometimes falter in delivering accurate information or completing tasks, which can

diminish user trust. Lastly, on the brand anthropomorphism scale, the item 'I think the Siri application is quite realistic.' is notable. Siri being perceived as realistic is related to its human-like characteristics. The way Siri communicates, its response speed, and natural language processing abilities lead users to perceive it as a more 'real' and humanized entity. This results in a strong perception of brand anthropomorphism.

The mean and standard deviation values of the scales used in the study are presented in Table 2.

Table 2. Mean and Standard Deviation Values of the Scales

Scale	Mean	Standard Deviation
Perceived Brand Warmth	2,92	1,42
Brand Trust	2,98	1,38
Brand Anthropomorphism	3,05	1,47

These findings indicate that perceptions of the Siri application are generally neutral or slightly negative. Brand warmth and brand trust may have fallen short of expectations. Although Siri's human-like characteristics are somewhat recognized by users, these traits may not have been perceived as sufficiently strong or consistent. Furthermore, the presence of high standard deviations among these values suggests that user experiences vary significantly, and not everyone perceives Siri in the same way. This implies that factors such as different demographic groups or varying levels of familiarity with technology could influence these perceptions.

2.2. Normal Distribution Results and Reliability Test for the Scales

In order to test the normality distribution of the scales used in the study, skewness and kurtosis values were examined. According to the criteria specified by George and Mallery (2010), if the skewness and kurtosis values fall within the ± 2 range, the variables in the data set are considered to be normally distributed. When looking at the three scales, it is observed that the data follow a normal distribution. Additionally, the Cronbach's Alpha test was applied to assess the reliability of the data. The results of the reliability test are presented in Table 3.

Table 3. Reliability Test Results

Scales	Cronbach α
Perceived Brand Warmth	0,594
Brand Trust	0,832
Brand Anthropomorphism	0,904

Table 3 presents the results of the reliability test (Cronbach's Alpha) for the scales used in the study. The perceived brand warmth scale shows a Cronbach's α value of 0.594, indicating moderate internal consistency, which suggests that the items on this scale are not highly correlated with each other. This could imply some variability in how respondents interpret or perceive brand warmth. On the other hand, the brand trust scale has a Cronbach's α of 0.832, reflecting high internal consistency, meaning that the items related to brand trust are well-aligned and measure the same construct consistently. Finally, the brand anthropomorphism scale demonstrates a very high internal consistency with a Cronbach's α of 0.904, indicating that the items on this scale are strongly correlated and consistently measure the anthropomorphism construct.

2.3. Examining the Relationships Between Variables

Correlation analysis was conducted to measure the relationships between the three scales used in the study. The results of the correlation analysis between the scales are presented in Table 4.

Table 4. Correlation Analysis Results Between the Scales

	Perceived Brand Warmth	Brand Trust	Brand Anthropomorphism
Perceived Brand Warmth	1.000	0.63	0.42
Brand Trust	0.63	1.000	0.28
Brand Anthropomorphism	0.42	0.28	1.000

Perceived Brand Warmth and Brand Trust (Correlation = 0.63); This is a strong positive correlation, indicating that as perceptions of Perceived Brand Warmth increase, Brand Trust also increases significantly. This suggests that respondents who perceive a brand as warm are more likely to trust it.

Perceived Brand Warmth and Brand Anthropomorphism (Correlation = 0.42); This is a moderate positive correlation, meaning that brands perceived as more human-like also tend to be seen as warmer. The relationship is noticeable but not as strong as the one between warmth and trust.

Brand Trust and Brand Anthropomorphism (Correlation = 0.28); This is a weak to moderate positive correlation, suggesting that brands perceived as more anthropomorphic (human-like) are slightly more trusted, but the relationship is not very strong.

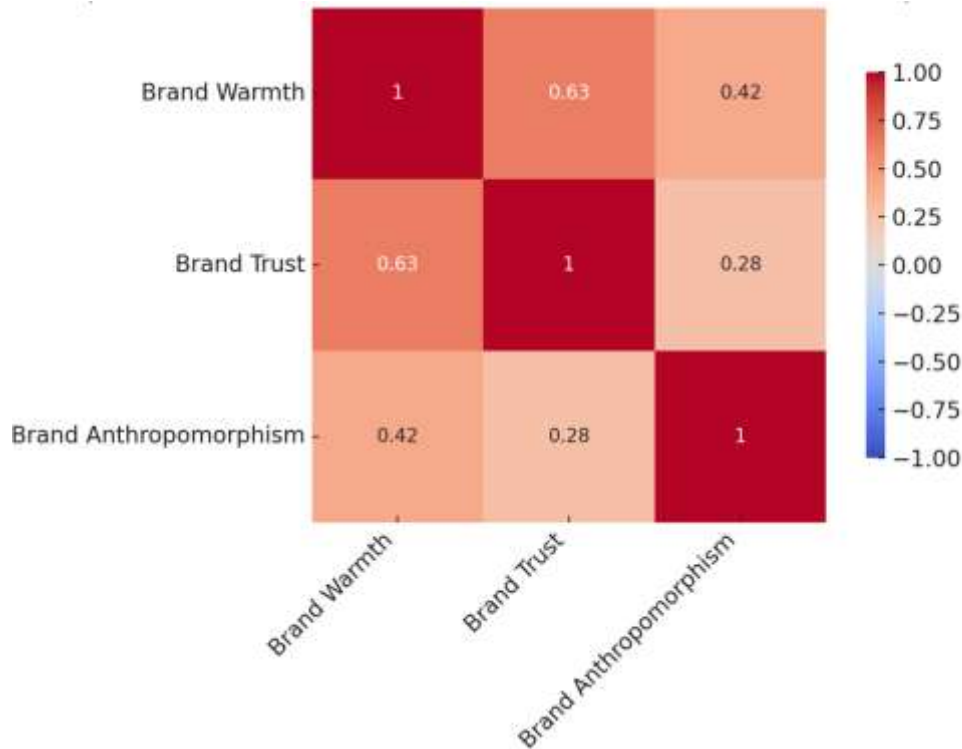


Figure 1. Relationships Between Variables

The strongest relationship is between Perceived Brand Warmth and Brand Trust, indicating that warmth plays a crucial role in fostering trust in a brand. Brand Anthropomorphism has a moderate effect on perceptions of warmth and a weaker effect on trust.

2.4. Examining the Mediating Role

To analyze the mediating role of perceived brand warmth in the relationship between brand anthropomorphism and brand trust, 600 surveys were collected using convenience sampling online. According to the mediation regression analysis approach developed by Baron and Kenny (1986), the following conditions must be met for a variable to assume a mediating role:

- The independent or antecedent variable must be significantly related to the mediator variable (a).
- The independent or antecedent variable must be significantly related to the dependent variable (c).

- The mediator variable must be significantly related to the dependent variable (b).
- The effect of the independent variable should be reduced when the mediator variable is introduced.

Full mediation occurs when the independent variable affects the dependent variable entirely through the mediator variable. In terms of the regression equation, the beta coefficient for the independent variable is significant in the bivariate equation, but not in the multivariate equation. Partial mediation occurs when the independent variable affects the dependent variable both directly and indirectly through the mediator variable. Baron and Kenny (1986) argued that it is unrealistic to completely eliminate the relationship between the independent and dependent variables, and therefore, partial mediation often indicates the presence of a mediating effect.

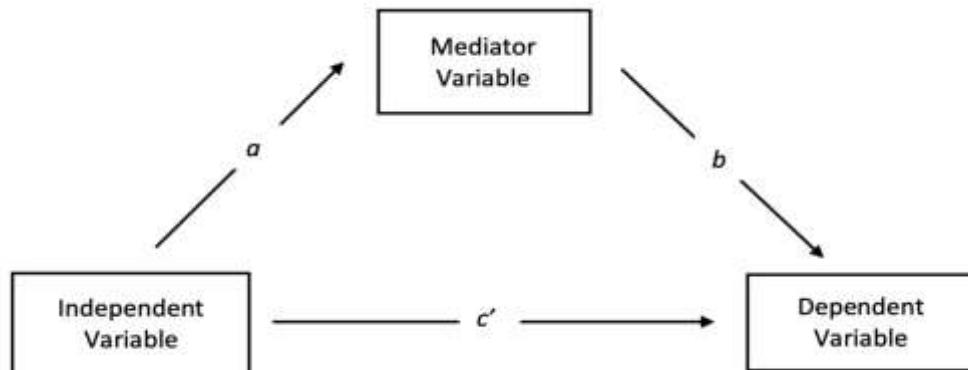


Figure 2. Baron and Kenny's Mediation Model

In light of this information, our study examines the direct effect of brand anthropomorphism (independent variable) on brand trust (dependent variable), the effect of consumers' perceived brand warmth (mediating variable) on brand trust, and finally, the effect of brand anthropomorphism on perceived brand warmth. The results of the analysis are presented below.

The direct effect from Brand Anthropomorphism to Brand Trust (with a coefficient of 0.27).

The indirect effect through Perceived Brand Warmth mediating the relationship between Brand Anthropomorphism and Brand Trust (with coefficients of 0.36 and 0.16, respectively).

In this mediation analysis, we are testing whether Perceived Brand Warmth mediates the relationship between Brand Anthropomorphism and Brand Trust. Here's a breakdown of the results:

1. Path a: Effect of Brand Anthropomorphism on Perceived Brand Warmth

Coefficient = 0.36

This positive coefficient indicates that as Brand Anthropomorphism increases, Perceived Brand Warmth also increases. The relationship is moderately strong.

2. Path b: Effect of Perceived Brand Warmth on Brand Trust, controlling for Brand Anthropomorphism

Coefficient = 0.16

This coefficient shows a smaller but positive relationship between Perceived Brand Warmth and Brand Trust when we control for Brand Anthropomorphism. As Perceived Brand Warmth increases, Brand Trust also increases.

3. Direct Effect (Path c): Effect of Brand Anthropomorphism on Brand Trust, controlling for Perceived Brand Warmth

Coefficient = 0.27

This direct effect shows that Brand Anthropomorphism has a positive and moderate effect on Brand Trust even after accounting for Perceived Brand Warmth.

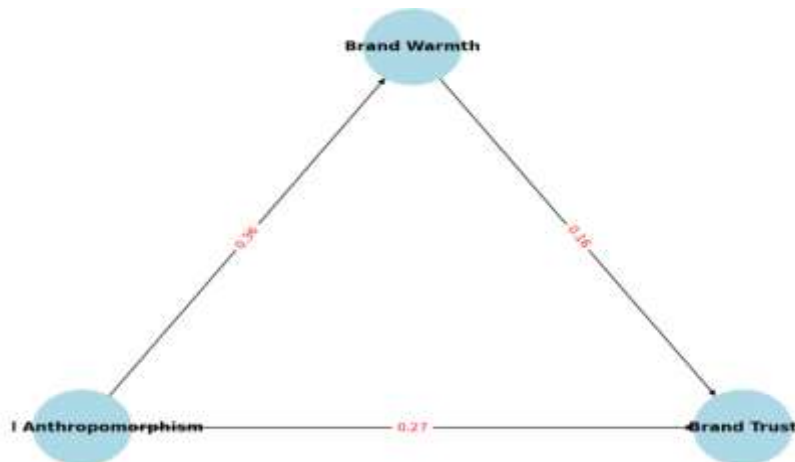


Figure 3. The Relationships Between Brand Anthropomorphism, Perceived Brand Warmth, and Brand Trust

4. Indirect Effect: Product of Path A and Path B

$$\text{Indirect Effect} = 0.36 * 0.16 = 0.06$$

This represents the indirect effect of Brand Anthropomorphism on Brand Trust through Perceived Brand Warmth. A value of 0.06 indicates that part of the effect of Brand Anthropomorphism on Brand Trust is mediated by Perceived Brand Warmth.

Interpretation;

Partial Mediation: Since the indirect effect (0.06) is positive and meaningful, Perceived Brand Warmth partially mediates the relationship between Brand Anthropomorphism and Brand Trust. In other words, Brand Anthropomorphism not only directly influences Brand Trust but also does so indirectly through Perceived Brand Warmth.

Significance: To confirm the significance of the mediation effect, you would typically run a bootstrapping analysis or check for statistical significance (e.g., p-values).

3. CONCLUSION

This study investigates the relationship between brand anthropomorphism and brand trust, focusing on the mediating role of perceived brand warmth. Brand anthropomorphism, which involves attributing human-like characteristics to brands, plays a significant role in fostering trust and emotional connections between consumers and brands. The study primarily examines users of Apple's Siri, exploring how the perceived warmth of anthropomorphized brands influences trust.

We can summarize the findings obtained within the scope of the study as follows

Brand Anthropomorphism and Trust: The results demonstrate that brand anthropomorphism has a positive and significant influence on brand trust. Brands that are seen as having human-like qualities are more likely to be trusted by consumers.

Perceived Brand Warmth as a Mediator: The mediating role of perceived brand warmth was confirmed. The study found that consumers who perceive anthropomorphized brands as warm and friendly are more likely to develop trust in those brands. Specifically, perceived warmth significantly enhances the emotional appeal of a brand, indirectly boosting trust.

The study applied Baron and Kenny's mediation model to test whether perceived brand warmth mediated the relationship between brand anthropomorphism and trust. The analysis found that brand anthropomorphism had a direct effect on brand trust (coefficient = 0.27) and an indirect effect through perceived brand warmth (coefficient = 0.06). This partial mediation suggests that while anthropomorphism directly influences trust, perceived warmth also plays a crucial role in shaping consumer trust.

This study highlights the importance of brand anthropomorphism as a strategic tool for building consumer trust. However, the results indicate that perceived warmth is a key

mediating factor. Brands that are humanized but do not evoke warmth may struggle to build strong consumer trust. For marketers, this emphasizes the need to focus not only on giving brands human-like features but also on ensuring those features convey friendliness and approachability. This is particularly relevant in the context of digital assistants like Siri, where perceptions of warmth significantly impact user trust and engagement.

Brands looking to enhance trust through anthropomorphism should prioritize creating perceptions of warmth, not just human-like traits. Digital assistants and AI-based brands, like Siri, can benefit from humanization strategies that focus on emotional connection, which helps build user trust and loyalty. These findings offer valuable insights for businesses aiming to strengthen their brand trust through anthropomorphization and emotional engagement strategies.

REFERENCES

- Aaker, J., Vohs, K. D., and Mogilner, C. (2010). Nonprofits are seen as warm and for-profits as competent: firm stereotypes matter. *J. Consum. Res.* 37, 224–237. doi: 10.1086/651566
- Aggarwal, P., & McGill, A. L. (2007). Is that car smiling at me? Schema congruity as a basis for evaluating anthropomorphized products. *Journal of Consumer Research*, 34(4), 468-479.
- Baron, R. M. and Kenny, D. A. (1986). “The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations”, *Journal of Personality and Social Psychology*, Vol. 51, No. 6, pp.1173-1182.
- Baumann, C., Hamin, H., & Chong, A. (2017). The Role of Brand Knowledge in Loyalty Programs. *Journal of Retailing and Consumer Services*, 38, 74-82.
- Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On Seeing Human: A Three-Factor Theory of Anthropomorphism. *Psychological Review*, 114(4), 864-886.
- George, D., & Mallery, P. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference* (10th ed.). Pearson.
- Ghorbani, A., Rauschnabel, P. A., Ramanathan, U., & Jung, B. (2022). Anthropomorphism and Artificial Intelligence in Marketing. *Journal of Business Research*, 140, 30-39.
- Golossenko, A., Pillai, K.G., Aroean, L., 2020. Seeing brands as humans: development and validation of a brand anthropomorphism scale. *Int. J. Res. Market.* 37 (4), 737–755.
- Holt, D. (2004). *How Brands Become Icons: The Principles of Cultural Branding*. Harvard Business Press.

Puzakova, M., Kwak, H., & Rocereto, J. F. (2013). When Humanizing Brands Goes Wrong: The Detrimental Effect of Brand Anthropomorphization Amid Product Wrongdoings. *Journal of Marketing*, 77(3), 81-100.

Sharp, B., Dawes, J., & Victory, K. (2024). The market-based assets theory of brand competition. *Journal of Retailing and Consumer Services*, 76, 103566

Wang, Z., Mao, H., Li, Y. J., and Liu, F. (2017). Smile big or not? Effects of smile intensity on perceptions of warmth and competence. *J. Consum. Res.* 43, 787–805. doi: 10.1093/jcr/ucw062

Xue J, Zhou Z, Zhang L and Majeed S (2020) Do Brand Competence and Warmth Always Influence Purchase Intention? The Moderating Role of Gender. *Front. Psychol.* 11:248. doi: 10.3389/fpsyg.2020.00248

Covid-19 Pandemic and its Financial Contagion Effects on Stock Exchange Indices of Developing Countries (E7 Countries)

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Abstract

Introduction: This study examines the correlation of the COVID-19 outbreak on the daily market returns of the stock market indices of developing countries (E-7) and the resulting contagion effect on the markets. Thus, it is aimed to inform decision makers on the causes and consequences of the contagion effect on financial markets during global crisis periods.

Aim: For this purpose, the period between 01.01.2018 and 31.05.2024 was divided into three periods as Pre-Covid-19, Covid-19 process and Post-Covid-19 and analyses were conducted on the stock market data of China, India, Brazil, Russia, Mexico, Indonesia and Turkey, which are called E-7 countries.

Method: Observations between the relevant dates were collected at a daily frequency and a multiple time series data set containing 1613 observations was created. The CCC-GARCH model from MGARCH models was used as the analysis model in the study.

The study was analyzed with the CCC-GARCH model using the MGARCH model. E-7 countries were evaluated independently and crosswise in the model and correlations were sought regarding the contagion effect. The z test was applied to the CCC-GARCH data and the statistical significance of the correlation data was also determined.

Findings: According to the applied CCC-Garch model, the stock market indices with statistically significant volatility spillovers in the entire period sample for E-7 countries are as follows; SSEC-IDX, NIFTY50-MOEX, BVSP-MOEX and S&P/BMV IPC-IDX.

Conclusion: All of the spillovers are positive, the correlation coefficients are quite small. It contains significant results in terms of determining the interaction levels with cross and individual correlation analysis in terms of contagion effect.

Originality and value: The study includes outputs and suggestions for policies that will make the stock and financial markets of developing country decision makers more resilient.

Key Words: Covid-19, Financial Contagion, CCC-Garch

Jel Kodes: G10, G15, G19

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1. INTRODUCTION

A great many pandemic cases have been observed throughout human history. Defined as the mother of all pandemics by Tauenberger and Morens (2006), 1918 H1N1 virus, also known as “Spanish Flu”, the swine flu in 2009, 2012 MERS virus, 2014-2015 Ebola virus are the most widely known viruses which had effect on global economic crisis and happened in the last century. Belser ve Tumpey, 2018:255; Salısu, Sıkıru ve Vo, 2020:40; Taubenberger ve Morens, 2006:69, Eyceyurt Batır) In the meantime of these pandemics which did not have inhibitive and global scale limitations, authorities did not follow the way of limitations at cities or countries scale. (Eyceyurt Batır ve Salihoğlu, 2021: 492). The COVID-19 pandemic is a kind of pandemic which originated in a small bazaar in Wuhan city, situated at Hubei State of China. WHO, declared the COVID-19 epidemic as pandemic in March 12, 2020. Although the pandemic originated and spread in China, more than 200 hundred countries suffered more than 37 million cases and again more than one million casualties. The anxiety and panic created by the pandemic causing more than a million peoples’ death with an unprecedentedly quick and complex spread, certainly affected social, cultural and economic activities.

Though it did not have direct economic causes, the topic of this research are the pandemic’s effects on the economy and financial contagiousness investigation of the COVID pandemic, affecting finance at global scale and causing a worldwide crisis. Along with the globalization’s effects, interactions among the markets affect the related parties and thus these interactions frequently result negatively. The search of reality for predicted negative interactions along with data, the solution to this problem in the light of results and presenting an opinion to the interested parties are the goals of this study. The aim of our study is, in a period during which the effects of Global Finance Crisis of 2008 still prevail, to compare and assess the COVID-19 pandemic’s contagiousness and effects over financial markets with the counterparts of previous years. In other words, it is aimed to investigate the interactions.

In this study, the data derived from indexes of SSEC, NIFTY 50, BVSP, MOEX, S&P/BMV IPC, IDX ve BIST 100 belonging to countries known as E-7 countries; China, India, Brazil, Russia, Indonesia and Türkiye. The developing countries, E-7, seven improving countries, are separated apart from other country groups due to the fact that they have relatively higher economic growth. Keeping these causes in mind, the data from E-7 countries composing the substantial part of global economy were used in this study. Stock market profit index data are collected from investin.com website on daily basis. Formal holidays and weekend holidays were excluded from data of all countries. Hence, the analyzed data were calculated over the dates that stock market of all countries are open.

2. LITERATURE REVIEW

Khan and et al. (2020) used the Least Squares, t-test, Mann-Whitney tests to analyze the effects of COVID-19 on primary stock market index of the world. According to the results of the study, the growth of new cases has negative and important effect on stock market indexes. Furthermore, the result of the study indicate that the stock market indexes did not react to any news report in the early stages of the pandemic.

Thorbecke (2020), while investigating the effects of COVID-19 over the economy of the USA, used the regression analysis to investigate the effects of macroeconomic variables over stock market shares profit in the USA sectors. According to the results of the study, due to the effects of COVID-19 manufacturing machinery and electrical equipment industry caused macroeconomic factors caused a great many losses. Besides, the result of the study show that during the sample period between February 19-July 10 2020 airways, aviation, estates, tourism, oil, brewery, retail clothing and funeral sectors suffered loss due to the factors which are related to these sectors. The Least Squares method was applied in the study to yield best and most suitable regression model.

Höhler and Lansink (2020) employed Linear Regression Model and CAPM to measure the effects of COVID-19 on stock market prices in food supply chain and profits. According to the result of the study, the stock shares of fertilizer and farm chemicals producers and food distributors had great fluctuations with the effects of COVID-19 pandemic.

Gunay (2020),stating that the COVID-19 pandemic had a different contagiousness and triggered a more severe version, investigated the effects of pandemic over six different stock market. The researcher investigated the effects of COVID-19 over six different stock markets of countries; the USA, the UK, China, Italy, Spain and Türkiye. He defined four different stages to be able to see the behaviors of different periods and compare these with the pandemic period as such: January 3 2005-December 31 2015, January 4 2010 – December 31 2015, January 2-November 29 2019, January 2 2016-November 29 2019 and January 2- April 3 2020. The M-ICSS test results show that all stock markets suffered structural fractures during the period of January 3 2005- April 3 2020.

Ashraf Badar Nadeem (2020) uses Least Square method to analyze the effects of COVID-19 related government actions like public awareness programs, test and quarantine policies and economic support programs over stock market profits. According to the test results, while the government's declarations about social distance measures had negative effects on the stock market profits; the declarations about public awareness programs, test and quarantine and social support policies had positive effects on stock market profits.

Sansa Nuhu A used a simple regression model to investigate the effects of COVID-19 over Shanghai Stock Market for China and the New York Dow Jones for the USA. According to the results of the study, the confirmed COVID-19 cases had important and

positive effects over Shanghai Stock Market for China and the New York Dow Jones for the USA from March 1 2020 to March 25 2020.

2.1. Financial Contagion

Contagion is explained as the spread of any positive or negative shock effect in a stock market to the others. In accordance with this, while the contagion effect can be more effective during crisis periods, it can also occur in times of good economic process. The reasons behind the spread of shock effect from one country to another can be defined as: the economic ties between them, investor behaviors, stock market flaws (imperfect markets). According to another definition; notwithstanding its cause, the spread effect from one country to the through any means is accepted as contagion (Budak,2017:453).

2.2. The Reason of Financial Contagion

Financial contagion is the outreach of locally originated financial problems to different societies over the boundaries. This contagion, with the support of some kind of systemic risks, occurs at the rate and severity of these risks. The reasons behind the financial contagion are mainly classified as: (Dornbush and Claessens (2000; Tiryaki, H. and Ekinici, A.9)

- **Common Shocks**

Common shocks are the exposure of some countries to a common global or local external shock. For the underdeveloped countries whose economic foundations resemble each other common shocks are the changes in world interest rates, the changes between their main currency and exchange rate, commodities and goods prices and the crisis occurring in developed industrialized countries.

- **Commercial Ties and Competitive Devaluation**

A crisis happening in an economy may certainly have an effect on the foundations of another economy. One of the causes behind this is the commercial ties. Supposing that there is a financial crisis resulting in a devaluation in a large commercial partner of a country, that country may also encounter sharp falls in commodity prices or large amount of capital outflows, speculative attacks in view of the fact that the investors will think that country will have a fall in the trade with its crisis suffering trade partner country and thus resulting in the defects in the trade calculations of that country.

- **Financial Ties / Connections**

The integration of a country's economy to the world markets demands financial and trade ties. Owing to these ties, a crisis seen all over the world or in an integrated region has a direct effect on other countries.

- **Investors' Behaviors**

Supposing that a country's economy is firmly integrated to global or regional financial markets, these financial markets are the mechanism that triggers the co-movement of commodity prices among these countries.

- **Liquidity and Promotion Problems**

For instance, during East Asia crisis the loss of value in the currencies and fall in commodity prices of countries affected at the early times of it along with Thailand caused in the great loss for international investors. These losses diverted the investors to sell their assets in other developing countries as a compensation for their loss in these countries and to increase the liquidity. During this period, the limitations of liquidity affected commercial banks which mainly granted credits to these regions.

3. RESEARCH METHODOLOGY

According to the literature, if a crisis in a country spreads to other countries the index data, interest rates and currencies are taken into account; if the asset price volatility spreads the prices of assets are taken into account. In this study, the contagiousness term which is the spread of crisis in a country to the others is taken into consideration. In order to investigate the presence of contagion in the financial markets of developing (E-7) countries, the daily stock market profit indexes are employed as variables. The study is divided into periods and analyzed so as to perform detailed investigations and have a comparison between the periods.

3.1 Research Model and Hypothesis

3.2 Explanation of Scales

The aim of our study is, in a period during which the effects of Global Finance Crisis of 2008 still prevail, to compare and assess the COVID-19 pandemic's contagiousness and effects over financial markets with the counterparts of previous years. In other words, it is aimed to investigate the interactions.

3.3 Data Analysis

3.3.1. Research Model

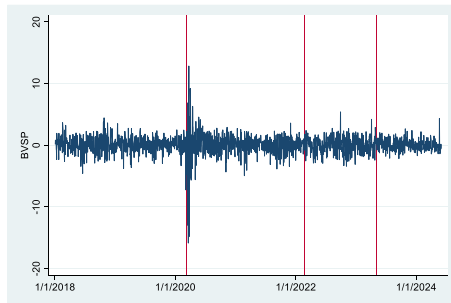
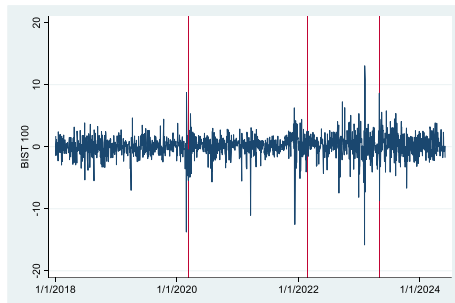
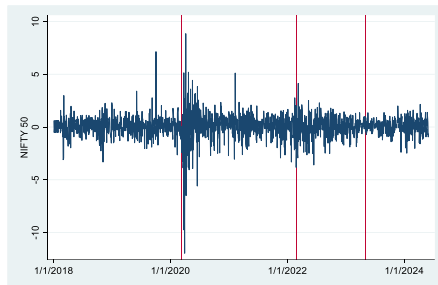
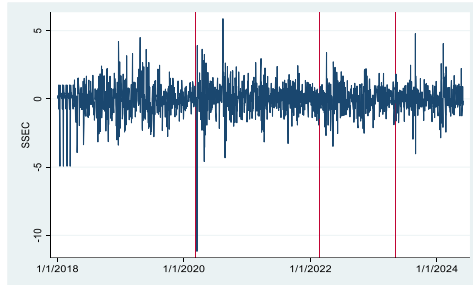
According to the literature, if a crisis in a country spreads to other countries the index data, interest rates and currencies are taken into account; if the asset price volatility spreads the prices of assets are taken into account. In this study, the contagiousness term which is the spread of crisis in a country to the others is taken into consideration. In order to investigate the presence of contagion in the financial markets of developing (E-7) countries, the daily stock market profit indexes are employed as variables. The study is divided into periods and analyzed so as to perform detailed investigations and have a comparison between the periods. The most widely used empiric model in the studies observing the contagion effects of financial crisis, M-GARCG (CCC-GARCH) is also employed in this study.

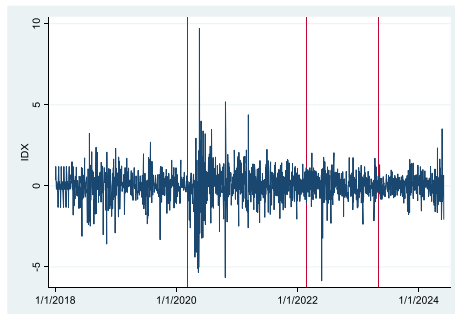
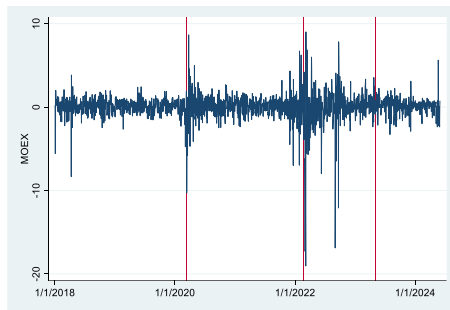
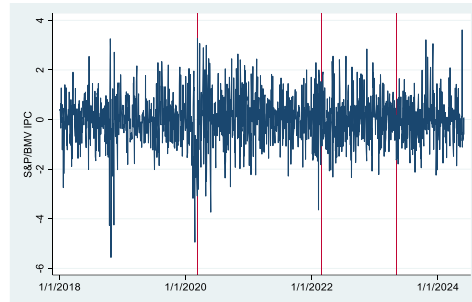
3.3.2. Descriptive Statistics

As the analysis period for COVID-19 the dates of 01.01.2018-30.05.2024 are selected. For the pre-crisis period the dates of 01.01.2018-31.09.2019 are selected. For the crisis period the dates of 01.10.2019-31.08.2021 are selected. For the post-crisis period the dates of 01.10.2019-31.08.2021 are selected. The stock market index data were daily gathered from investing.com website. The formal holidays and weekend holidays were excluded from the data of all countries. Hence, the analyzed data were collected from the same dates when the stock markets of all countries were open. The analysis of the study was performed utilizing the Stata 14.0 program.

For the whole sample period, the stock market profit averages are positive, except for China (SSEC). During the whole period, the highest daily profit was in Turkish (BIST 100) stock market, the highest daily loss was in Brazil (BVSP). For the whole sample period, the highest standard deviation value was observed in BIST 100 stock market. For the sample period before the COVID-19, the average stock market profits were positive except for Russia (MOEX). For the sample period before the COVID-19, the highest daily profit and highest daily loss was observed in Turkish (BIST 100) stock market. For the sample period before the COVID-19, the highest standard deviation value was observed in Turkish (BIST 100) stock market. For the sample period after the COVID-19, the stock market profit averages are positive, except for China (SSEC). For the sample period after the COVID-19, the highest daily profit and highest daily loss was observed in Turkish (BIST 100) stock market. For the sample period after the COVID-19, the highest standard deviation value was observed in Turkish (BIST 100) stock market.

Table 1: The Time Process Graphics of Stock Markets Index Profits in E-7 Countries





In these graphics, the first vertical line in the timeline shows the beginning of CPVID-19 pandemic, second vertical line shows the beginning of Russia-Ukraine war, third vertical line shows the end of COVID-19 pandemic. In India (NIFT 50) and IDX stock markets, a rise of volatility was observed with the declaration of pandemic. However, in MOEX stock markets the rise of volatility was observed after the beginning of war. In other stock markets, the changes on the day of pandemic declaration were remarkably high and these changes did not continue in the following days, though.

3.3.3. Unit Root Tests and Arch-Lm Tests

As the results of unit root tests, the profits of stock market index in all countries were linear stable series in terms of whole period and sub sample periods. Linear stable series as such to define $I(0)$ and time series analysis were decided to pursue since there were no obstacles in terms of being nonstationary. In accordance with the ARCH-LM tests performed to the stock market indexes of the countries, as some stock market index profits did not have the ARCH effect for some sub samples, the mentioned stock market indexes were excluded from the related sub samples. On the other hand, as the variant in GARCH model did not meet the conditions of being positive and having end, for the mentioned sub samples it was excluded from the model in the M-GARCH predictions.

Table 2: Unit Root Tests for E-7 Countries

Stock Markets (E-7)	Whole Period	Before Covid-19	During Covid19	After Covid19
SSEC	$\chi^2(1)=12.303^{***}$	$\chi^2(1)=14.446^{***}$	$\chi^2(1)=2.131$	$\chi^2(1)=22.092^{***}$
NIFTY 50	$\chi^2(1)=66.627^{***}$	$\chi^2(1)=3.609^*$	$\chi^2(1)=31.519^{***}$	$\chi^2(1)=0.658$
BIST 100	$\chi^2(1)=168.649^{***}$	$\chi^2(1)=32.112^{***}$	$\chi^2(1)=89.521^{***}$	$\chi^2(1)=3.444^*$
BVSP	$\chi^2(1)=25.259^{***}$	$\chi^2(1)=9.968^{***}$	$\chi^2(1)=13.341^{***}$	$\chi^2(1)=0.119$
S&P/BMV IPC	$\chi^2(1)=301.715^{***}$	$\chi^2(1)=1.566$	$\chi^2(1)=114.905^{***}$	$\chi^2(1)=0.242$
MOEX	$\chi^2(1)=66.601^{***}$	$\chi^2(1)=8.683^{***}$	$\chi^2(1)=30.788^{***}$	$\chi^2(1)=4.673^{**}$
IDX	$\chi^2(1)=129.821^{***}$	$\chi^2(1)=21.432^{***}$	$\chi^2(1)=61.071^{***}$	$\chi^2(1)=3.971^{**}$

3.3.4. ICSS Tests

In the series of stock market index profits of SSEC, NIFTY 50, MOEX and IDX, no structural breaking was observed at the date of 11.03.2020. For the the series of stock market index profits of BIST 100, BVSP ve S&P/BMV IPC, it can be said that there was a structural breaking was spotted for the dates of 11.03.2020.

For the date of 05.05.2023, which is the end of pandemic, no statistically meaningful structural breaking was spotted for the all stock market index profit series except for IDX. For the IDX index profit series, a meaningful structural breaking of %10 was observed.

Table 3: ICSS Tests for E-7 Countries

Stock Markets- E7	Structural Break	
	11.03.2020	05.05.2023
	Beginning of Covid-19 Pandemic	End of Covid-19 Pandemic
SSEC	$\chi^2(2)=0.585$	$\chi^2(2)=1.184$
NIFTY 50	$\chi^2(2)=1.235$	$\chi^2(2)=0.276$
BIST 100	$\chi^2(2)=7.288^{**}$	$\chi^2(2)=4.329$
BVSP	$\chi^2(2)=11.183^{***}$	$\chi^2(2)=2.189$
S&P/BMV IPC	$\chi^2(2)=12.285^{***}$	$\chi^2(2)=1.071$
MOEX	$\chi^2(2)=0.139$	$\chi^2(2)=1.819$

3.3.5. CCC-GARCH Analysis Results

In the sample including whole study period, when individual GARCH (1,1) models are observed, it is clear to see that for all stock markets index profits the variant equation meets the conditions of being positive and has an end. ($\alpha_i > 0$, $\beta_1 > 0$, $\alpha_1 + \beta_1 < 1$) When stock market indexes are separately observed, it can clearly be seen that the highest short term shock effect was in IDX stock index ($\alpha_1 = 0.2134$, $p < 0.01$), the highest long term shock effect was in Russia (MOEX) stock market index ($\beta_1 = 0.90214$, $p < 0.01$).

When observed for the permanence of shock, however, the highest shock permanence was spotted in India (NIFTY 50) stock market index ($\alpha_1 + \beta_1 = 0.96852$).

For the E-7 countries, the conditions of being positive and has an end were met for the all stock market index profits included in the model of before COVID-19 period ($\alpha_i > 0$, $\beta_1 > 0$, $\alpha_1 + \beta_1 < 1$). When stock market indexes are separately observed, the highest short term shock effect was seen in India (NIFTY 50) ($\alpha_1 = 0.43077$, $p < 0.01$), the longest period shock effect was in Türkiye (BIST 100) ($\beta_1 = 0.76759$, $p < 0.01$). when observed in terms of the permanence of shock, the highest was in Türkiye (BIST 100) ($\alpha_1 + \beta_1 = 0.88973$).

For the E-7 countries, the conditions of being positive and has an end were met for the all stock market index profits included in the model of during COVID-19 period

($\alpha_i > 0$, $\beta_1 > 0$, $\alpha_1 + \beta_1 < 1$). When stock market indexes are separately observed, the highest short term effect was in Türkiye (BIST 100) ($\alpha_1 = 0.30766$, $p < 0.01$), the highest long term short effect was in India (NIFTY 50) ($\beta_1 = 0.85992$, $p < 0.01$). When observed in terms of the permanence of the shock, the highest shock permanence can be seen in India (NIFTY 50) stock market.

For the E-7 countries, the conditions of being positive and has an end were met for the all stock market index profits included in the model of after COVID-19 period ($\alpha_i > 0$, $\beta_1 > 0$, $\alpha_1 + \beta_1 < 1$). When stock market indexes are separately observed, short term shock effect can be seen more in Russia (MOEX) stock ($\alpha_1 = 0.20768$, $p < 0.01$), the long term shock effect can be seen higher in China (SSEC) ($\beta_1 = 0.78584$, $p < 0.01$). When observed in terms of the permanence of the shock, the permanence in Russia (MOEX) stock market index can be seen to be higher ($\alpha_1 + \beta_1 = 0.93974$).

4. CONCLUSION

In the light of data collected in this study, a statistically meaningful volatility distributions were observed in different periods between different stock market indexes. For the mentioned stock market pairs, it can be said that the volatility in any of the stock markets may increase the volatility in the other stock market. For the all periods of investigation (before, during and after the financial crisis), the relation of stock market profit in developed countries is higher than the counterparts in developing countries. Furthermore, it can be said that the higher is the relation the more integration between these mentioned stock markets. This finding, supports the studies in the literature indicating that rising integration increases the effect of contagion. Our study presents evidences for the existence of financial contagion. This research is going to have contribution to the literature in terms of financial contagion of global crisis.

REFERENCE

- Ashraf, B. N. (2020). ‘‘Stock markets’ reaction to COVID-19: Cases or fatalities?’’. *Research in international business and finance*, 54, 101249.
- Budak, H.Z. (2017). ‘‘Finansal Bulařma Üzerine Bir Literatür İncelemesi’’. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi*, Cilt: 39, Sayı: 2, ss/pp. 451-472.
- Eyceyurt Batır, T., Salihođlu, E. (2021), ‘‘Covid-19’un Kısıtlamalardan Etkilenen BIST Sektör Endeks Getirileri Üzerindeki Etkisi ‘‘Seçilmiş Sektörler Üzerine Bir Uygulama’’, *Muhasebe ve Finansman Dergisi*, 491-500.
- Gunay, S. (2020). ‘‘A new form of financial contagion: Covid-19 and stock market responses’’. Working Paper SSRN 3584243. (accessed on 1 December 2020).Nwosa (2021), and profits in the food supply chain. *Agribusiness*, 37(1), 171-186.
- Höhler, J., & Lansink, A. O. (2021). ‘‘Measuring the impact of COVID-19 on stock prices and profits in the food supply chain’’. *Agribusiness*, 37(1), 171-186.

Khan, S., Siddique, R., Xiaoyan, W., Zhang, R., Nabi, G., Sohail, Afzal, M., Liu, J., VE Xue, M. (2021). ‘‘Mental health consequences of infections by coronaviruses including severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)’’. *Brain Behavior*, 11(2).

Sansa, N. A. (2020). ‘‘The Impact of the COVID-19 on the Financial Markets: Evidence from China and USA’’. Guangxi University, China.

Thorbecke, W. (2020). ‘‘The impact of the COVID-19 pandemic on the US economy: Evidence from the stock market’’. *Journal of Risk and Financial Management*, 13(10), 233.

Tiryaki, H. N. ve Ekinci, A. (2015). ‘‘Finansal Bulařıcılık erevesinde Kresel Kriz ve Trkiye’ye Etkileri’’. *Sakarya İktisat Dergisi*. 1-30.

Strategic Areas of the Consumer Cooperatives Sustainable Development in the Republic of Moldova

Larisa Savga³⁷, Ghenadie Savga³⁸

Abstract

Introduction: Cooperatives play a significant role in the modern economy, being an important actor of the social economy and contributing to economic, social and environmental sustainability.

Aim: The purpose of this research is to analyze the evolution of consumer cooperatives in the Republic of Moldova and to identify the strategic development areas of this sector.

Method: A complex methodology was used to carry out the research. This included the literature review, analysis of relevant national development policies, sectoral development strategies and programs. The normative and strategic European and international framework for the development of cooperatives was studied. For the analysis of the socioeconomic context of the consumer cooperative activities in Moldova, there were used managerial analysis methods, economic and statistical methods, the survey, and interviews with relevant actors.

Findings: Cooperatives can significantly contribute to solving societal problems, including employability, poverty reduction, social inclusion, environmental protection, and community development. They are viable in various extreme conditions and are resilient to crises and challenges. The sustainable evolution of Moldovan cooperatives requires well-grounded strategies, anchored in the country's realities and oriented towards European integration perspectives.

Conclusion: The identification of strategic directions and actions for the development of consumer cooperatives will boost their evolution and increase their contribution to sustainable socioeconomic development.

Originality and value: The obtained results are both original and valuable. They formed the basis of the Consumer Cooperatives Development Strategy in the Republic of Moldova until 2030, which is going to be approved at the Congress.

Key Words: consumer cooperatives; strategic development

Jel Codes: M10; M21; O21; P13

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1. INTRODUCTION

Cooperatives play an important role in contemporary society due to their impact on the socio-economic development of any country. Thanks to the diversity of activities they promote, the level of public involvement, and their contribution to improving quality of life and community development, cooperatives have become a significant pillar in international and European economic development, social cohesion, and inclusion policies.

According to the International Cooperative Alliance (ICA), there are over 3 million cooperatives worldwide, encompassing more than one billion members. Cooperatives provide over 280 million jobs globally, accounting for 10% of the total employed population (International Cooperative Alliance. (n.d.-b.)). The European Division of ICA—Cooperatives Europe (CoopsEurope) represents 140 million members, 4.7 million employees, and 180,000 enterprises, focusing on activities related to innovation, sustainable development, economic growth, and social cohesion (Cooperatives Europe (n.d.-b.)). An important sector of the cooperative movement is that of consumer cooperatives. In Europe, this sector is represented by the European Community of Consumer Cooperatives (EuroCoop), which brings together 30 million consumer-members (or 21.3% of the total membership in Europe), 750,000 employees (14.9%), and manages an infrastructure of 94,000 sales points (EuroCoop (n.d.-b.)). These figures demonstrate the scale and importance of cooperatives and the organizations that represent them in the global and European economic and social systems.

The consumer cooperatives in the Republic of Moldova have evolved over decades as an important component of the national economic system. Throughout its 155-year history, the consumer cooperative movement has faced numerous challenges and undergone profound transformations. Yet, it has managed to respond to the demands of the times, maintaining its place within the national economic system and contributing to its development through the diversity of activities it promotes, the level of public involvement, and its contribution to improving the quality of life and addressing community issues. Even in the face of recent challenges, such as the COVID-19 pandemic, the regional war, geopolitical tensions, the energy crisis, demographic pressures, and others, cooperative organizations and enterprises have continued their economic activities, which have a deep social character, serving their members and the community.

The intensification of globalization processes, climate change, the rapid digitalization of activities in all spheres of human endeavor, the advanced technologization of business processes, and other global mega-challenges necessitate a shift in the development paradigm of consumer cooperatives and the adoption of new visions and concepts for the development of the cooperative system. The importance of this goal has increased with the Republic of Moldova's attainment of candidate status for EU integration (2022) and the opening of accession negotiations by the European Council (December 2023),

through which our country, along with the cooperative sector, has committed to aligning with the European framework.

In this context, identifying the strategic directions and objectives for the development of consumer cooperatives in the Republic of Moldova until 2030 takes on significant importance. The purpose of this research is to analyze the development trends of consumer cooperatives in the Republic of Moldova, highlight the challenges they face, assess the internal needs for change, and establish strategic priorities and future action directions to ensure the sustainable development of the cooperative system in the country. The results of this research formed the foundation for the draft of the Consumer Cooperatives Development Strategy in the Republic of Moldova until 2030.

2. LITERATURE REVIEW

The importance of research in the field of cooperatives is due to the size of the cooperative sector at the international level and the impact of their activities on society. Research into cooperatives, particularly in identifying innovative solutions for cooperative development, is of interest to various research and educational institutions as well as researchers from different countries.

For instance, cooperative theory is explored by Grashuis and Cook (2018) and Elliott and Olson (2023). Issues related to the legislative regulation of cooperative activities are studied by Cracogna, Fici, and Henry (2013) (renowned experts in cooperative law). Topics concerning the social capital of cooperatives are examined by Saz-Gil, Bretos, and Díaz-Fonca (2021). The role of cooperatives in the social economy is a focus of authors such as Borgaza, Dependi, and Ermanno (2009). The nature of cooperative activities is studied by Menard (2004), Petrescu (2013), and Crisan (2010). Works dedicated to arguing the cooperative business model are examined by Birchall and Ketilson (2009), Zeuli (2004), and Novkovic (2006). Models of cooperative governance and performance measurement are researched by Banaszak and Beckmann (2009), Jamaluddin, et al. (2023). The study of the typology and diversity of cooperative organizational forms is addressed by Corcodan and Wilson (2010), Lambriu and Petrescu (2014), while the consolidation of indigenous knowledge, human rights, and the principles and values of cooperation are examined by Settee (2019), among others.

International organizations are also concerned with the issues related to cooperative development. Various studies and publications reflect contemporary aspects of cooperative activities, their involvement in addressing societal issues, and their impact on sustainable socio-economic development (UN, OECD, ILO, ICA, Cooperatives Europe, EuroCoop, etc.).

The most recent research findings from scholars worldwide on cooperative issues are published in the Review of International Co-operation, edited under the auspices of the ICA Committee on Cooperative Research, Annals of Public and Cooperative Economics, edited by CIRIEC, and other publications. At the national level, research on cooperative development is presented in the Journal of Research on Trade, Management and Economic Development, edited by Trade Co-operative University of Moldova, in

monographs (Şavga (Ed.) (2019), Şavga (2018)), and in publications by researchers from the Republic of Moldova (Iordachi, Şavga, and Perciun (2023), Şavga (2023), Şavga and Liviţchi (2021), etc.).

It is also important to note that research on the design of development strategies for cooperatives is less frequently reflected in specialized publications, even though this aspect holds significant importance. A well-founded medium-term development strategy ensures the progress and sustainability of cooperative activities and contributes to improving the population's well-being. Strategic planning for the development of cooperatives at the national level must consider the specific operating conditions of cooperatives, the challenges of the internal and external environment, and the best practices and performance of cooperative activities in other countries and regions.

3. RESEARCH METHODOLOGY

To carry out this research, a comprehensive methodology was employed, which included:

- Analysis of relevant national policy documents, including the National Development Strategy “European Moldova 2030”, sectoral development strategies and programs, evaluation reports on their implementation, and the progress made in the field.
- Study of the European and global normative and strategic framework for cooperative development, including consumer cooperatives, as well as their evolving trends and visions.
- Evaluation of recommendations from international organizations and decisions from European institutions regarding the support of cooperatives as a sustainable business model in economic, social, and environmental terms.

The diagnosis of the socioeconomic context of consumer cooperative activities in the country was based on data provided by the Central Union of Consumer Cooperatives of Moldova (Moldcoop), cooperative organizations, analysis of the implementation of the Cooperative System Development Strategy for 2020-2023, the current situation through a SWOT analysis, and the evaluation of the challenges facing the consumer cooperative system in the country.

The identification of development prospects for consumer cooperatives in the Republic was conducted through online surveys, interviews, and consultations with employees, cooperative members, decision-makers, and other stakeholders, as well as through field visits. This process also considered future national socioeconomic developments, the international growth of cooperatives, and the perspective of Moldova’s integration into the European Union.

All these factors served as the foundation for identifying the vision, strategic intervention areas, and actions necessary to ensure the sustainable development of consumer cooperatives by 2030. A comprehensive methodological toolkit was employed in the research, which included economic analysis methods, statistical analysis, synthesis, surveys, interviews, benchmarking, forecasting, and more.

4. CURRENT STATUS OF THE CONSUMER COOPERATIVE SYSTEM IN THE REPUBLIC OF MOLDOVA AND STRATEGIC DEVELOPMENT DIRECTIONS

4.1. Trends in the Development of Consumer Cooperatives and the Factors Influencing their Evolution

An important role in implementing national and sectoral economic and social policies falls to the cooperative sector in the country, including consumer cooperatives. Over its evolution, this system has established itself as one of the largest organized systems in the country. At the same time, the cooperative system has gone through various periods of growth and decline, enduring the impact of global economic crises and internal challenges.

In recent years (starting in 2020), given the specific conditions related to the COVID-19 pandemic, regional war, and energy crisis, cooperative organizations and enterprises have continued their economic activities, including offering a wide range of services such as retail and wholesale trade, purchasing agricultural products, animal products, and other goods, processing these products, and providing various services, including educational, market, and public catering services, serving their members and the community within their area of operation.

Currently, the consumer cooperative system includes about 56,000 cooperative members; 118 economic agents, including 74 consumer cooperatives; 1,344 retail units; 144 public catering units; and 21 markets. The consumer cooperative sector is present in approximately 700 localities nationwide, serving the population, predominantly in rural areas. Throughout its existence, it has developed its own educational system, which now integrates four educational institutions representing technical and higher education.

Particular attention has been given to infrastructural development, the rational use of available resources, and the efficiency of promoted activities, which has influenced the operations of cooperatives in recent years (Figure 1).

The data presented in Figure 1 demonstrate the negative impact of the COVID-19 pandemic on the activities of the consumer cooperatives in the Republic of Moldova, particularly in 2020. In the following years, there is already a noted positive development trend. Thus, in 2023, retail sales amounted to 840 million lei, marking a 7% increase compared to 2020 and a 5% increase compared to 2016. Wholesale sales more than doubled compared to 2020, reaching 582 million lei, and increased by 44.3% compared to 2016. Paid service provision to the population increased by 61.2% and 24.1%, respectively. The purchase of agricultural, animal-origin, and other types of production increased by 2.1 and 2.3 times, respectively. The manufacturing of industrial products shows a general decreasing trend throughout the analyzed period—by 2023, it constituted 66.3% compared to 2016.

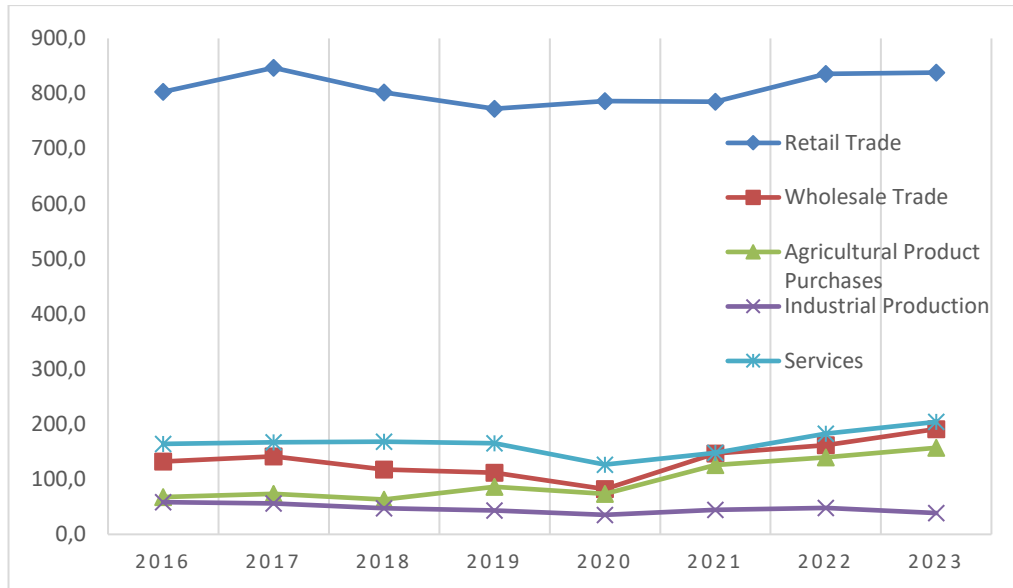


Figure 1. Volume of Retail Sales, Wholesale, Agricultural Product Purchases, Industrial Production, and Services in Consumer Cooperatives (mil. lei)
 Source: Moldcoop Information

In the structure of the strategic planning periods for Moldcoop's activities (2016-2019 and 2020-2023), it is noted that in the last period (2020-2023), the turnover in consumer cooperatives amounted to 3,817.4 million lei, increasing by 8.4% compared to the previous period. Gross income increased by 12.5%, and net profit by 58.2%. These trends facilitate the maintenance of the financial and economic stability of the cooperative system.

However, the lack of necessary investments and the system's unattractiveness to external investors remain significant barriers to the sustainable development of consumer cooperatives in the long term. Even under these conditions of financial resource insufficiency, the cooperative system invested around 50 million lei in its development in recent years.

To identify the internal and external factors influencing the activities of consumer cooperative entities and to develop strategies that capitalize on strengths, mitigate weaknesses, exploit opportunities, and manage threats, a SWOT analysis of the consumer cooperative system was conducted.

The *strengths* identified include:

- the social base of the consumer cooperative system; comprised of cooperative members who join voluntarily and contribute to the cooperative's social capital;
- the existence of a specific legislative framework for the operation of consumer cooperatives at both national and international levels;

- the organizational unity of the consumer cooperative system and established internal relationships;
- a management system based on democratic principles and participatory management;
- a continually developing infrastructure (technical and material base);
- the global presence of cooperatives and support for the cooperative movement worldwide;
- promotion of social, ethical, and sustainable cooperative values;
- experience in cooperative activities accumulated over decades;
- contribution to the implementation of national development programs;
- contribution to rural development, community growth, and local development, including in remote areas;
- a proprietary educational system represented by various levels of vocational education (technical, higher, and continuous training).

In the SWOT analysis the *weaknesses* impacting the consumer cooperative system were identified. These weaknesses include:

- the imperfection of the regulatory framework concerning consumer cooperatives;
- reduced interest from members in supporting and developing cooperatives;
- low level of member involvement in cooperative businesses and responsibility for their outcomes;
- underutilized technical and material base, partially outdated, and not fully used;
- irresponsibility of some managers and employees in cooperative entities regarding the results and efficiency of economic and financial activities;
- insufficient financial resources for implementing extensive modernization programs, retechnology, and business expansion;
- limited access to external financing from international funds and programs;
- unattractiveness of the consumer cooperative system for external investments;
- limited capacity to compete with large retail chains offering lower prices;
- an imperfect system of property relations and motivation;
- insufficient awareness among the population, authorities, and society in general about the benefits offered by consumer cooperatives.

Based on the analysis of the economic environment, internal market trends, market needs, collaboration opportunities, and other aspects, the following development *opportunities* for consumer cooperatives were highlighted:

- improvement of existing legislation, aligning it with internal needs and EU acquis;
- recognition of the identity and role of cooperatives in society and support from national authorities for consumer cooperative activities, as recommended by international institutions, and synergistic cooperation with public authorities at all levels;

- recruitment of new members and strengthening the cooperative member community;
- increasing credibility of the national cooperative system from foreign partners and attractiveness for external investments;
- diversification of cooperative activities according to societal needs and international best practices;
- enhancement of integration and associative processes, creation of strategic alliances involving cooperative entities and interested partners;
- implementation of modern production, commercial, and business management technologies, and modernization of cooperative enterprises' infrastructure;
- optimization of the cooperative system's structure and managerial reengineering;
- penetration into new internal markets and market niches (urban, regional, agri-food products, etc.) and into external markets;
- development of an integrated information system within consumer cooperatives;
- investment in modern technologies;
- increasing trust in the products, services, and performance of consumer cooperatives, and implementing consumer loyalty programs;

Among the *threats* that could pose dangers and obstacles to the evolution of consumer cooperatives and the achievement of their mission and objectives are:

- economic fluctuations or recessions with adverse economic and social effects;
- decreased interest in joining consumer cooperatives and participating in their activities and management;
- underestimation of the consumer cooperative system by public authorities and the role it plays in implementing the state's social policies;
- lack of or imperfect mechanisms for supporting social cooperative activities in remote areas or those with small populations (economically unviable);
- persistent contradictions between consumer cooperative legislation and other legislative acts;
- increased impact of the economic-financial crisis and regional conflicts;
- reduction in income and purchasing power of cooperative members and consumers; and changes in the population's consumption expenditure structure;
- limited financial capabilities for investments and development projects;
- declining demographic trends in the country, labor migration, and changes in population and demand;
- unfair competitive environment in the domestic market, maintaining unfair competition;
- low attractiveness of consumer cooperatives for engaging young people in their activities.

The SWOT analysis conducted, the survey of members and employees of consumer cooperatives, consultations with decision-makers, and the evaluation of international and European policies and experiences in the cooperative sector have provided the necessary

informational support for defining the strategic development priorities of consumer cooperatives through the end of the current decade.

4.2. Strategic Directions for Consumer Cooperatives Development until 2030 and the Impact of their Implementation

Based on the analysis of the current status of consumer cooperatives in the country, the challenges faced by this system, national development policies, trends, perspectives, and international practices in the cooperative sector, three pillars, four strategic areas, and priority strategic objectives for future intervention have been identified to ensure the sustainable development of the consumer cooperative system in the Republic of Moldova until 2030.

These pillars include:

- strengthening the identity, visibility, and attractiveness of consumer cooperatives;
- enhancing the capacities (structural, infrastructural, financial, economic, technological, investment) and technological innovation of the consumer cooperative system;
- strengthening and expanding multidimensional cooperation.

In our view, the main strategic areas requiring undeniable intervention and the strategic objectives to be achieved for revitalizing the development of consumer cooperatives are summarized as follows (Table 1).

For each of these strategic objectives, priority actions have been identified to achieve the strategic mission of consumer cooperatives by 2030. These areas, objectives, and strategic actions for the development of consumer cooperatives in the country are included in the draft of the Consumer Cooperatives Development Strategy in the Republic of Moldova for the 2030 horizon. This draft was developed at the request of the Central Union of Consumer Cooperatives of Moldova (Moldcoop) by the research team led by one of the authors of this paper (Larisa Şavga) and is to be approved at the Consumer Cooperatives Congress in September 2024.

The Strategy is based on the premise that consumer cooperatives can play a valuable role in socio-economic development by achieving major objectives such as job creating, reducing poverty, providing social support to members, improving living standards and working conditions, promoting social inclusion, and the environment protecting.

The Strategy aims to ensure the sustainable development of consumer cooperatives, balancing economic, social, and environmental needs.

Table 1: Main Strategic Areas and Objectives for the Development of Consumer Cooperatives until 2030

Strategic Areas	Strategic Objectives
1. Creating a favorable environment for the development of consumer cooperatives	<ol style="list-style-type: none"> 1. Improving the legislative and policy framework for consumer cooperatives, aligning with EU acquis and international cooperative policy priorities. 2. Strengthening and expanding the community of cooperative members, implementing policies to attract and integrate youth into the cooperative movement, and utilizing effective support mechanisms. 3. Optimizing and streamlining the consumer cooperative system, regional integration of cooperative entities, and managerial reengineering. 4. Strengthening the human potential of consumer cooperatives and developing professional skills.
2. Integration, development, and infrastructural modernization, technological innovation	<ol style="list-style-type: none"> 1. Strengthening and modernizing cooperative infrastructure. 2. Enhancing integrative and associative processes within the consumer cooperatives, optimizing resource use. 3. Increasing innovation capacity, and implementing sustainable and digital technologies. 4. Developing a favorable environment for internal and external investments.
3. Diversification of activities, promotion of efficient services to members and other beneficiaries, and bringing them closer to consumers	<ol style="list-style-type: none"> 1. Diversification of services offered by consumer cooperative entities, and improving their quality. 2. Increasing societal awareness of the importance of cooperatives and the opportunities they offer. 3. Encouraging member participation in cooperative businesses. 4. Developing own brands for cooperative products and services, and implementing loyalty mechanisms to stimulate their purchase/consumption.
4. Multidimensional cooperation	<ol style="list-style-type: none"> 1. Strengthening internal cooperation between consumer cooperatives and cooperative enterprises. 2. Developing international business partnerships and penetrating on foreign markets. 3. Collaborating with central and local public authorities to support consumer cooperative activities in areas neglected by traditional businesses. 4. Cooperating with other types of cooperatives and enterprises in partner sectors.

5. CONCLUSION

The cooperative movement at the global level is on the rise thanks to the specific nature of cooperatives (dual character—economic and social), the diversity of activities promoted, the level of member involvement, social inclusion, contribution to community development, and the enhancement of population well-being. Consumer cooperatives in the Republic of Moldova have been part of the global cooperative system since 1993, committing to adhere to international cooperative principles and values.

Throughout its one and a half century existence, consumer cooperatives in the Republic of Moldova has undergone various periods of growth and decline but has managed to remain within the national economic system due to its socioeconomic mission, services benefiting members and society, democratic governance principles, and the priority of member benefits over profit.

The global, regional, and internal challenges in recent years – such as the COVID-19 pandemic, the regional war between Ukraine and Russia, natural phenomena related to climate change (including frequent drought, which has a negative impact on the economy of Moldova, which is an agrarian country), the passive attitude of central and local public authorities towards supporting cooperatives (despite recommendations from international institutions like the UN (United Nations (2021)), the European Commission (European Commission (2021)), and the International Labour Organization (International Labour Organization (2019)) to support and promote cooperatives), insufficient internal resources, limited access to external investments, and often outdated technologies – continue to influence the activities of cooperatives in the country, necessitating a rethinking of the development paradigm of the cooperative system and the design of future development strategies to address these challenges. These strategies must be based on innovations and actions that ensure economic, social, and environmental sustainability.

In this context, the paper analyzed the development trends of the consumer cooperative system in the Republic of Moldova and the main challenges it faces, determining priority intervention areas and strategic objectives for the development of this socio-economic sector over the next six years. The research findings are reflected in the draft of the Consumer Cooperatives Development Strategy in the Republic of Moldova until 2030, which has been validated by the governing bodies of the Central Union of Consumer Cooperatives of Moldova and is set to be approved by the Congress—the highest forum of consumer cooperatives in the country (September 2024). The implementation of this policy document will contribute to innovative development and strengthening of the national cooperative system, enhancing its competitive advantages, and maximizing the benefits provided to members and the population within its area of activity.

REFERENCES

- Banaszak, I., Beckmann, V. (2009), "New modes of governance of cooperative arrangements in agricultural markets: The case of polish producer groups", AgEcon Serch. https://ageconsearch.umn.edu/bitstream/53269/2/v13_53269.pdf, (Accessed: 15.08.2024).
- Birchall, J., Ketilson, L. (2009), Resilience of the Cooperative Business Model in Times of Crisis, International Labour Organization, Sustainable Enterprise Programme, Geneva. http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_108416.pdf, (Accessed: 15.08.2024).
- Borzaga, C., Depedri, S., Ermanno, T. (2009), "The Role of Cooperative and Social Enterprises: A Multifaceted Approach for an Economic Pluralism", Eurisce Working Papers. Italy: Eurisce, 2009, no. 000/09.
- Cooperatives Europe (n.d.-b.), What is a cooperative? <https://coopseurope.coop/what-cooperative/> (Accessed: 07.07.2024).
- Corcoran, H., Wilson, D. (2010), The Worker Co-operative Movements in Italy, Mondragon and France: Context, Success Factors and Lessons, Canadian Worker Co-operative Federation <https://base.socioeco.org/docs/paper-corcoran-wilson.pdf>, (Accessed: 11.07.2024).
- Cragorna, D., Fici, A., Henry, H. (2013), International Handbook of Cooperative Law, Springer-Verlag Berlin Heidelberg. https://books.google.md/books/about/International_Handbook_of_Cooperative_La.htm?id=vy2_BAAQBAJ&printsec=frontcover&source=kp_read_button&redir_esc=y#v=onepage&q&f=false, (Accessed: 15.08.2024).
- Crisan, I. (2010), Cooperația de consum. Evoluție, structuri, strategii de dezvoltare, București: Editura Universitară, 2010.
- Elliott, M.S., Olson, F. (2023). "The new institutional economic theory of cooperatives: taking stock, looking ahead", Elliott, M.S., and Boland, M. (eds.). Handbook of research on cooperatives and mutuals, Cheltenham, UK: Edward Elgar, 22-50.
- EuroCoop (n.d.-b.), Who We Are. <https://www.eurocoop.coop/about-us/Who-We-Are/>, (Accessed: 07.07.2024).
- European Commission. (2021). Building an economy that works for people: an action plan for the social economy. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. <https://eur-lex.europa.eu/legal-content/eng/TXT/HTML/?uri=CELEX:52021DC0778>, (Accessed: 07.07.2024).
- Jamaluddin, F. et al. (2023), "Cooperative Governance and Cooperative Performance: A Systematic Literature Review", Sage Journals, vol. 13, issue 3.

<https://journals.sagepub.com/doi/10.1177/21582440231192944>, (Accessed: 23.07.2024).

Grashuis, J., Cook, M. (2018), "Theory of cooperatives: recent developments", Cramer, G.L., Paudel, K.P., and Schmitz, A. (eds.). Routledge Handbook of Agricultural Economics, Routledge, 748-759.

International Cooperative Alliance. (n.d.-b.), Facts and figures. <https://www.ica.coop/en/cooperatives/facts-and-figures>, (Accessed: 07.07.2024).

International Labour Organization. (2019). Cooperatives & Social Solidarity Economy. Responses to key issues in the report of the Global Commission on the Future of Work. International Labour Office. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---coop/documents/publication/wcms_705803.pdf, (Accessed: 12.07.2024).

Iordachi, V., Şavga, L., Perciun, R. (2023), "Identifying the potential of consumer cooperatives in the development of circular business models in the Republic of Moldova", VII International applied social sciences congress (C-IASOS-2023), Valetta-Malta, 86-111.

Lambriu, M., Petrescu, C. (2014), "Surviving the crisis: Worker cooperatives in Romania", Organization, 21(5), 730-745. <http://journals.sagepub.com/doi/abs/10.1177/1350508414537807>, (Accessed: 22.05.2024)

Menard, C. "The Economics of Hybrid Organizations", Journal of Institutional and Theoretical Economics, JITE, 160 (3), 345-376.

Novkovic, S. (2006), "Co-operative business: the role of co-operative principles and values", Journal of Co-operative Studies, vol. 39:1 (no. 116), 5–16.

Petrescu, C. (2013), Cooperativele din România: actori ai dezvoltării socio-economice, Iaşi: Polirom.

SAVGA, L. (2018), Evoluții și orientări strategice de dezvoltare a cooperației de consum din Republica Moldova. Chișinău: UCCM, (PIM Iași). https://ibn.idsi.md/sites/default/files/imag_file/Carte%20Coop%202018%2011.04.18_1.pdf, (Accessed: 22.06.2024).

Şavga, L. (2023), "Cooperatives in the circular economy: economic, social and environmental sustainability". Approaches on the quality of life. Cross-border perspectives. CEEOL Press, 162-182.

Şavga, L. (Ed.). (2019), Dezvoltarea comerțului și a cooperației de consum în contextul integrării economice a Republicii Moldova în spațiul comunitar European. Chisinau: UCCM (PIM, Iași).

https://ibn.idsi.md/sites/default/files/imag_file/Dezv%20C%20si%20CC.pdf,
(Accessed: 22.06.2024).

Șavga, L. Livițchi, O. (2021), "Direcții strategice de dezvoltare inovativă a cooperăției de consum din Republica Moldova", Dezvoltare economică și cercetare. Materialele conferinței științifico-practice internaționale. Chișinău: UCCM, 14-22. [Culegerea-2021-Conf-UCCM.pdf](#) (Accessed: 25.07.2024).

Saz-Gil, I., Bretos, I., Díaz-Foncea M. (2021), "Cooperatives and Social Capital: A Narrative Literature Review and Directions for Future Research", Sustainability, 13(2), 534. <https://doi.org/10.3390/su13020534> (Accessed: 15.08.2024).

Settee, P. (2019), "Indigenous Knowledge, Human Rights, and the Principles and Values of Co-operation", Review of International Co-operation, 105/2019, 7-23. <https://ccr.ica.coop/sites/default/files/2021-11/Review%20of%20International%20Co-operation%202019%20-%20DIGITAL.pdf>, (Accessed: 28.05.2024).

United Nations. (2021), Cooperatives in social development. (UN Resolution A/RES/76/135 on 16th December 2021). <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N21/401/05/PDF/N2140105.pdf?OpenElement>,
(Accessed: 15.07.2024).

World Co-operative Monitor (2023). Exploring the Co-operative Economy. Report 2023. https://monitor.coop/sites/default/files/2024-01/wcm_2023_3101.pdf,
(Accessed: 19.06.2024).

Zeuli, K. (2004), "The Evolution of the Cooperative Model", Cooperatives and Local Development: Theory and Applications for the 21st Century, London and Armonk, NY: M.E. Sharpe, 52–69.

Correlation Between Public Debt, Economic Growth and Private Consumption: An Econometric Analysis for Countries in Transition

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Abstract

Introduction: This study aims to identify the main factors that influence the relationship between public debt, economic growth and private consumption. Also, it will be assessed if this impact varies depending on the different stages of the economic transition, providing policy recommendations that can mitigate the negative effects of public debt and economic growth on private consumption.

Aim: This paper aims to analyze the correlation between public debt, economic growth and private consumption in transition countries.

Method: For the realization of this research we will use secondary data provided by the Central Bank, International Monetary Fund, Eurostat, etc. For the literature review, we have focused on various scientific papers, conferences and books that are related to our topic. The years that will be analyzed in this research are 2014-2023. We used the STATA software program for data processing.

Findings: Based on the results obtained from this research, we can say that there is a correlation between public debt, economic growth and private consumption. The analyzes carried out by the research show that some of the variables analyzed in the research have an impact on the final consumption and economic growth while some others do not.

Conclusion: The results of this research can serve as a good reference point for future studies that will be done in this field by other researchers. Also, they will help the analyzed countries in the design of monetary and fiscal policies.

Originality and value: This paper presents real and sustainable data for drawing conclusions and recommendations for the analyzed period (2014-2023) in this research.

Key Words: Public debt, private consumption, countries in transition, economic growth

Jel Codes: C58, E21, E62, H54, H60

1. INTRODUCTION

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Lee and Ng (2015) investigated whether Malaysia's economic development between 1991 and 2013 was influenced by the public debt. Public debt and economic growth, as indicated by GDP per capita, have a negative relationship. According to a study by Bolat et al. (2016), the government in the United Kingdom reduced the primary surplus rather than increasing it in response to an increase in government debt, and this move had a substantial impact on the nation's economy. Butkus and Seputiene (2018) suggest that the influence of public debt on economic growth is contingent upon institutional factors. Stable institutions alone won't be enough to stop debt's detrimental effects.

As a result, there have been numerous studies conducted recently on the relationship between public debt and economic growth. A frequently referenced contribution is the one by Reinhart and Rogoff (2010) who, using histograms, discover an inverted U-shaped association between debt and growth, with the relationship becoming negative if the debt to GDP ratio hits roughly 90 percent (Reinhart & K.S, 2010).

At last, Panizza and Presbitero (2013) provide an overview of studies pertaining to debt and growth. They conclude that thresholds and, more broadly, a nonmonotonic relationship between public debt and economic growth are not resistant to modifications in the coverage of the data or to the empirical methods used. They contend that cross-country heterogeneity should be heavily emphasised in empirical research pertaining to that topic.

There are various ways in which government policies can impact growth according to theoretical literature. Neoclassical theories hold that as government policies only have an immediate impact on savings or labour force participation, they only have short-term effects and no long-term effects. Government policies can have long-term impacts based on the type of expenditure they authorise, such as the benefits of education spending on human capital and therefore economic growth, according to endogenous-growth theories. Government policies can also promote growth by enhancing the calibre of institutions, which are gauged by factors like clear property rights, the rule of law, and transparent regulations (Ghurchian & Yilmazkuday, 2020).

This paper is divided into several sections. The first section contains the literature part, the second section includes the meta-analysis of the paper. In the third section we have the research methodology and model specification. The fourth section contains the part of the research results and the last section includes the part of conclusions and recommendations.

2. LITERATURE REVIEW

Although Barro presented the formal articulation of the relationship between public debt and private consumption in 1974, it was Ricardo who originally introduced the essential idea that eventually became known as the Ricardian equivalency argument. According to this theory, raising the public debt ratio now won't boost private spending since a sane consumer would anticipate higher taxes from the government in the future. In this case, the consumer will save the income increase as interest rates rise in tandem

with higher taxes. Regretfully, empirical research like that conducted by Gogas et al. (2014) yields inconsistent results; some prove the hypothesis, while others do so only partially or completely.

Karras (1994) examined the link between government spending and private consumption for a number of chosen nations between 1950 and 1987. The results show that government expenditure and private consumption are complimentary, with an increase in government spending having the ability to raise marginal private consumption. Becker (1995) maintained that both expected and unexpected changes in taxes and government spending, as well as long-term and short-term changes, should be included when analysing fiscal policy. His conclusion that the Ricardian hypothesis has some support is contrasted with some findings that deviate from its expectations. Nonetheless, the distinctions support the idea of expansionary fiscal policy in response to recession rather than a Keynesian understanding of budget deficits (Karras, 1994).

According to Morina and Misiri (2019) research, the budget deficit of the Western Balkan countries has been positively impacted by taxes, public debt, and subsidies. Silva (2020) asserts that while private external debt lowers private investment, both public and private external debt raise public investment. Portugal's external debt has therefore not been used to considerably and favorably boost economic growth.

According to a 2009 study by Wigger, it is concluded that by issuing public debt, future generations will be able to profit from specific programs and subsequently invest in technology or other industries that might encourage economic development and growth generally.

Researchers have also looked into the relationship between public debt and economic growth in EU nations (Gomez & Sosvilla, 2017). The findings of this scientific study demonstrate differing opinions about the use of public debt: generally speaking, public debt hinders economic growth, but it can also have favourable short-term effects, albeit these are up to the EU member states to decide.

In the past, the earliest theories of economic growth believed that it was an external phenomenon that was mostly influenced by technological advancements and natural causes (Bastable, 1989; Cairnes, 1874). But since then, endogenous growth theories have emphasized the critical role that public spending on infrastructure, R&D, and other areas plays in the growth dynamic, particularly in emerging nations where external debt is a major factor (Barro, 2001; Lucas, 1998).

Non-linear approach: (Sachs, 1995; Cohen, 1993; Raffinot, 1998), have demonstrated that non-linear models of debt overhang indicate that the effect of external debt on economic growth turns negative beyond a crucial threshold. The primary debt burden, which includes interest and amortization payments, as well as the virtual debt burden, which raises expectations for future taxes, both worsen this situation. This condition limits productive investment since resources are transferred from economic development to debt payment, limiting economic growth (Krugman, 1988).

According to (Senadza, Fiagbe, & Quartey, 2018) use data from 1990 to 2013 to investigate the impact of external debt on economic growth in 39 Sub-Saharan African

nations. The authors find that external debt significantly hinders regional economic growth when using the Generalized Method of Moments (GMM). This supports the traditional theory that high debt might impair economic growth by accumulating future debt that discourages investment and consumption.

A study on the long-term contribution of public debt on economic growth was conducted by (Kumar & Woo, 2010). They have examined this matter from 1970 to 2010 in 38 industrialized and developing nations. As a result, there was a non-linear relationship that was evident at 90% of the amount of the public debt between the initial negative level of government debt and economic growth. The decline in investments and the decline in capital stock growth per employee are impacted by the rise in public debt it has an impact on the decline in worker productivity. Investment (as a percentage of GDP) decreased by 0.4% in industrialized nations when debt to GDP increased by 10% points. In developing countries an increase of 10% points in the debt lead to a 0.2 % point decrease in economic growth. In developed countries the effect is smaller.

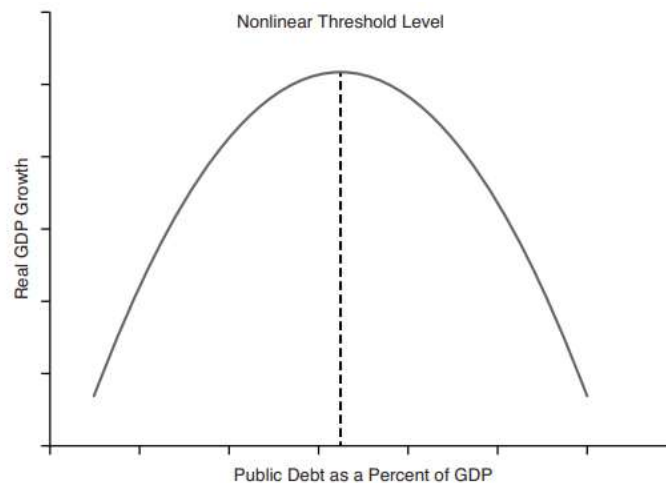


Figure 1. The relationship between debt and growth

A model put forth by Sutherland (1997) illustrates how the impact of fiscal policy on consumption might change based on the size of the national debt. There are classic Keynesian impacts with mild debt financing policy. Because they might not be there when the next debt stabilization program is implemented-more consumers will be able to pay taxes if a stabilization program is in place-current generations of consumers are deducting future taxes. But when debt levels reach extremes, consumers in today's generation know that if the next stabilization program is put in place, there's a good chance they will survive. Consumer spending may be restrained by a fiscal deficit.

Demand and supply-that is, the supply and demand for commodities both domestically and internationally-determine economic activity. Private consumption as a part of aggregate expenditure-which is contingent upon income and taxes-is one of the key demands. Private consumption rises in tandem with an increase in income. Conversely, private consumption declines in response to higher taxation. Furthermore, income taxes serve as the primary source of government revenue, which is used to finance spending. If revenue is insufficient to pay for all expenses, the government should borrow money or increase taxes. Therefore, it's interesting to consider whether the government should raise debt or lower tax rates and how that might affect economic activity (Kusairi, Maulina, & Margaretha, 2019).

3. META -ANALYSIS OF SCIENTIFIC RESEARCH

In this part, a meta-analysis of the research will be done, including works by different authors who have examined topics similar to what we have analyzed, and will examine the findings from these studies.

Table 1. Meta-analysis of the research

Author	Title	Method	Findings
(Avdimetaj, Marmullaku, & Haziri, 2022)	Impact of Public Debt on Private Consumption in Developing European Countries	The dynamic panel model (GMM)	The results show that in developing European countries, there is a non-linear relationship between government debt and private consumption. More precisely, private consumption expenditures have been negatively affected by the increase in government debt. The findings of the study provide information on how European countries are creating their policies on the ratio of public debt to private consumption.
(Juarez & Almada, 2016)	Public Debt, Public Investment and Economic Growth in Mexico	Panel data	Econometric findings verified the favorable correlation between public debt and investment, which leads to economic growth. Given that there is a positive marginal impact of public investment and, consequently, public debt on output per person.

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(Berben & Brosens, 2007)	The impact of government debt on private consumption in OECD countries	Meta-analysis	The findings show that there is a non-linear relationship between private consumption and government debt in a panel of OECD countries. The amount of government debt has little impact on private consumption in countries with modest levels of debt.
(Morina, Misiri, & Alijaj, 2024)	Examining the relationship between public debt and private consumption in European OECD countries (2011-2020)	Panel data	Based on the results obtained from this study, it is said that Public debt is a very important mechanism not only for fighting the budgetary deficit, but also for raising economic growth and development.
(Elkhalif, et al., 2024)	The impact of external debt on economic growth: The case of emerging countries	Deductive methodology	While growth is initially stimulated by an increase in the stock of external debt, excessive debt buildup results in decreasing returns and growth-defeating effects. These findings highlight the significance of responsible debt management, particularly in light of globalization and the increased susceptibility of emerging countries to shocks from the outside world.
(Çifligu, 2018)	Academic Journal of Interdisciplinary Studies	Panel data	The main drivers of Albania's economic growth in recent years have been the transition of the country's workforce from low to high productivity, prudent monetary and fiscal policies, the stability of the macroeconomic environment and the continuous growth of investments.
(Casares, 2015)	A relationship between external public debt and economic growth	Meta-analysis	Two productive sectors were used to create an endogenous growth model in which only the tradable sector contributes to domestic technological advancement. The government spends money on interest payments

			on its foreign debt as well as on commercial products.
(Morina & Berisha, 2021)	The Effect of Public Debt on Private Consumption: The Case of Countries in Transition	Panel data	The findings show that the only variables that significantly affect consumer spending are gross fixed capital and exports. As a result, the creation of gross fixed capital affected the final consumption of consumers, while other factors such as the export of goods and services affected both the growth of GDP and the expansion of final consumption.
(Chen, Yao, Hu, & Lin, 2016)	Optimal Government Investment and Public Debt in an Economic Growth Mode	GMM Model	Our findings imply that, in terms of economic growth, there must be a minimum and maximum level of public debt and investment by the government, however these may fluctuate throughout economies. China's 2014 GDP/GDP ratios for public debt and government investment were 41.14% and 15.66%, respectively.
(Kusairi, Maulina, & Margaretha, 2019)	Public debt and private consumption in Asia Pacific countries: Is there evidence for Ricardian equivalence?	Dynamic heterogeneous panel data	These results show that consumers expect governments to raise taxes to finance debt service, including principal and interest payments, so an increase in public debt does not increase private spending.

4. RESEARCH METHODOLOGY

The purpose of this research is to analyze the correlation between public debt, economic growth and private consumption for countries in transition. For the realization of this work, we will use secondary data provided by the World Bank, the International Monetary Fund, Eurostat, etc. While for the literature review we will focus on various scientific papers that are related to our field of study, we will focus on many conferences, books, reports and various online resources. The period analyzed in this study will be 10 years (2014-2023). The paper will contain an econometric model that will include seven variables, one of them dependent and six independent. We will use the STATA program for data processing and extraction. The tests that will be applied in this work are: linear

regression, random effect, fixed effect, Hausman - Taylor Regression, GMM Model - Arellano Bond Estimation, Generalized Estimating Equations (GEE Model).

The main hypotheses of this study are:

H0: *There is no statistically significant correlation between public debt, economic growth and private consumption for transition countries.*

H1: *There is a statistically significant correlation between public debt, economic growth and private consumption for countries in transition.*

The research questions of this study are:

1. 1. What is the relationship between public spending and private consumption in transition countries, and how does this consumption affect economic performance?
2. 2. How does public debt affect economic growth in countries in transition, and what are the possible mechanisms related to this impact?
3. 3. Is there a correlation between public debt, economic growth and private consumption?

Table 2. Description of variables included in econometric model

Variables	Variable Description	Data Source
Dependent variable (Y)	Consumption expenditure	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₁)	Government Debt	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₂)	Gross Fixed Capital Formation	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₃)	Foreign Direct Investments	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₄)	Consumer Price Inflation	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₅)	Export of Goods and Services	World Bank Annual Reports (2014 – 2023)
Independent variable (X ₆)	GDP growth	World Bank Annual Reports (2014 – 2023)

The econometric model of this study is as follows:

$$CE = \beta_0 + \beta_1 GD + \beta_2 GFCF + \beta_3 FDI + \beta_4 CPI + \beta_5 EGS + \beta_6 GDP + \gamma_{it}$$

Where:

CE - Consumption expenditure

GD - Government Debt

GFCF- Formation of Gross Fixed Capital

FDI - Foreign Direct Investments

CPI - Consumer Price Inflation

EGS - Export of Goods and Services

GDP_GROWTH– Grosse Domestic Products

5. ECONOMETRIC ANALYSIS AND STUDY FINDINGS

In the next section of this paper, we will analyze the econometric analysis specific to European countries. This analysis will include examining descriptive statistics, performing correlation analysis, and using various econometric models that have previously been applied to the analysis of Transition countries. Our objective is to test the hypotheses and address the research questions posed in this study. To achieve this, we will process all the results obtained using the STATA program, since our data consists of secondary data.

Table 3. Descriptive statistics for the variables included in the econometric model

Variables	CE	GD	GFCF	FDI	CPI	EGS	GDP
CE	1.0000						
GD	-0.0517	1.0000					
GFCF	-0.1280	-0.0537	1.0000				
FDI	-0.0367	0.1822	0.1283	1.0000			
CPI	0.0244	-0.1964	-0.1066	-0.0709	1.0000		
EGS	-0.7980	0.0477	-0.0486	0.0395	0.0808	1.0000	
GDP	-0.0906	0.0415	0.0964	-0.0032	-0.2342	0.0555	1.0000

Based on the results obtained, we can see that the research includes 220 observations, here we can see that the final consumption expenditure variable has the highest average value of 82.19034, the government debt variable has the highest standard deviation value of 30.18116, the variable with the highest minimum value is the final consumption expenses with a value of 66.0277, while the variable with the highest maximum value is also the final consumption expenses with a value of 107.39.

Table 4. Correlation analysis for the variables included in the econometric model

Variables	Obs.	Mean	Std.Deviation	Minimum	Maximum
CE	220	82.19034	10.25781	66.0277	107.39
GD	219	36.18129	30.18116	-1.404	98.671
GFCF	220	22.0133	4.636612	0	33.225
FDI	220	4.582282	9.761571	-10.086	106.532
CPI	220	4.419505	5.945485	-1.584	48.7
EGS	220	56.03657	19.29573	21.695	99.297
GDP	220	2.655014	4.461282	-28.759	13.93

According to the results of the correlation, it can be seen that there is a weak and negative correlation of -0.0517 between government debt and consumption expenditure, this means that if we have a decrease of -5.17% of government debt then consumption expenditure will decrease and vice versa. There is a weak and negative correlation of -0.1280 between the formation of gross fixed capital and consumption expenses, this means that if we have a reduction of -12.80% of the formation of gross fixed capital, then consumption expenses will decrease and vice versa. There is a weak and negative correlation of -0.0367 between foreign direct investment and consumption expenditure, this means that if we have a decrease of -3.67% of foreign direct investment then consumption expenditure will decrease and vice versa. There is a weak and positive correlation of 0.0244 between consumer price inflation and consumer spending, this means that if we have a 2.44% increase in consumer price inflation, then consumer spending will increase and vice versa. There is a weak and negative correlation of -0.7980 between the export of goods and services and consumption expenditure, this means that if we have a decrease of -79.80% of the export of goods and services, then consumption expenditure will decrease and vice versa. There is a weak and negative correlation of -0.0906 between GDP growth and consumption expenditures, this means that if we have a decrease of -9.06% in GDP growth, then consumption expenditures will decrease and vice versa.

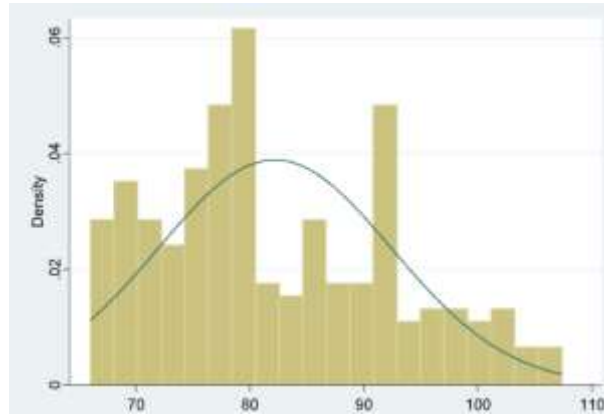


Figure 2. Presentation of the histogram for the dependent variable

Table 5. Econometric results and empirical findings of the study

Variable	Linear Regression	Random Effects – GLS Regression	Fixed – Effects Regression	Hausman – Taylor Regression	GEE Model	GMM Model
CE	-	-	-	-	-	-
GD	-0.004034 (0.772)	-0.0062254 (0.460)	-0.005608 (0.515)	-0.0056543 (0.507)	-0.0063314 (0.449)	0.1871764 (0.058)
GFCF	-0.362622 (0.000)	-0.2942339 (0.000)	-0.283494 (0.000)	-0.293055 (0.000)	-0.2965324 (0.000)	-0.0017836 (0.821)
FDI	0.024286 (0.568)	-0.0023105 (0.911)	-0.002650 (0.899)	-0.0022219 (0.915)	-0.0021775 (0.916)	-0.1797048 (0.003)
CPI	0.1181958 (0.101)	0.1253179 (0.003)	0.1138864 (0.011)	0.1195695 (0.005)	0.1274992 (0.002)	0.0014305 (0.925)
EGS	-0.430764 (0.000)	-0.3728214 (0.000)	-0.347419 (0.000)	-0.361296 (0.000)	-0.3778739 (0.000)	0.0014305 (0.925)
GDP	-0.030536 (0.746)	-0.0605128 (0.216)	-0.073855 (0.150)	-0.0664114 (0.181)	-0.0578477 (0.232)	-0.2200988 (0.000)
Const.	113.8672 (0.000)	109.3866 (0.000)	107.7631 (0.000)	111.4526 (0.000)	109.7066 (0.000)	-0.1326203 (0.010)
R Square	0.6706	0.7075	0.7075	-	-	-

Explanation: P-values are shown in parentheses: *** indicates statistical significance at the level of 1%; ** indicates statistical significance at 5% level and * indicates statistical significance 10%.

Based on the econometric results in the table above, we can conclude that some of the independent variables are significant at the 1%, 5% and 10% levels. The data obtained will be commented through the GEE Model regression.

b0 - If all other factors are constant, then the value of Final Consumption Expenditures will be 109.7066 units.

b1- If the General Government Debt increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditures will decrease by -0.006 units. This statement does not turn out to be correct since the significance value is not within the statistical significance range ($p\text{-value} = 0.449 > 0.05$). Knowing that an increase in debt directly or indirectly affects the reduction of consumption among consumers, since the government through fiscal policies affects taxes and credit, which makes it difficult for individuals and families to consume. So the proper management of public debt and fiscal policy plays an essential role in final consumption expenditure

b2 - If Gross Fixed Capital Formation increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditures will decrease by -0.296 units. This statement turns out to be correct since the significance value is within the statistical range ($p\text{-value} = 0.000 < 0.05$). Knowing that the formation of gross fixed capital is an essential indicator related to the final consumption of individuals and families means that both one and the other cannot stand alone. The increase in gross fixed capital formation is a positive sign for the economy and has the potential to increase final consumption expenditure in the long run.

b3 - If Foreign Direct Investment increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditures will decrease by -0.002 units. This statement turns out to be incorrect since the significance value is not within the statistical range ($p\text{-value} = 0.916 > 0.05$). Foreign direct investments have an impact on final consumption, I take into account that foreign investments bring about the creation of new jobs, an automatic increase in income, and this in an increase in consumption expenses. Increase in production, which results in higher quality products and services at an affordable price for individuals and families.

b4 - If Consumer Price Inflation increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditure will increase by 0.127 units. This statement turns out to be correct since the significance value is within the statistical range ($p\text{-value} = 0.002 < 0.05$). Consumer price inflation is an important indicator of final consumption expenditures. The increase in prices causes the consumer to reduce spending on goods and services that are less important, this affects the consumer to focus on spending that is more basic and essential. Inflation affects the growth of the economy to be uncertain. The causes of the price increase are the production costs of the goods and services you bring).

b5 - If Export of Goods and Services increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditures will decrease by -0.377 units.

This statement turns out to be correct since the significance value is within the statistical range ($p\text{-value} = 0.000 < 0.05$). The export of goods and services has a great impact on the increase in final consumption expenses, it directly affects income because it affects the countries that export, bringing income that can affect investments, which is accompanied by an increase in final consumption. This affects the growth of jobs and this is accompanied by higher consumption expenses

b6 - If GDP Growth increases by 1 unit keeping other independent variables constant, then Final Consumption Expenditures will decrease by -0.057 units. This statement turns out to be incorrect since the significance value is not within the statistical range ($p\text{-value} = 0.232 > 0.05$). The increase in the gross domestic product is an indicator of the increase in final consumption expenses as it creates more income for individuals and families, the way of life changes completely, the belief that individuals have for a sustainable economy leads to investment in infrastructure that products and services are offered in an effective and efficient way, simultaneously creating new jobs, which leads to an increase in consumer spending

6. CONCLUSION

Given that this research has discussed the correlation between public debt, economic growth and private consumption for countries in transition, we have come to a conclusion with some conclusions and recommendations. It is known that every variable used in this research has a special importance and gives us an important result. If we stop to discuss the results, we see that most of the variables had a positive impact on private consumption and only a certain number had a negative impact. Private consumption is often affected by public debt and economic growth. A high debt can inhibit consumption due to the fear of high taxes in the future, while economic growth can stimulate consumption. Also, countries in transition are those that exhibit large variations in the way public exchange affects economic growth and private consumption. Fiscal policies and macroeconomic stability are very important factors that determine such relationships.

Regarding the recommendations related to this topic, we can give some recommendations as follows;

- The implementation of policies that stimulate private consumption, such as fiscal relief for individuals and businesses, can help increase demand and hence economic growth.
- Countries in transition must implement strong public debt management policies to maintain investor confidence and support economic growth.
- All governments should invest in infrastructure and public services that promote economic development and increased consumption.
- Finally, we can say that more studies should be done to analyze other factors that influence the relationship between public debt, economic growth and private consumption.

REFERENCES

- Avdimetaj, K., Marmullaku, B., & Haziri, A. (2022). Impact of Public Debt on Private Consumption in Developing European Countries. *JTSR* , 29 (2), 3-18.
- Barro, J. (2001). Human capital and growth. *American Economic Review* , 91 (2), 12-17.
- Bastable, C. (1989). On some application of theory of international trade. *Quarterly Journal of Economics* , 3 (1), 119-165.
- Berben, P. R., & Brosens, T. (2007). The impact of government debt on private consumption in OECD countries. *Economics Letters* , 97, 220-225.
- Cairnes, J. (1874). *Some leading principles of political economy newly expounded*. London: Macmillan .
- Cohen, D. (1993). Low Investment and Large LDC Debt in the 1980's. *American Economic Review* , 436-449.
- Çifligu, E. P. (2018). The relationship between public debt and economic Growth in Albania and Other countries. *Academic Journal of Interdisciplinary Studies*, 7(3), 95-102.
- Chen, C., Yao, S., Hu, P. & Li, Y. 2016. Optimal government investment and public debt in an economic growth model. *China Economic Review Elsevier BV*, pp. 37-53.
- Enrique R. Casares, (2015), A relationship between external public debt and economic growth, *Estudios Económicos*, 30, (2), 219-243
- F., M., & V., M. (2019). Impact of Taxation, Public Debt and Subsidiaries in the Budget Deficit of Western Balcan Countries. *Knowl Int J* , 31, 95-100.
- Ghourchian, S., & Yilmazkuday, H. (2020). Government Consumption, Government Debt and Economic Growth. 1-10.
- Gogas, P., Plakandaras, V., & Papadimitriou, T. (2014). Public debt and private consumption in OECD countries. *The Journal of Economic Asymmetries* , 11, 1-7.
- Juarez, S. I., & Almada, G. R. (2016). Public Debt, Public Investment and Economic Growth in Mexico. *MDPI, Int. J. Financial Stud.* , 4 (2).
- Karras, G. (1994). Government spending and private consumption: some international evidence. *Journal of Money, credit and Banking* , 26 (1), 9-22.

- Krugman, P. (1988). Financing vs. forgiving a debt overhang. *NBER Working Paper No.2486*.
- Kumar, M., & Woo, J. (2010). Public Debt and Growth,. *IMF Working Paper WP/10/174* .
- Kusairi, S., Maulina, V., & Margaretha, F. (2019). Public debt and private consumption in Asia Pacific countries: Is there evidenceAsia Pacific countries: Is there evidence. *Journal of International Studies* , 12 (1), 50-64.
- Lee, S., & Ng, Y. (2015). Public Debt and Economic Growth in Malaysia. *Asian Econ Financ Rev* 5 , 119-126.
- Lucas, R. (1998). On the mechanics of economic development. *Journal of Monetary Economics* , 22 (1), 3-42.
- M., B., & ., S. J. (2018). Growth Effect of Public Debt: The Role of Government Effectiveness and Trade Balance. *Economies* , 1-27.
- Morina, F., & Berisha, A. (2021). The Effect of Public Debt on Private Consumption: The Case of Countries in Transition. *Journal of Corporate Governance, Insurance, and Risk Management (JCGIRM)*. Volume 8, Series 2
- Morina, F., Misiri, V., & Alijaj., Sh. (2024). Examining the relationship between public debt and private consumption in European OECD countries (2011–2020). *Quantitative Finance and Economics* , 81 (1), 75-102.
- Panizza, U., & Presbitero, A. (2013). “Public debt and economic growth in advanced economies: A Survey”. *Swiss Journal of Economics and Statistics* , 149 (2), 175-204.
- Raffinot, M. (1998). The management of external debt in developing countries: Lessons from a decade. *Journal of Development Economics* , 3-32.
- Reinhart, C., & K.S, R. .. (2010). “Growth in a time of debt. *NBER working paper number 15639*.
- Sachs, J. &. (1995). Economic Reformand the Process of Global Integration. *Brookings Paper on Economic Activity* (1), 1-118.
- Senadza, B., Fiagbe, A., & Quartey, P. (2018). The effect of external debt on economic growth in sub-Saharan Africa. *International Journal of Business and Economic Sciences Applied Research (IJBESAR)* , , 11 (1), 61-69.
- Silva, J. (2020). Impact of public and private sector external debt on economic growth: the case of Portugal. *Eurasian Econ Rev* , 607-634.

The Impact of blockchain technology on brand loyalty in the context of sustainability in the fashion industry*

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Abstract

Introduction: In line with today’s consumer demand for transparency, blockchain technology can record all production data and all logistics operations of each supplier in the fashion industry’s value chain. This technology creates greater transparency, strengthening verifiable trust between brands and consumers. Thus, brands can build stronger brand loyalty.

Aim: This study aims to examine the potential impact of blockchain technology on brand loyalty in the fashion industry in the context of sustainability. It also focuses on gaining a deeper understanding of the possible factors that can influence the strengthening of brand loyalty.

Method: An in-depth interview, one of the qualitative research methods, has been conducted. As a result of the literature review, seven basic semi-structured questions have been created. Industry experts who work professionally in the context of sustainability in the fashion industry and are interested in blockchain technology have been identified, and interviews have been conducted with them.

Findings: It is concluded that blockchain technology positively impacts creating strong brand loyalty for the sustainable fashion industry. In this context, a new conceptual model, having dimensions that traceability, transparency, trust, ethics, and environment, is developed for future research.

Originality and value: Since blockchain technology is new, no brands have fully adopted it. Therefore, this academic study provides valuable insights into the steps that fashion industry brands can take in the context of this technology by exploring potential factors that could have an impact.

Key Words: Blockchain Technology, Sustainability, Fashion Industry, Brand Loyalty,

Jel Codes: M15, M31, M30

1. INTRODUCTION

Blockchain technology is a structure that stores transactional records, “also known as the block, of the public in several databases, known as the “chain,” in a network

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connected through peer-to-peer nodes. Typically, this storage is referred to as a digital ledger.” (Quora, 2018). It was invented by a person (or group of people) using the name Satoshi Nakamoto (probably a pseudonym), who created Bitcoin and brought blockchain technology to the world. Since its emergence, blockchain has been seen as a powerful technology transforming fashion, manufacturing, healthcare, logistics, and many other industries (Joshi, 2020). The implementation of transparency and traceability in the life cycle of the design product is undoubtedly essential for the fashion industry (Pautasso et al., 2019). Blockchain technology is an indispensable requirement for the fashion industry to transform from a slow-developing sector to an early adopter of technology to meet the needs of this century.

By associating blockchain technology with “quick response” codes, also known as QR systems, fashion brands can track multiple levels of sourcing raw materials, distribution operations, creating the garment, and delivering it to the retailer for customers (Nevalainen et al., 2020). Moreover, blockchain can track intermediaries, ensuring all steps are operated ethically, sustainably, and securely (Greene & Longobucco, 2018).

One in every six people is connected with the fashion sector. It accounts for 4% of the world's Gross Domestic Product (GDP), making the situation even more noticeable as it touches today's civilization customers, designers, fashion industry players, producers, and end-of-the-chain shoppers. (Turrillo, 2020).

The fashion sector has important sustainability and ethical problems. By 2030, it is estimated that the fashion industry's water use will increase by almost 50 percent to 118 billion cubic meters, its carbon footprint will rise to 2,791 million tons, and the weight of waste the industry produces will hit 148 million tons. Due to these estimations, fashion brands have announced some operational practices to reduce the demand for sources and minimize harmful *environmental effects*. (Sumner, 2019).

Blockchain and emerging technologies present an opportunity for sustainability, social impact, and ethical sourcing in one of the world's largest industries. The fashion industry is complex and on the verge of a collapsing ecosystem. Furthermore, the \$800 billion international apparel industry is notorious for its challenges related to the ethical treatment of industry workers, intellectual property, fraudulent supply chain issues, environmental and sustainable illegal competition, and the lack of rent ability of the industry. The life cycle of a product lacks transparency from raw material to finished product and even the second-hand market. All these problems are challenging to deal with but not impossible to solve.

Blockchains are the most reliable technologies of recent times for both the public and private sectors. Blockchain or distributed ledger technologies have a holistic genetic structure and multiple capacities that create trust in the originality of products, identify production sources, detect supply chain route records and solve their problems, and improve some intermediaries' serious problems. On the other hand, it can improve the understanding and processing of data to optimize operations in global business models. This leads to optimizing resources, previewing problems, finding the best approach to

solve problems, automation, estimating expected parameters, and quantifying and optimizing production, distribution processes, and operations in real-time.

On the other hand, brand loyalty can be defined as the consumer having a good experience and attachment to a brand (Jacoby & Kyner, 1973). A loyal customer repeatedly purchases the same product or service from the same company, even though there are alternative brands in the sector (Jacoby & Kyner, 1973). Customer loyalty to the brand is independent of competitors' practices or changes in sector conditions and does not change (Oliver, 1999). Building strong brand loyalty is one of the most important goals of businesses, and brands in the fashion industry have difficulty achieving this for the current generation due to sustainability and ethical values.

This study aims to examine the potential impact of blockchain technology on brand loyalty in the fashion industry in the context of sustainability. Furthermore, to gain a deeper understanding of the possible factors that may influence the strengthening of brand loyalty by implementing blockchain technology in the operations of fashion brands.

The importance of this study, which is conducted as qualitative research, is to explore the factors that affect *brand loyalty* in the fashion industry in the context of sustainability and to develop a theoretical model that reveals the relationships of these factors with brand loyalty. Thus, new information can be obtained on how fashion companies can integrate blockchain technology into their brands to create stronger brand loyalty and offer various application areas. Another critical aspect of this research is that the results from this study form a theoretical basis for future academic studies since it examines a subject that has not been studied academically before.

2. LITERATURE REVIEW

The literature has been reviewed based on three essential phenomena: challenges in the sustainable fashion industry, advantages of blockchain technology for fashion brands, and disadvantages of blockchain in the fashion industry.

2.1. Challenges in the Sustainable Fashion Industry

According to one of the latest findings of the study conducted by Kirsi Niinimäki from Aalto University, the fashion industry is the second largest polluter of nature after aviation. Niinimäki says that fashion not only produces a large amount of fabric waste yearly but also causes approximately 190,000 tons of microplastic pollution recorded in the oceans and consumes approximately trillion liters of water yearly (Mavrokefalidis, 2020).

When considering industries that harm nature, the first things that come to mind are food production, transportation, energy, and clothing. However, the fashion sector is also one industry that demands the most resources. The current fashion industry causes 4% of greenhouse gas emissions and 20% of industrial water pollution globally (GFA,

2021). In the current production model of the fashion industry, non-renewable resources are often used to create fashion garments for a short time. According to Ellen MacArthur's research, the fashion industry causes a large amount of waste and pollution due to the activities of producing fashion products. Carbon emissions from the clothing sector are approximately 1.2 billion tons per year. In addition, less than 1% of the fabrics used in the production of clothes are recycled into new products, which means a loss of \$100 billion worth of materials (Pautasso et al., 2019).

From a social perspective, the fashion industry also faces significant challenges. Extensive outsourcing to low-wage countries results in poor working conditions, with hours worked much longer than agreed, a lack of total wages, and child labor in developing countries. The “Rana Plaza collapse” in Bangladesh in 2013 illustrates the potential risks associated with these unethical working conditions (Pautasso et al., 2019).

2.2. Advantages of Blockchain Technology for Fashion Brands

Brands in the fashion industry have begun to redesign their business models to create a more conscious ecosystem for greater customer satisfaction and to strengthen brand loyalty. However, a significant problem remains: how consumers will trust brands that operate a sustainable and *ethical business ecosystem*.

In today's technology, the only way to solve this problem is to implement blockchain technology, which represents a distributed ledger and provides open-source data sharing so that brands can store the entire lifecycle data of a product, such as fabric composition, transportation process, amount of water and electricity used during production, who made the garments, where they were manufactured and stocked. Applying technology to redesign the business model offers a tremendous opportunity to validate brand trust among today's consumers.

Blockchain is more than just a data storage system. In addition to holding data, data can be shared with other participants safely and securely. (TOC Logistics, 2019) With the application of blockchain technology to supply chains, transparency is one of the biggest promises of blockchain technology. Since transactions are recorded chronologically on a blockchain, collaborating parties can see the transactions. In this way, collaborating parties move away from having data warehouses and instead adopt a more honest, semi-transparent technique. The benefit for the parties on the chain is that the data is *auditable* for each party. (Taylor, 2017)

Transparency has become essential to track supply chains, demonstrate sustainability-oriented operations, and combat counterfeiting. At this point, *traceability* is one of the main tools to create a sustainable and ethical ecosystem. Counterfeiting issues have been identified by the digital media in “The Business of Fashion” as one of the main problems in the international fashion market (Pautasso et al., 2019). Applying Blockchain's traceability configuration to fashion brands can effectively overcome this challenge.

The fashion industry is known for its "best-kept secrets". The production of fashion or intermediaries has never been an open book, which gives businesses a competitive advantage. However, it is believed that fashion players will not be able to play with these typical traditional practices again as long as they want long-term performance across the business. Considering the demands of consumers for more transparency throughout the value chain, we can see three primary dynamics (transparency, traceability, and trust) in the coming period. Consumers need to know their purchasing power to encourage brands to take transparency and traceability seriously, including knowing where all supply chain stages are. "*Sustainability*" is no longer a trend but a business imperative (Lam, 2020).

Today's consumers are closely informed about the social and environmental practices of brands in the fashion industry. However, one of the most critical issues is how consumers can *trust* that brands truly have sustainable approaches and how they can trust the information that brands transparently share about their ethical and sustainable practices without the need for any third parties. One solution for consumers to understand the reliability of brands in these matters is to apply blockchain technology.

Customer satisfaction evaluates the satisfaction customers perceive with the experience a company offers. It is mainly based on survey data and is expressed as a rating. This measurement quantifies a critical dynamic. When a company has loyal customers, it is favorable to have "free" and highly effective word-of-mouth marketing. Even in the sustainable fashion industry, achieving customer satisfaction is positively correlated with the accuracy of the sustainable practices that brands claim to implement. Blockchain technology is the most fundamental tool for making this accuracy visible in this context.

2.3. Disadvantages of Blockchain in the Fashion Industry

Blockchain technology is not yet fully developed or fully understood. Many analysts warn against adopting blockchain platforms for large-scale manufacturing (TOC Logistics, 2019). Since this technology is not fully understood, implementing blockchain technology into brands' operations may not make sense for consumers in society, so it is thought that consumers need to be educated on what blockchain is and what it will mean to create a more sustainable fashion ecosystem.

3. RESEARCH METHODOLOGY

Within the scope of the study, two research questions were created:

1. How does the use of blockchain technology by fashion brands relate to building brand loyalty in the context of sustainability?
2. Does the use of blockchain technology affect building brand loyalty? If so, does this positively affect building brand loyalty?

In order to find answers to these two research questions, in-depth interviews were carried out with professionals. A qualitative data collection method, in-depth interviews provide the opportunity to gather rich, detailed information regarding how people think and behave and unfold complicated activities. They can be used as a standalone research method depending on the needs of the study. Efficient in-depth interviewers listen rather than speak. The interview was conducted using a discussion plan that facilitates flushing out the respondents' views through open-ended questioning. Projective techniques can also be incorporated into the interview. In-depth interviews are generally made out face to face so that a rapport can be created with respondents. However, due to the Covid-19 pandemic conditions, most companies and professionals tend to have meetings virtually. Thus, all the meetings for the interview were scheduled for a virtual meeting. Interviews were conducted through Zoom (a cloud-based video communications application) meetings. Besides, questions were also sent out to the sector professionals and then returned through e-mail to get more information on the subject and a comprehensive understanding. In this process, semi-structured interviews were used. Because it allows the possibility to regulate the order of the questions, the respondents can express their thoughts and tell everything in detail rather than relying only on forms and questions prepared before the interview. Before the interviews, many questions were prepared regarding blockchain technology, sustainability, trust, customer satisfaction, and brand loyalty. Some were eliminated, and some were combined so that the main questions were finalized in a reasonable number. The motivation behind all questions is to understand the relationship between blockchain technology and brand loyalty in terms of sustainability in the fashion sector.

3.1. The Respondents, Questions and Answers

Six fashion industry professionals were defined. The interviewees were selected from Istanbul/Turkey, Oslo/Norway, Stockholm/Sweden, and London/United Kingdom. Their professions are fashion school manager and fashion brand management lecturer, fashion consultant and influencer, chief brand officer for an international fashion and jewelry brand, fashion consultant, sustainable fashion activist and blockchain technology expert, software developer, and fashion consultant. The questions and answers are briefly presented below.

Q1 / How can we open up the concept of sustainability in the fashion industry?
“Minimizing the possible damage to nature by not using chemical fabrics and getting rid of the waste of fabrics by re-separating a used fabric such as denim into yarns and reusing them as we call it recycling. All these approaches would define the concept of sustainable practices in the fashion sector”.

“I think that ethical approaches such as working conditions, proper salaries, and positive discrimination would be considered the main topic of sustainability.”

“The notion of sustainability is quite comprehensive. During the cutting phase of a product produced by traditional methods, the waste of fabric parts can be left behind.

There are new technologies that prevent this problem, and they are called zero-cuts. For example this is an example of sustainability. It prevents fabric waste”.

“Sustainability in the fashion industry would express an ecosystem compatible with nature by reducing carbon footprint, by not creating a waste of fabrics during production and by not using chemical dyes.”

“Sustainability in the fashion industry refers to an ecosystem that does not pollute nature and provides ethical working conditions.”

Q2 / How do you describe the relationship between blockchain technology and sustainable practices in the fashion industry?

“Blockchain is still quite a new technology for all industries. Blockchain is an open-source system of recording information in a way that makes it almost impossible to change, hack, or cheat the system. In the fashion industry, it is possible to record the amount of electricity and water consumed to produce a product, the type of fabric used, the logistics model applied, etc. Many data could be recorded using this technology. Customers with this tech could see all the data. This could contribute to understanding sustainability in the sector and satisfy consumers with transparent data“.

“Brands that declare that they implement sustainable practices in their ecosystems can record their operations with blockchain technology and share this with everyone as open source. Generation Z, which grows with technology, would attract more attention. The brands compatible with blockchain technology will also be positively differentiated in the sector”.

“This technology can be used in the fashion industry, especially in the supply chain. It is possible to record information such as the amount of water and energy used in the production process and the fabrics' properties. All that information would be shared with customers as an open source and unchangeable form with blockchain technology, which could create more transparency and build trust between brands and customers”.

“A brand that uses the zero-cut method and prefers organic dyes to chemical dyes can record these practices with blockchain technology. All of those data can be shared with consumers. For example, a QR code could be placed on product labels, and the dates we record with blockchain would be linked with this QR code. With this code, customers can view many stages of that product instantly. I see blockchain as a precious technology for brands that claim to be sustainable”.

“This technology allows brands to disclose what they are doing in the name of sustainability to gain trust in the industry.”

“Recording the practices made in the context of sustainability with blockchain technology is a kind of definitive proof of the accuracy of these practices in the fashion industry.”

Q3 / In the context of sustainability in the fashion industry, is it possible to point out a trust problem between brands and customers?

“I do not believe the trust issue has been completely overcome yet. However, the interest in brands such as Reformation, which have built all their operations on sustainability, indicates that many brands will follow. I also see the positive

developments in big organizations such as H&M and Inditex, but I also have a trust problem with brands. Many brands may say they are taking more ethical and sustainable steps, but I still think they do not explain much. For instance, let us think about the collapse of The Rana Plaza. If this had not been, perhaps these issues would still not have occupied such a place on our fashion industry's agenda."

"Many brands have expressed that they are more sustainable via their communication channels or are willing to be more sustainable. However, it is complicated to know whether this is true or if they are doing it just for marketing purposes. In this sense, I observe a serious problem of trust in the sector."

"The notion of sustainability has become very trendy in the sector. It is pretty difficult to understand whether a brand is implementing the practices as they say or not. There are third-party firms in this regard. These firms examine brands and conclude sustainability approaches to let customers trust the brands, but we do not know how ethically this process works. For this reason, it is very possible to use the concept of sustainability as a marketing tool, creating a trust problem in the sector".

"It is possible for the brands to use this concept as a marketing tool. This creates a trust problem in the industry because we may not know whether the said methods are applied."

"We cannot know what fashion brands are doing. I feel like this concept is being used for marketing to motivate profitability."

"The main reason for this trust problem is that brands use many concepts as a marketing tool with the motivation of profitability. I think sustainability has become one of these concepts."

Q4 / To what extent could fashion brands use blockchain technology to build trust between consumers and brands regarding sustainable practices?

"Blockchain technology may be vital at this point. For example, suppose a brand records all data regarding sustainability with blockchain technology as they promise to make. In this case, since the data processed by this technology becomes a reliable source, we may not have to believe either the brand or the third-party institutions. At this point, I find this technology very important to build the trustful ecosystem."

"In particular, the fact that the information recorded with blockchain technology is unchangeable and can be shared as open source is a kind of guarantee document on behalf of the processed information. If a brand claims to implement sustainable practices and can record the data regarding sustainability approaches with this technology and share it as an open-source with its customers, at this point, a sense of trust can arise."

"I think that brands that integrate this technology into their workflow would create a more permanent trust with their customers."

"If a brand is involved in sustainable actions, the most up-to-date and correct way to prove this is to record these applications with blockchain technology and share these data with consumers. I can say that this will undoubtedly build trust between brands and consumers. Of course, this technology is quite new, and it is necessary to raise awareness and explain the importance of the technology to the consumers."

“I would like to speak the way to brands: Are you doing something for sustainability, then record it on the blockchain? This builds trust.”

“It is possible to provide trust with this technology and create transparency with the consumers by recording data-related sustainable approaches and sharing the data without the need for an intermediary.”

Q5 / What would be the effects on customer satisfaction of building trust by blockchain technology between brands and customers in the context of sustainability?

“Whatever steps a fashion brand takes to reduce global warming, they could record this information with blockchain technology and share it with the customers”.

“The sense of trust created between brands and their customers will undoubtedly positively affect customer satisfaction.”

“We can say that a brand that has created a sense of trust will also have a more assertive stance on customer satisfaction.”

“Since the data recorded with blockchain technology cannot be changed, the data processed here gives confidence in the name of accuracy, which undoubtedly brings customer satisfaction.”

“Customer satisfaction is impossible without trust. Blockchain technology is the key to creating a sense of trust between brands and consumers”.

“Blockchain technology will become a prerequisite for a sense of trust.”

Q6 / How can the relationship between customer satisfaction and brand loyalty be defined?

“Analyzing the expectations of the consumers well, detecting the changing and transforming customer perception and being able to give them what they want creates customer satisfaction, which is the most important method leading to brand loyalty.”

“Brands should be able to analyze their customers well and respond to their demands that may change over time. I can say that this will lead to loyalty between customers and brands over time.”

“For brand loyalty to be formed, it is necessary to ensure permanent customer satisfaction.”

“Customer satisfaction could turn into brand loyalty over time.”

“In order for a brand to gain the loyalty of its consumers, it must be able to establish a permanent customer satisfaction ecosystem.”

“Brand loyalty can only be born after strong trust and long-term customer satisfaction.”

Q7 / What are the effects of using blockchain technology on creating brand loyalty in the context of sustainability?

“We can say that many fashion brands have started to invest in the concept of 'sustainability' for a long time. Of course, this trend in fashion brands aims to meet customers' demands in this direction. Although blockchain is a new technology, brands should invest in it, educate, and enlighten their consumers on this issue to show them how assertive they are in this field. I think using blockchain technology in the field of

sustainability will increase trust and customer satisfaction, making brand loyalty more permanent over time.”

“Fashion brands can record their sustainable practices with blockchain technology and thus build a strong sense of trust with their customers, which results in customer satisfaction. As a result, the phenomenon of brand loyalty can be created healthier.”

“We said that customer satisfaction must be ensured permanently for brand loyalty. I think blockchain technology is the most valuable tool for a brand, especially in terms of sustainability,”

“At this point, sustainability is vital in creating brand loyalty.”

“I have stated that the primary criterion for forming brand loyalty is to create a sense of trust. I think the key to this sense of trust is blockchain technology. Of course, the technology is new, and the importance of blockchain technology may not be fully understood. Brands should grasp this issue as soon as possible, integrate it into their structures, and take an essential step at this point to raise awareness of their consumers. I think this action will provide brands with a permanent position in the sector and positively differentiate brands by building brand loyalty.”

“I think blockchain technology has gained vital importance in creating brand loyalty regarding sustainability.”

3.2. Developing a Conceptual Model

Based on these insights, a new conceptual model is developed, as shown in Figure 1. The hypothesis that ‘The use of blockchain technology has a positive contribution to brand loyalty.’ has been formed with the results obtained in this qualitative study. Besides the primary hypothesis, six more hypotheses regarding traceability, transparency, trust, ethics, and environment can also be shaped by the results obtained in this qualitative study. These are:

1. Tracking a fashion product by blockchain technology’s traceability configuration positively affects brand loyalty.
2. The use of blockchain technology has a positive effect on the transparency of brands.
3. There is a positive relationship between using blockchain technology and creating a sense of trust.
4. The use of blockchain technology for fashion brands positively affects the implementation of more ethical practices.
5. Setting up blockchain configurations for fashion brands can empower them to create a sustainable environment.
6. There is a positive relationship between customer satisfaction and brand loyalty.

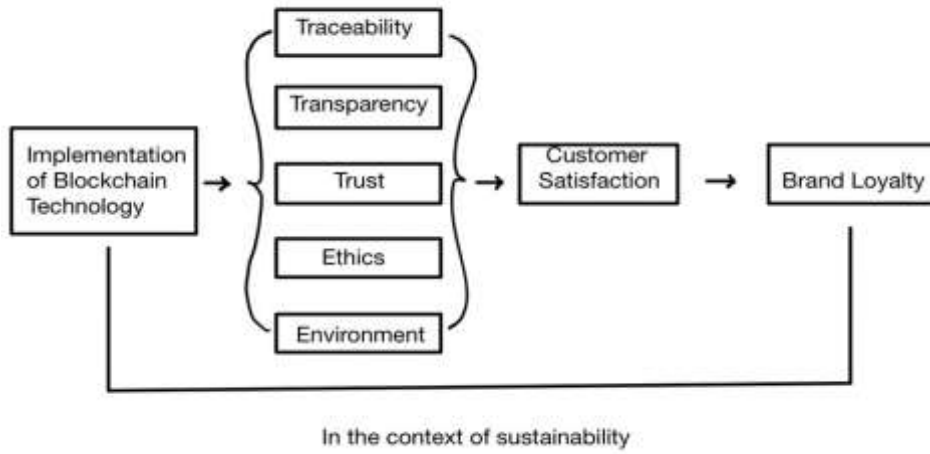


Figure 1. The effect of blockchain technology implementations on brand loyalty.

4. CONCLUSION

This study, exploratory research, examines the potential impact of blockchain technology on brand loyalty in the fashion industry in the context of sustainability. It also focuses on gaining a deeper understanding of the possible factors that may affect the strengthening of brand loyalty. In this context, in-depth interviews, one of the qualitative research methods, were conducted. Seven basic semi-structured questions were created as a result of the literature review. Industry experts who work professionally in the context of sustainability in the fashion industry and are interested in blockchain technology were identified and interviewed. The study concluded that using blockchain technology for fashion industry brands could positively affect brand loyalty in the context of sustainability. It was hypothesized that five intermediary factors emerging with the integration of blockchain technology positively affect customer satisfaction and brand loyalty. These intermediary factors are traceability, transparency, trust, ethics, and environment. Finally, a new conceptual model was developed based on these findings.

No study on the subject of this study has been encountered in previous academic studies. Therefore, it can be said that it is one of the first studies on this subject. Besides, since this technology is new, brands have not yet fully adopted it. Therefore, quantitative data could not be collected from the sector. For this reason, surveying during the data collection period was not deemed appropriate, so an in-depth interview method was used. It is expected that the study will shed light on future research.

REFERENCES

GFA (2021). Global Fashion Agenda. Retrieved from:

Greene, J., and Longobucco, A. M. (2018). What can Blockchain Technology do for the Fashion Industry? *Fashnerd*. Retrieved from <https://fashnerd.com/2018/04/blockchain-technology-fashion-tech-industry/><https://www.globalfashionagenda.com/about-us/> .

(Accessed: 22.08.2024).

Jacoby, J. & Kyner, D. B., (1973). Brand Loyalty vs Repeat Purchasing Behavior. *Journal of Marketing Research* 10 (1), 1-9. doi: 10.2307/3149402.

Joshi, N. (2020). Public vs Private Blockchain: Who Wins? *Allerin*. Retrieved from <https://www.allerin.com/blog/public-vs-private-blockchain-who-wins>.(Accessed: 22.08.2024).

Lam, W. (2020). Why do Fashion Supply Chain Transparency and Traceability Matter? *Equiply*. Retrieved from <https://equiply.org/why-fashion-supply-chain-transparency-and-traceability-matter/>. (Accessed: 22.08.2024).

- Mavrokefalidis, D. (2020). Fashion Industry Branded ‘Second-Largest Polluter after Aviation’. Retrieved from <https://www.futurenetzero.com/2020/04/08/fashion-industry-branded-second-largest-polluter-after-aviation>. (Accessed: 12.02.2024).
- Nevalainen, J., Sundberg, C., Coleman, I., and Pirinen, A. (2020). Blockchain – A New Trend in the Fashion Industry? Hannes Snellman. Retrieved from
- Oliver, R. L. (1999). Whence Consumer Loyalty? *Journal of Marketing* 63, 33-44. doi: 10.2307/1252099
- Pautasso, E., Ferro, E., Osella, M. (2019). Blockchain in the Fashion Industry: Opportunities and Challenges. Research Note. Retrieved from <https://tcbf.eu/sites/tcbf.eu/files/doc/blog/blockchain-fashion-industry-tcbf-foundation.pdf>. (Accessed: 22.08.2024).
- Sumner, M. (2019). Can the Fashion Industry ever Really be Sustainable? Retrieved from <https://www.thefashionlaw.com/can-the-fashion-industry-ever-really-be-sustainable/> (Accessed: 20.07.2024).
- Taylor, G. (2017). Three Benefits of Using Blockchain in Your Supply Chain (And Three Downsides). Chain Point Blog. Retrieved from <https://blog.chainpoint.com/blog/three-benefits-of-using-blockchain-in-your-supply-chain-and-three-downsides>. (Accessed: 02.11.2021).
- TOC Logistics (2019). Pros and Cons of Blockchain in Logistics. Retrieved from <https://www.toclogistics.com/pros-and-cons-of-blockchain-in-logistics/>(Accessed: 21.09.2021).
- Turrillo, H. (2020). AI and Blockchain and the \$3 Trillion Fashion Industry – Challenges and Opportunities. *Fashion ABC*. Retrieved from <https://www.fashionabc.org/ai-and-blockchain-and-the-3-trillion-fashion-industry-challenges-and-opportunities/> (Accessed: 02.09.2021).
- Quora (2018). Quora, Inc. Retrieved from <https://www.quora.com/Who-invented-blockchain> (Accessed: 02.05.2021).

Legal regulations for the operation of national restaurants in the region and Kosovo

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Abstract

Introduction: This paper examines the potential for sustainable development and cultural collaboration in hospitality establishments, focusing on national restaurants as symbols of tradition. While most countries regulate national restaurants under general laws, only a few, including North Macedonia, Montenegro, and Kosovo, have specific regulations for these unique establishments.

Aim: To conduct a comprehensive analysis of current management practices in hospitality services, identify the main challenges faced by restaurants, and propose strategies to enhance the development of restaurant services and cultural collaboration in the region.

Method: This involves a thorough systematic analysis of relevant literature on similar topics, including selected studies, theoretical articles, and reports on hospitality management and national restaurants.

Findings: Additionally, the importance of regional collaboration in strengthening the capacity for sustainable management of natural resources, tradition, and cultural heritage is particularly emphasized.

Conclusion: Restaurants have become an integral part of modern life today. Without their existence, contemporary people would struggle to function properly. The concept of a national restaurant primarily revolves around traditional dishes that have been prepared in the region for many years, with many dishes having roots in distant history.

Originality and Value: This paper provides new insights into the criteria for conducting hospitality services, including the operation of restaurants, which are used in selecting information sources, and places them in the context of previous research. The study also covers the information behavior of adolescents in everyday life.

Key Words: cultural policy and cooperation, hospitality establishments, region, national restaurants, political challenges.

Jel Codes: Z00, Z1, Z32

1. INTRODUCTION

Legal regulations for the operation of national restaurants in the region and Kosovo

The subject of these seminars is national restaurants as a distinct type of restaurant that protects national interests and preserves the tradition of a people. Our work

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highlights the importance of national restaurants in modern society, where they are currently located, and their significance in preserving the identity of a society. Today, people go to restaurants not just to eat but to enjoy the food, so it is no longer enough to offer just high-quality prepared food; there is an increasing demand for other factors. Modern consumers place greater importance on factors such as service quality, ambiance, professional staff, and differentiation from others. A national restaurant, however, is characterized by a special atmosphere and ambiance, distinguishing itself from other restaurants and offering all these mentioned factors to consumers. Additionally, we highlighted the legal regulations that govern the operation of national restaurants. Few countries have adopted specific legislation for national restaurants; instead, national regulations are governed by general tourism industry laws. This is the case with Kosovo, where we reside. In the following section, we describe the restaurant concept. Based on the information, the restaurant concept should represent an adequate creation for the market where it is presented, with efforts to showcase itself as better than competing restaurants. We also listed restaurants in our city, specifically in the city of Prizren, that proudly carry the label of a national restaurant. Although Prizren is a tourist city with numerous restaurants, the number of restaurants that selflessly preserve the tradition of our region is small. In the final section, we present the criteria important to us for a national restaurant.

2. LEGAL REGULATIONS

2.1. Legal regulations and criteria for national restaurants in North Macedonia

As a special type of hospitality establishment, a national restaurant is defined under the Hospitality Law, and a special designation is issued by the government authority responsible for hospitality. To obtain this label, the hospitality establishment must meet the following criteria:

1. Must have undergone classification of hospitality establishments, without an expiration of the term;
2. Food on the menu must consist of at least 70% local traditional dishes compared to international dishes, while the offer of wine and other beverages must consist of at least 80% wines and other beverages produced in the Republic of North Macedonia compared to international wines and other beverages;
3. The exterior and interior of the establishment must use natural materials and motifs from traditional national culture, including folk instruments, traditional costumes, household items, and similar products;
4. The staff's clothing must feature traditional applications and motifs;
5. The music played must be authentic with acoustic sound.

The label once obtained cannot be transferred. Hospitality establishments must have at least 70% of the menu consisting of local traditional dishes compared to international dishes, with a minimum of five traditional dishes. Food preparation must use locally

sourced ingredients and follow traditional methods according to national or regional recipes. Wine and other alcoholic beverages must consist of at least 80% from local sources compared to international sources. The exterior decoration should use materials such as stone, wood, brick, fired brick, wrought iron, or other natural building materials characteristic of traditional architecture. The interior design should reflect traditional styles from old taverns, including furniture and decorations specific to the region, while respecting old traditions and customs.

The symbol for "National Restaurant - Meana" is a standardized rectangular plaque measuring 21 to 30 cm with a thickness of 1 mm, made of highly polished stainless steel (material INOH 18/10).

The following information is inscribed on the plaque:



At the top of the plaque, "Republic of North Macedonia" is written in Macedonian, followed by "National Restaurant - Meana." The same text is written in English on the lower part of the plaque. Between the Macedonian and English inscriptions is a graphic symbol - a cauldron with black lines and shaded copper parts. In the upper left corner of the cauldron, there are two semi-arches, one yellow and one red. On the lower part of the cauldron, there are two semi-arches in blue and green.

The size of the symbol is 17 to 26 cm. (pravdiko.mk, 2024)

The procedure for obtaining the title of national restaurant is carried out by a Commission for Implementing the Procedure for Obtaining the National Restaurant Sign, consisting of five members with deputies. The Commission is formed by the minister at the head of the government authority responsible for hospitality and includes one member from the tourism authority, one from the Ministry of Culture, one from the Cabinet of the Deputy Prime Minister responsible for economic affairs and coordination of economic resources, one member from the tourism chambers, and one member from the tourism industry.

The Commission prepares a decision within 30 days of receiving the application if all criteria are met. The decision is valid for three years. An appeal against this decision can be submitted to the State Commission for Administrative Procedure and

Employment. The costs for obtaining the label are borne by the hospitality provider. Those seeking the right to use the National Restaurant - Meana label must submit their application to the Ministry of Economy with the required documentation, including:

1. Decision from the Central Register of the Republic of North Macedonia;
2. Decision for completed classification;
3. Proof of payment of administrative tax;
4. Proof of payment for the Commission's work.

Applications should be submitted in two identical forms with one set of evidence.

2.2. Legislation and criteria for national restaurants in Montenegro

According to the new Tourism Law, national restaurants in Montenegro must be categorized under the rating of four and five stars. (MRT, 2024) The Ministry of Sustainable Development and Tourism will provide its approval for operations, and its commission will categorize the national restaurants. National restaurants must constitute 70% of the total offer. If the restaurant also includes special design and decoration elements and certain service characteristics, the national label may be used.

According to the rules, a five-star restaurant should have the highest quality of service and comfort, an exclusive appearance, and a designed interior with a minimum of 1.8 square meters per table. Standards include high-quality linens and napkins, a menu in at least four languages, with at least 15 dishes including eight international ones, wine from Montenegro, and at least one foreign language. The restaurant should also have high-quality materials for dishes, branded tableware, and glasses, with a bar equipped with a coffee machine, ice maker, sailor, and glass washer. "Wine must include 20 types, with ten being high-quality and five premium wines with geographic origin, champagne, and cognac, served with professional service." The restaurant must be able to prepare dishes with unique combinations of top culinary techniques, according to classification regulations. It must also have parking immediately adjacent to the facility.

2.3. Legal regulations and criteria for national restaurants in Kosovo

In Kosovo, there is no specific law governing the operation of national restaurants. The operation of national restaurants is regulated by the Law on Tourism and Hospitality Services. Under this law, hospitality activities include food preparation, the preparation and serving of alcoholic and non-alcoholic beverages, and accommodation services. Hospitality establishments under this law include:

- Hotels: hotels, tourist resorts, depandances, apartment complexes, motels, guesthouses, etc.
- Camps, rental rooms, apartments, youth hostels, mountain lodges, inns, etc.
- Restaurants: restaurants, taverns, national restaurants, dairy restaurants, cafes, pizzerias, cévapi houses, national cuisine, burek shops, etc.
- Bars: bars, night bars, disco clubs, etc.
- Buffets: pubs, bistros, etc.
- Cafés: cafés, coffee shops, dessert cafes, etc.

- Meal preparation (food delivery).

The Ministry of Tourism re-categorizes hospitality facilities every two years as part of its official duties and redefines the category of these facilities.

For the categorization of facilities, the Ministry of Tourism issues a decision that is recorded in the Register of Categorized Hospitality Facilities. If it is determined that a facility no longer meets the conditions for a defined type and category, a new type and category of facility will be assigned by decision.

A hospitality facility can have a name based on the type of services it offers. The name of the type of hospitality facility may be changed if the conditions for providing other types of services in the hospitality facility are met. (Kosoves, 2024)

The Ministry of Tourism is determined by a special act regarding the types of hospitality facilities it categorizes, the categories, the elements, and criteria for categorization, as well as the way of accommodating hospitality facilities. The categorization of a hospitality facility will be determined by an act issued by the Ministry of Tourism, upon request by the hospitality provider. The hospitality facility may begin operations when the competent administrative authority determines the category.

The entrance of each hospitality facility indicates the prescribed designation of the type and category of the facility. The Ministry of Tourism maintains a register of categorized hospitality facilities.

The Ministry of Tourism issues operating permits for hospitality facilities according to Article 67, paragraph 1. The Ministry responsible for tourism determines whether the conditions are met within 30 days from the day of the properly submitted request.

2.4. The concept of restaurants

Each restaurant has a specific concept on which it builds its image. The conceptual value of restaurants arises from information obtained through market research.

The concept and market include the following elements: (Martinovska, 2011)

- ❖ Location
- ❖ Atmosphere and ambiance
- ❖ Price
- ❖ Menu
- ❖ Quality
- ❖ Service
- ❖ Food and beverages
- ❖ Management

Based on this information, the restaurant concept should represent an adequate creation for the market to which the offer is presented, with an effort to present it as best as possible compared to competing restaurants. (Martinovska, 2011)



Figure 1. Restaurant Concept (Martinovska, 2011)

2.4.1. Location

The restaurant concept must align with the location, and the location should be compatible with the concept. The location should meet the needs of the "main market." In addition to the basic criteria for determining the location (demographic characteristics of the area, economic power of the area), the following criteria should be met for determining a more specific location:

- Advantages or disadvantages of fitting the facility into a given environment (ecological, technological)
- Whether the restaurant is adapted to the purchasing power of the consumers
- Whether the restaurant has an attractive external appearance and decoration for consumers
- Location and surroundings (whether the surroundings are safe and desirable)
- Whether the restaurant has parking space

2.4.2. Atmosphere and Ambiance

The atmosphere and ambiance of the restaurant are key elements of its concept. The ambiance of the restaurant and its surroundings, the mood, and the situation are subjective factors, but also material factors of the environment.

Elements that make up the ambiance and atmosphere in the restaurant include architecture, decoration, the condition of technical equipment, and the quality of service. The architectural restaurant must blend with the center and together form a cohesive whole. The interior arrangement and decoration of all rooms in the restaurant, along with

an environmentally clean environment, contribute to making the restaurant attractive to visitors.

A good ambiance and atmosphere contribute to achieving good communication with consumers and are therefore important. The ambiance and atmosphere largely contribute to creating a good mood for the guests.

2.4.3. Restaurant Quality

The quality and concept of a restaurant relate to the provision of food and beverages, services, and the environment, which have characteristics and meet the expectations of consumers. Quality is crucial for competing successfully. Additionally, with their quality, restaurants can ensure long-term customer loyalty, achieving significant success in business that contributes to higher profitability.

Customer satisfaction and profitability are closely linked to the quality of products and services. High quality results in high customer satisfaction, which simultaneously means higher prices and lower costs.

2.4.4. Food and Beverages

The selection of food and beverages for guests is primarily based on their desires and perfection. The good characteristics of food and beverages are related to consumer perception and represent an essential element of the restaurant concept. This includes:

- The choice of food and beverages offered on the menu, whether limited or extensive
- The quality of the product offered, whether it is freshly prepared or was frozen before preparation
- The ingredients of the product, whether they consistently have the same characteristics
- Variety of flavors, aromas, and colors offered
- Whether food and beverages are served at the appropriate temperature
- Presentation of food and beverages

2.4.5. Menu

The menu and its offerings depend on the food and beverages served. The menu also influences the equipment and number of staff. The creation of the menu is primarily influenced by several factors, such as the price consumers are willing to pay, the time consumers can spend using restaurant services, the market level where the restaurant is located, etc.

2.4.6. Service

A successful restaurant concept is created based on consumers. All operations in restaurants should be designed to meet consumer needs.

The level of service primarily depends on the type of restaurant. Restaurant services are categorized as direct and indirect. Direct restaurant service refers to food and beverages, while indirect service refers to telephone use, baggage storage, etc.

Depending on the restaurant concept, management should determine the level of service offered. Within the restaurant concept, services for food and beverages, as well as indirect aspects of service, should be established.

2.4.7. Price

Restaurant prices complement the restaurant concept. The price levels vary depending on the type of restaurant and the characteristics of prices in the market where the offer is intended.

The selling price should be acceptable to the market and profitable for the restaurant. The main factors affecting the price are:

- Competitive pricing
- Size of direct costs
- Labor costs
- Other expenses
- Expected profit
- Profit margin

2.4.8. Management

Managers are the creators of restaurant concepts. The interaction between consumers and restaurants as providers of products and services consists of three phases:

1. Consumer expectations before visiting the restaurant
2. Actual experience
3. Impression (positive or negative) experienced by the consumer

In the first phase, there should be advertising for the restaurant, products, and services, but the promotion should be realistic.

The second phase is where managers pay more attention, and their control is greatest. This phase occurs during the consumer's stay in the restaurant, evaluating the ambiance, taste, and quality of food and service.

In the third phase, consumer expectations are compared with the experience they had, leading to a decision on whether to return or not. Here, the manager's control is minimal. It is very important for the ability of managers and staff to resolve customer dissatisfaction without conflict.

3. METHODOLOGY

This study employs a combination of qualitative and quantitative methods for data collection and analysis regarding the functionality and legislative framework for national restaurants in the region.

❖ Systematic Literature Review:

The first step in the methodology involves a thorough analysis of relevant literature. This includes studying existing theoretical papers, case studies, reports, and research focused on hospitality, restaurant management, and the legal regulations related to national restaurants. This analysis helps identify current challenges in the regulation and operation of national restaurants, as well as understanding the role of these establishments in preserving cultural identity.

❖ **Field Research:**

The qualitative aspect of the research is based on field research, which includes observing and interacting with local restaurants. This research uses participatory observation, where researchers actively observe the operations of the restaurants and engage with owners, staff, and customers to collect data on daily practices and challenges faced by national restaurants.

❖ **Analysis of Secondary Sources:**

Another important aspect of the research involves analyzing secondary data sources such as reports, statistics, and previous studies on hospitality services, legal frameworks, and the restaurant market. These sources provide a broader context for understanding existing regulations and their impact on the operation of national restaurants.

❖ **Engagement with Local Stakeholders:**

Through engagement with local stakeholders (restaurant owners, lawmakers, cultural organizations, and tourism experts), the research gathers concrete data on legislative practices and local needs regarding the preservation of cultural values in hospitality. This process provides a better understanding of local challenges and perspectives on legal frameworks and their implementation in practice.

❖ **Data Analysis and Interpretation:**

The data collected from literature, field research, and interactions with stakeholders are analyzed to develop recommendations for improving legislative frameworks and practices in the hospitality industry, with a particular focus on national restaurants. The analysis identifies key factors that influence the success of national restaurants, as well as opportunities for enhancing legal and management practices aimed at preserving cultural traditions and identity.

Through this methodology, the research provides a comprehensive insight into the current situation of national restaurants in the region and proposes strategies to improve their operations and legal regulations.

Hypothesis: National restaurants in the region, including Kosovo, face challenges due to the lack of specific legal regulations, as they are governed by general laws related to the hospitality and tourism industry. This lack of specific legislation may negatively affect the preservation of cultural heritage and traditions through the operation of national restaurants.

Secondary Hypothesis: The development of national restaurants is influenced by regional collaboration, which strengthens sustainable management practices, cultural preservation, and the promotion of traditional culinary heritage.

3.1. Regression analysis results

Every restaurant, including national restaurants, must meet certain criteria. The criteria that national restaurants should meet include:

- **Exterior Appearance, Location, and Infrastructure:** The restaurant's appearance should feature traditional motifs, which should also be present inside the restaurant. The location must be accessible to guests, with parking provided for guest vehicles.
- **Design and Decoration Elements:** The restaurant should contain unique design and decoration elements that make it stand out.
- **Serving Dishes:** The dishes used to serve food should match the given ambiance and follow the traditional cuisine and traditions of the region.
- **Staff Uniforms:** Employees should be dressed in accordance with the restaurant's interior design, ideally in traditional attire if possible.
- **Lighting:** Proper lighting throughout the establishment is necessary for the safety and comfort of guests.
- **Condition of the Building and Equipment:** The restaurant, along with its equipment, should be in good condition, functional, and hygienic. This means that the restaurant and its accompanying equipment should be well-maintained, and hygiene should be of a high standard.
- **Kitchen, Dining Area, Restrooms, Auxiliary Rooms, and Hallways Hygiene:** Cleanliness in all areas of the restaurant is crucial.
- **Accessibility:** Ramps for disabled persons in wheelchairs should be available to ensure that people with special needs can visit the restaurant comfortably.
- **Management and Staff Behavior:** The conduct, appearance, and competence of the management and staff are essential for guest satisfaction, which in turn affects the restaurant's reputation and operation. Restaurant staff should ideally be dressed according to the restaurant's appearance, preferably in traditional clothing.
- **Knowledge of Restaurant Operations:** Staff should have a good understanding of restaurant operations.
- **Courtesy of Staff:** The staff's politeness towards guests should result in customer satisfaction.

4. CONCLUSION

Today, restaurants have become an integral part of modern life. Without their existence, modern people would struggle to function properly. Among the myriad of different restaurants, national restaurants hold a special place. The owner aims to preserve the tradition of the region and its people. Without preserved traditions, a nation faces the risk of losing its identity. Modern life and globalization tend to erode national traditions, leading people to lose their cultural identity. The concept of a national restaurant primarily revolves around traditional dishes that have been prepared in the

region for many years, with many dishes having roots in distant history. The modern lifestyle, which is heavily based on fast food, has made traditional food less appealing, especially to younger people. National restaurants strive to preserve these traditions in an original manner.

The ambiance of the restaurant should also preserve the traditions of the region and its people. National restaurants often serve as a place where young people encounter certain cultural items they may have heard about but have not had the opportunity to see. In a unique ethnographic environment, enriched with numerous historical items and the soft sounds of traditional music, guests can enjoy all their senses in authentic home-cooked dishes, local specialties, and domestic wines.

We can certainly say that national restaurants are a cultural passport of a nation and should be carefully preserved and maintained.

REFERENCES

- Damnjanović, I. (2021). *ODRŽIVI TURIZAM*. Valjevo: Univerzitet Singidunum.
- Drazic, G. (2020). *Održivi Turizam*. Beograd: Uni. Singidunum.
- Grzinic, J. (2014). *Medzynarodni Turizam*. Pula: Sveuciliste Jurja Dobrile.
- Kosoves, K. (2024, 04 20). *www.kuvendikosoves.org*. Retrieved from www.kuvendikosoves.org:
https://www.kuvendikosoves.org/common/docs/ligjet/2004_16_sr.pdf
- Krivosejev V., R. B. (2020). *Uvod u Turizam*. Valjevo: udv.
- Martinovska, D. S. (2011). *Restaurant Management*. Ohrid: FTU.
- MRT. (2024, 04 10). *www.mrt.gov.me*. Retrieved from www.mrt.gov.me:
http://www.mrt.gov.me/info_vodici/vodici/104719/
- pravdiko.mk. (2024, 05 15). *www.pravdiko.mk*. Retrieved from www.pravdiko.mk:
<https://www.pravdiko.mk/postapka-i-uslovi-za-dobivane-oznaka-za-natsionalen-restoran-meana/>

The relationship between debit and credit card expenditure and inflation in the Turkish Economy

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Abstract

Introduction: Recently, debit and credit cards have become an important element of the payment system for household expenditures of goods and services in Türkiye.

Aim: The aim of this study is to analyze whether the expenditures of goods and services made by households using debit and credit cards, in other words, whether the increase in aggregate demand for goods and services effect the consumer price index in the economy.

Method: The relationship between the total amount of debit and credit card expenditure made in the economy and the consumer price index was investigated by VAR method using quarterly data for the period 2014:01 and 2024:03. Granger causality test was performed to determine whether there is a relationship between the two variables.

Findings: As a result of the Granger causality test conducted to determine the relationship between the amount of debit and credit card aggregate expenditure and the consumer price index, there is a unidirectional causality running from the total amount of debit and credit card expenditure to consumer price index.

Conclusion: The findings showed that the total amount of debit and credit card expenditure in the Turkish economy effects the consumer price index. Spending with debit and credit cards increases the aggregate demand for goods and services, which causes inflation caused by demand-pull

Originality and value: Since the data received are reliable and in the adequate number for analysis, the analysis results are reliable and accurate.

Key Words: Debit and Credit Card, Consumer Price Index, Granger Causality Test.

Jel Codes : C32, P24.

1. INTRODUCTION

In the economic sense, the concept of money is defined as a generally accepted tool in the expenditure on goods and services and the repayment of debts by all sectors of the economy. Before the invention of money, barter economics, which is the exchange of goods for goods, prevailed in economic activities. However, since there was no common unit that could be used in the exchange of different products in the barter economy, it could cause confusion in the economic system. Some products also had a short lifespan. For this reason, money was started to be used in the economic system as a medium of

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exchange in order for the economy to function better. Mussel shells, wood, and precious metals such as gold and silver were used as money in history. Later, the paper money system was introduced. Money serves all of these functions: it is a medium of exchange, store of value, unit of account, and standard of deferred payment. Money as a medium of exchange is used to pay for goods and services. As a unit of account, it measures the values in the economy. Money being a store of value means that money maintains its purchasing power between the time the income is earned and the time it is spent (Özdemir, 2018: 27-29).

The banking sector has an important role in the economy in determining the money supply. If there were no banks, there would be no instruments like check accounts and credit cards. Economic units would have to use cash for all kinds of expenditures on goods and services. In an economy without banks, the money supply would be equal to the volume of emissions issued and released to the market by central banks. Thus, the control of the money supply in the economy would be completely under the control of the central banks. With the use of debit and credit cards, this control of the central bank has partially disappeared. Today, a large part of the household uses credit cards to expenditure on goods and services.

A credit card is a card, which is owned by a bank or financial institution, and which is issued at predetermined limits for the purpose of expenditure on goods and services at contracted businesses, domestically and abroad, and withdrawing cash from cash payment units or automatic payment machines (ATM) (Tuğay and Başgöl, 2007: 216). Households' preferences for using credit cards include not wanting to carry cash, expenditure on goods and services more quickly, benefiting from special services offered by credit card issuers, using interest-free loans for a certain period, withdrawing cash in foreign countries and obtaining extended credit opportunities (Karabulut et al., 2004: 96). In addition to these positive effects of the credit card, it may also have negative effects on the economy. The use of credit cards instead of money will reduce the speed of circulation of money. When households use credit cards, they can spend more than the amount of their disposable income. The increase in these expenditures will lead to an increase in the money supply. When expenditure on goods and services increases, aggregate demand in the economy increases. When the aggregate demand for goods and services increases, the prices of goods and services also increase. This situation increases the general level of prices in the economy. This causes demand-pull inflation in the economy.

The widespread use of credit cards in the economy mostly increases the efficiency of trade. When the rate of circulation of money in the economy increases, if there is no monetary intervention in the economy, it causes inflation. If monetary authorities want to reduce the money supply and meet pre-credit card price levels, they may have to give up efficiency gains in the economy. When there is a default on credit cards, there is more inflation and fewer productivity gains. Monetary authorities may then have to accept less than pre-credit card efficiency in order to return to pre-credit card price levels. If they don't want to reduce productivity below pre-credit card levels, then they will have to

accept inflation. This cycle can be the source of stagflation (Geanakoplos and Dubey, 2010).

Since the use of debit and credit cards affects inflation in the economy, the Granger causality test was performed using quarterly data for the period 2014:01-2024:03 in order to test whether this situation applies to Türkiye. As a result of the Granger causality test, it has been concluded that there is a unidirectional causality relationship from the total amount of expenditure made by debit and credit cards to the consumer price index. This study consists of four section. In the first section, the use of debit and credit cards in Türkiye, in the second section, the literature review on this subject, in the third section, data and method, and in the fourth section, the conclusion part are included.

2. USE OF DEBIT AND CREDIT CARDS IN TURKIYE

In 1968, "Servis Turistik AŞ", a subsidiary of the Koç Group, the representative of the first credit cards issued in Türkiye, obtained the authorization from Diners Club to issue domestic cards and started to offer the Diners Club credit card to its customers. After Setur's Diners Club application, Türk Ekspres Aviation and Tourism Limited Company entered the market with "American Express" cards. These two cards continued to operate until 1975. After 1975, Eurocard, Mastercard and Access credit cards affiliated with the Interbank group entered the market. Since 1980, many banks have started to implement credit cards due to the increase in interest in credit cards and the foreign currency input they provide (Kaya, 2009: 17-18). It is seen that there has been a great increase in the use of credit cards in Türkiye recently. Table 1 shows the domestic use of domestic and foreign credit cards in the last 5 years.

Table 1: Domestic Use of Domestic and Foreign Credit Cards

Years	Number of Transactions			Transaction Amount (Million TL)		
	Shopping	Cash Withdrawal	Total	Shopping	Cash Withdrawal	Total
2019	4.262.857.347	110.050.212	4.372.907.559	862.166,22	93.176,25	955.342,47
2020	4.242.976.816	105.250.310	4.348.227.126	961.621,68	101.060,49	1.062.682,17
2021	5.281.408.605	146.863.694	5.428.272.299	1.449.912,30	159.082,64	1.608.994,94
2022	6.827.611.499	202.427.856	7.030.039.355	3.083.087,92	355.353,17	3.438.441,09
2023	8.556.337.886	248.346.838	8.804.684.724	6.848.420,39	847.271,15	7.695.691,54
2024	4.882.993.024	114.506.860	4.997.499.884	5.745.785,34	502.490,93	6.248.276,28

Source: Interbank Card Center Inc, <https://bkm.com.tr/yerli-ve-yabanci-kredi-kartlarinin-yurt-ici-kullanimi>.

It can be seen from Table 1 that the number of shopping and cash withdrawal transactions made with domestic and foreign credit cards has increased over the years.

It is seen that the highest increase was in 2023. The transaction amount also reached the highest amount in 2023 in both shopping and cash withdrawals. Over the years, expenditure on goods and services has increased. Table 2 shows the domestic use of domestic and foreign bank cards in the last 5 years.

Table 2: Domestic Use of Domestic and Foreign Bank Cards

Years	Number of Transactions			Transaction Amount (Million TL)		
	Shopping	Cash Withdrawal	Total	Shopping	Cash Withdrawal	Total
2019	2.233.434.803	1.484.946.495	3.718.381.298	171.951,91	868.755,78	1.040.707,69
2020	2.431.670.539	1.220.110.188	3.651.780.727	208.789,77	927.590,31	1.136.380,08
2021	3.397.221.238	1.240.682.935	4.637.904.173	369.247,97	1.053.670,39	1.422.918,37
2022	5.369.455.571	1.436.936.432	6.806.392.003	884.926,01	1.593.383,90	2.478.309,91
2023	6.760.345.041	1.412.652.463	8.172.997.504	1.686.464,20	2.450.172,34	4.136.636,55
2024	3.715.079.845	710.404.964	4.425.484.809	1.199.838,76	1.751.894,46	2.951.733,23

Source: Interbank Card Center Inc, <https://bkm.com.tr/yerli-ve-yabanci-banka-kartlarinin-yurt-ici-kullanimi>.

According to the data in Table 2, it is seen that the highest amount of shopping and cash withdrawal transactions made with debit cards was made in 2023. Looking at the table in general, there has been an increase in the number of transactions made with bank cards over the years. Economic units have recently been making their expenditures with debit and credit cards.

There has also been an increase in the number of debit and credit cards issued in the last 5 years. The total number of debit and credit cards is given in Table 3.

Table 3: Total Number of Debit and Credit Cards

Years	Total Debit Cards	Total Credit Cards
2019	133.199.632	69.825.826
2020	144.743.198	75.697.214
2021	150.099.166	83.791.396
2022	168.870.330	99.489.990
2023	189.507.582	117.713.320
2024	191.825.079	124.101.350

Source: Interbank Card Center Inc, <https://bkm.com.tr/kart-sayilari>.

3. LITERATURE REVIEW

The literature review for other countries and Türkiye regarding the relationship between debit and credit card use and inflation is given in Table 4.

Table 4: Findings of Studies on Debit, Credit Card and Inflation

Author(s)/Year of Study/Country(s)/Method/Years Covered by Study	Findings
Studies for Foreign Countries	
Reddy and Kumarasamy/2015/India/Cointegration Test/2007:08-2013:03	The inflation rate leads to electronic payments by debit and credit card.
Wong and Tang/2020/Malaysia/ARDL/1997-2017	Credit card usage is the most dominant factor explaining price level behavior in the long run.
Titalessy/2020/Indonesia/OLS/2019-2020:02	Debit and credit cards do not have a significant impact on inflation.
Alazaki/2020/Saudi Arabia/Granger Causality Test/2007:01-2019:03	There is a unidirectional causality relationship between consumer borrowing and inflation. Credit cards effect inflation.
Muslikhati and Aprilianto/2022/Indonesia/OLS/2009:01-2020:12	Debit card has a significant positive effect on inflation, while a credit card has a significant negative impact.
Sahriana et al./2022/Indonesia/SPSS/2018-2021	Cashless payments partially effect the inflation rate.
Anggraini and Agustin/2022/Indonesia/SPSS/2016-2020	Credit cards have a significant effect on inflation.
Nathan/2023/Nigeria/OLS/2012-2021	The effect of expenditures made with money withdrawn at ATMs on inflation is positive.
Gbawae and Tonye/2023/Nigeria/Johansen Cointegration Test/1990:01-2021:04	There is a long-term relationship between the variables. The use of ATMs does not reduce the inflation rate.
Eid et al./2024/Egypt/SPSS/2011-2021	The credit card has an effect on inflation.
Studies Done for Türkiye	
Kayahan/2022/Granger Causality Test/2014:04-2022:05	There is a bidirectional relationship between credit and debit card usage volume and CPI.

Tunay/2023/OLS/2005:04-2022:04 and 2005:12-2022:11	Credit card expenditure is sensitive to inflation.
Yilmazkuday/2024/VAR/2015m1-2023m12	Inflation shocks increase the amount per transaction on both credit and debit cards.

4. DATA AND METHOD

In this study, the relationship between the total amount of expenditure made by debit and credit cards (DCC) and the consumer price index (CPI) was investigated using quarterly data for the period 2014:01-2024:03. Since both series have very large values, their logarithms are taken. DCC and CPI data are taken from the electronic data distribution website of the Central Bank of the Republic of Türkiye (TCMB). VAR model was used as a method.

4.1. Unit Root Test

Since the variables used in the study are time series, first of all, the ADF unit root test developed by Dickey and Fuller (1979) and the PP unit root test proposed by Phillips and Peron (1988) should be performed to test that these variables are stationary.

Table 5: ADF and PP Unit Root Test Results

Variables		ADF		PP	
		t-statistic	p-value	t-statistic	p-value
LDCC at Level	Constant	-1.632	0.457	-1.631	0.458
	Trend- Constant	-2.397	0.375	-2.668	0.254
LDCC 1st Difference	Constant	-7.295	0.000*	-7.288	0.000*
	Trend- Constant	-7.259	0.000*	-7.268	0.000*
LCPI at Level	Constant	1.961	0.999	4.608	1.000
	Trend- Constant	-0.463	0.981	0.662	0.999
LCPI 1st Difference	Constant	-2.831	0.062***	-2.770	0.071***
	Trend- Constant	-3.956	0.018**	-3.815	0.025**

Note: The signs *, **, *** indicate that the variables are statistically significant at the significance level of 1%, 5%, and 10%, respectively.

As can be seen from Table 5, according to the results of the ADF and PP unit root tests, it was determined that the DCC and CPI variables were not stationary at the level, and that they were stationary I(1) in the constant and trend-constant state in their first difference.

4.2. VAR Delay Length

According to the VAR model, the delay length was chosen as 4 because the variables were quarterly data. The test results showing the length of the VAR delay are given in Table 6.

Table 6: Delay Length Test Results

Delay	LR	FPE	AIC	SC	HQ
0	NA	0.000	-3.472	-3.385	-3.441
1	23.103*	6.70e-05	-3.935	-3.674*	-3.843
2	9.060	6.28e-05	-4.003	-3.567	-3.849*
3	6.334	6.35e-05	-3.997	-3.388	-3.782
4	8.359	5.91E-05*	-4.080*	-3.296	-3.803
5	3.432	6.54E-05	-3.995	-3.038	-3.658

According to the Final Prediction Error (FPE) and Akaike Information Criterion (AIC) seen in Table 6 and obtained from the VAR delay length test results, the delay length was determined as 4, which makes these criteria the minimum. In addition, it was tested whether there was a heteroscedasticity problem among error terms, which is one of the assumptions of the VAR model. In order to test the existence of heteroscedasticity, the chi-square (Chi-sq) statistic was found to be 60.052 and the p probability value was found to be 0.113. According to this result, the H_0 hypothesis, which is expressed as there is no heteroscedasticity among the error terms, was accepted at the 5% significance level.

4.3. Granger Causality Test

Since the variables used in the model are stationary at the same level, that is, at the I(1) level, the Granger causality test was performed to determine whether the variables in the model interact with each other. The basic idea in the Granger (1969) causality test is that if the past of a random variable X provides a better prediction of the future of another random variable Y, after taking into account all other possible relevant factors and non-random information, then the X variable is the Granger cause of Y (Atukeren, 2011: 137-138).

$$\Delta LDCC_t = \sum_{i=1}^n \alpha_i \Delta LCPI_{t-i} + \sum_{j=1}^n \beta_j \Delta LDCC_{t-j} + u_{1t} \quad (1)$$

$$\Delta LCPI_t = \sum_{i=1}^m \lambda_i \Delta LCPI_{t-i} + \sum_{j=1}^m \delta_j \Delta LDCC_{t-j} + u_{2t} \quad (2)$$

The causality relationship test results between the total amount expenditure by debit and credit card (DCC) and the consumer price index (CPI) are given in Table 7 according to the four lag lengths.

Table 7: Granger Causality Test Results

Direction of Causality	F-Statistic Value	Probability Value (p)	Decision
Δ LDCC is not the cause of Δ LCPI Granger	5.044	0.003*	Exist
Δ LCPI is not the cause of Δ LDCC Granger	2.021	0.117	Does not exist

Note: *1% is statistically significant

According to the result of the Granger causality test shown in Table 7, the total amount of expenditure made by debit and credit card is the cause of CPI. The probability value (p) was found to be 0.003. According to the 1% significance level, the null hypothesis that the total amount of expenditure made by debit and credit card is not the cause of CPI is rejected. The null hypothesis that CPI is not the cause of the total amount expenditure by debit and credit card is accepted according to the 5% significance level because the probability value (p) is found to be 0.117. According to these evaluations, a unidirectional causality relationship was found from the total amount of expenditure made by debit and credit cards to CPI in the period under review. Since expenditure with debit and credit cards increases the demand for goods and services, it causes inflation in the economy caused by demand. Since individual's expenditure more than their disposable income with credit cards, it causes an increase in CPI in the economy.

5. CONCLUSION

The importance and effects of credit cards in the economy have started to increase recently. Credit cards are used just like cash in the expenditure of goods and services of economic units. Credit card has become a payment tool used instead of money. While the use of credit cards has positive effects on the economy, it also has negative effects. Among the advantages of expenditure with credit cards are the payment of goods and services fees in future months, use of interest-free credit, installment and promotion. Due to these advantages provided by the credit card, it is observed that there is an increase in the expenditures made with credit cards. The increasing tendency to expenditure with credit cards also increases the aggregate demand for goods and services. This leads to an increase in the production of goods and services. The increase in production increases employment. With the increase in employment, the disposable income of the household will increase, and the aggregate demand for goods and services will increase more. This, in turn, will positively effect and increase the national income. However, thanks to the credit cards they have, households may expenditure more than their disposable income in some periods. In this case, there is a continuous increase in the aggregate demand for goods and services. When aggregate demand increases, the prices of goods and services will increase, unless the supply side increases in parallel. It will negatively affect the general level of prices. The problem of inflation arising from demand will arise in the economy. Since the real purchasing power of households will decrease as inflation rates

increase, that is, their disposable income will decrease as real, households will use bank and credit cards more in their expenditures.

Since the use of debit and credit cards has an impact on many macroeconomic indicators, in this study, the relationship between the total amount of expenditure made by debit and credit cards and the consumer price index was investigated by the VAR method using quarterly data for the period 2014:01-2024:03. Granger causality test was performed to determine whether there is a relationship between the two variables. As a result of the Granger causality test, it has been concluded that there is a unidirectional causality relationship from the total amount of expenditure made by debit and credit cards to the consumer price index.

This study reveals similar results with Wong and Tang (2020), Alazaki (2020), Anggraini and Agustin (2022), Nathan (2023), Eid et al. (2024), Tunay (2023) and different results with Reddy and Kumarasamy (2015), Titalessy (2020), Muslikhati and Aprilianto (2022), Sahriana et al. (2022), Kayahan (2022), Yilmazkuday (2024).

Despite the tight monetary policy implemented by the Central Bank of the Republic of Türkiye to control the rate of price increase, the use of debit and credit cards continues to increase. Expenditures made with debit and credit cards increase the rate of price increase. In order to reduce the rate of price increase, it is necessary to impose some restrictions on the use of debit and credit cards. Some of the measures to be taken for this purpose include; limiting debit and credit card limits, increasing interest rates on debit and credit card debts, limiting installments in expenditures, increasing the minimum payment amount for credit cards and limiting the use of cards for expenditures made from abroad. Since the use of debit and credit cards increases the rate of price increase, the rate of price increase can be slowed down by reducing the use of debit and credit cards with the implementation of these policies.

REFERENCES

- Alazaki, Z. A. (2020), "The Relationship of Consumer Loans, Credit Cards and the Interest Rate to Inflation in Saudi Arabia: An Econometric Study through Quarter Data for the Period 2007-2019", *Management & Economics Research Journal*, 2(3), 78-95.
- Anggraini, A., Agustin, G. (2022), "Effect Cashless Payment on Inflation with Velocity of Money as Intervening Variable", *Balance Jurnal Economics*, 18(02), 199-207.
- Atukeren, E. (2011), "Granger-New Approaches to Causality Tests", *Journal of Atatürk University Faculty of Economics and Administrative Sciences*, 10. Special Issue of Econometrics and Statistics Symposium, 25, 137-153.
- Interbank Card Center ICC Inc, 2024, <https://bkm.com.tr/yerli-ve-yabanci-kredi-kartlarinin-yurt-ici-kullanimi>, Access Date: 28.08.2024.
- Interbank Card Center ICC Inc, 2024, <https://bkm.com.tr/yerli-ve-yabanci-banka-kartlarinin-yurt-ici-kullanimi>, Access Date: 28.08.2024.

Interbank Card Center ICC Inc, 2024, <https://bkm.com.tr/kart-sayilari>, Access Date: 28.08.2024.

Dickey, D. A., Fuller, W. A. (1979), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root", *Journal of the American Statistical Association*, 74(366), 427-431.

Eid, E. A., Mohamed, A. el S., Meslehy, A. I. (2024), "The Impact of Monetary Policy- Using Credit Card-on Inflation, Economic Growth, Total Loans, Liquidity and Profitability Evidence From Egypt For The Period Of (2011-2021), *Science Journal for Commercial Research*, 54(3), 39-54.

Gbawae, N. C., Tonye, T. (2023), "The Impact of Cashless Economy on Inflation and Corruption in Nigeria", *Global Academic Journal of Humanities and Social Sciences*, 5(3), 161-174.

Geanakoplos, J., Dubey, P. (2010), "Credit Cards and Inflation", *Games and Economic Behavior*, 70(2), 325-353.

Granger, C. W. J. (1969), "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods", *Econometrica*, 37(3), 424-438.

Karabulut, K., Polat, D., Gündüz, Ö. (2004). "The Relationship Between Credit Card Usage and Expenditure- An Application on Doctors Working in Erzurum-", *Journal of the Faculty of Economics and Administrative Sciences of Uludag University*, XXIII(2), 91-115.

Kaya, F. (2009). "Credit Card Application in Turkiye", *Banks Association of Turkiye*, No.263, Istanbul, 17-18.

Kayahan, G. (2022), "The Relationship Between Credit Cards, Debit Cards and Inflation Rates: A Study on Turkiye", *International Journal of Social Sciences and Humanities Research*, 9(85), 1291-1296.

Muslikhati, M., Aprilianto, F. (2022), "The Impact of a Cashless Payment System on Inflation", *Jurnal Ekonomi Pembangunan*, 20(02), 124-136.

Nathan, O-P. S. (2023), "Electronic Payment System and Inflation Rate: Empirical Evidence from Nigeria", *International Journal of Economics and Financial Management*, 8(3), 140-152.

Özdemir, B. K. (2018), "Money and the System of Payments", *Monetary Theory*, (Ed. S. Gerek), Anadolu University Press, No. 2635, Eskişehir, 27-29.

Phillips, P. C. B., Perron, P. (1988), "Testing for a Unit Root in Time Series Regression", *Biometrika*, 75(2), 335-346.

- Reddy, K. S., Kumarasamy, D. (2015). "Is There Any Nexus between Electronic Based Payments in Banking and Inflation? Evidence from India", *International Journal of Economics and Finance*, 7(9), 85-95.
- Sahriana, D. Y., Yafiz, M., Tambunan, K. (2022). "The Effect of Cashless Payment and the Amount of the Money Circulation on the Inflation Rate in Indonesia for the Period of 2018-2021", *Jurma: Jurnal Program Mahasiswa Kreatif*, 6(2), 289-294.
- Titalessy, P. B. (2020), "Cashless Payments and Its Impact on Inflation", *Advances in Social Sciences Research Journal*, 7(9), 524-532.
- Tugay, O., Başgül, N. (2007). "Credit Cards as an Important Source of Financing: A Study in Burdur Province to Determine the Impact of Credit Cards on Cardholders' Expenditures", *Süleyman Demirel University, Journal of the Faculty of Economics and Administrative Sciences*, 12(3), 215-226.
- Tunay, K. B. (2023), "Determinants of Credit Card Expenditures in Türkiye and the Effects of Inflation Expectations on These Expenditures", *Journal of Banking and Financial Research*, 10(2), 100-122.
- Wong, Z. J. R., Tang, T. C. (2020), "Credit Card Usage and Inflation: A Case Study of a Small Open Economy", *Jurnal Ekonomi Malaysia*, 54(1), 19-32.
- Yilmazkuday, H. (2024), "Drivers of Credit and Debit Card Transactions", <https://ssrn.com/abstract=4806310>, <http://dx.doi.org/10.2139/ssrn.4806310>.

Exploring Causality Between Foreign Aid and Economic Growth: A Cross-Country Analysis

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Abstract

Introduction: Foreign aid plays a crucial role in global efforts to alleviate poverty and promote economic growth.

Aim: This research explores the causal link between foreign aid and economic growth across six Western Balkan countries, utilizing time series data spanning from 1995 to 2022.

Method: The study employs methodologies such as the Granger causality test and various empirical unit root tests.

Findings: The findings reveal a statistically significant causal relationship, with foreign aid emerging as a strong predictor of economic growth only in Serbia, while in Bosnia and Herzegovina, the reverse was observed. These outcomes underscore the existence of notable disparities and imbalances in the interplay between foreign aid and economic growth across the region.

Conclusion: The reduction in foreign aid to the Western Balkans underscores the region's growing economic independence and the impact of shifting geopolitical priorities.

Originality and value: This study makes a distinctive contribution to the body of literature by concentrating on the Western Balkans, a region that isn't as often studied in connection to the relationship between foreign aid and economic growth.

Key Words: Official Development Assistance (ODA), economic growth, FDI, Western Balkan, Granger causality analysis.

JEL-Codes: F35. O40

1. INTRODUCTION

Studies on economic growth have long been a focus of research, especially among development economists. Although these studies have been around for a long time, new ways to stimulate economic growth are always being sought. Numerous economic theories have been developed and are constantly being improved to better understand the causes of economic growth and their interrelationships. Many variables have been

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investigated to discover the factors that influence economic growth. In fact, every nation aspires to achieve rapid economic growth and development.

The political and economic environment of the Balkan countries underwent tremendous changes with the fall of the Berlin Wall, an event that greatly altered the region's long and complex history. The battles that ensued in the 1990s brought about a catastrophic economic collapse in the region, with losses amounting to billions of US dollars (USD). Reconstruction in Kosovo and Bosnia and Herzegovina moved slowly after the devastation of war. The region's recovery is still moving more slowly than in other areas of the former Yugoslavia, despite significant progress being made in the last 20 years. This can be attributed to the extent of the destruction as well as difficulties arising from complex political structures in some of the affected countries, including Bosnia and Herzegovina and North Macedonia (Ganić, 2021). Understanding a country's financial sources is crucial, as funds are necessary for economic progress. This research will emphasize external funding sources alongside internal ones, such as contributions from households, the government, and the private sector, to enhance understanding.

Foreign aid is a vital global tactic for reducing poverty and fostering economic development in poor nations. International organizations with a global reputation for this tactic include the United Nations, the World Bank, and the International Monetary Fund (Tarp, 2000). However, economic difficulties still beset emerging nations, raising concerns about the usefulness and efficacy of foreign aid in promoting economic development and prosperity. Savings are typically a barrier to domestic investment, and the revenue from exporting commodities and services is insufficient to cover the cost of capital goods imports.

Theory disputes on the causal relationship between foreign aid and economic growth have made the relationship between these two variables a hot topic in development economics and finance today. The hypothesis of positive growth caused by foreign assistance, the hypothesis of negative growth caused by foreign aid, and the hypothesis with mixed outcomes—which will be covered in more detail—are the three theoretical approaches that explain the relationship between foreign aid and economic growth. For a few reasons, the Western Balkans region is particularly affected by the current discussion on the link between aid and growth. Between 1990 and 2015, one of the main objectives of the United Nations Millennium Development Goals (MDGs) was to reduce poverty. The Western Balkans still has a lot of work to do on this subject, even though the aim has been accomplished.

Considering the significance of foreign aid for economic growth, the following two major research questions are put forward:

Q1: How does the relationship between economic growth and foreign aid generally pan out?

Q2: How strong of a causal link exists between economic growth and foreign aid, and in which direction?

The research examines the inflows of ODA in selected Western Balkan countries, offering insights into the relationships between economic growth and foreign aid aiming to address the question of their causality.

This study will enhance existing literature in several ways. Firstly, it will contribute to the limited research on the Western Balkan region. Previous research has primarily concentrated on the correlation between foreign aid and economic growth in poor nations overall, with no focus on this region. Second, the study employs techniques that are commonly used in applied econometrics: the Granger causality test and the Johansen cointegration test. In contrast, simpler techniques like ordinary least squares (OLS) regression did not always examine the characteristics of time series and could produce inaccurate results.

2. LITERATURE REVIEW

Although there is a wealth of empirical research on the connection between foreign aid and economic progress in developing nations, the findings are frequently imprecise, confusing, and contradicting. Quibria (2010) asserts that despite the abundance of research on the efficacy of aid, fundamental disagreements still exist and that numerous empirical investigations have yielded more ambiguity and uncertainty than conclusive data. We will first go over the research in this area that suggests foreign aid boosts economic growth.

Numerous studies have proven that help has a positive effect on economic growth. In examining 39 African nations, 19 of which are low-income, Lee and Alemu (2015) discovered that aid has a stronger beneficial impact on economic growth in low-income nations than in middle-income nations. Karras (2006) examined annual data from 1961 to 1997 in one of the validated studies on a sample of 71 nations receiving economic aid and discovered a positive association between aid and economic growth. When Juselius et al. (2014) investigated the same subject in a sample of 36 African countries between 1960 and 2007, they too came to similar conclusions.

Papanek (1973) studied the intertemporal effects of foreign aid, FDI, and other inflows on domestic savings on a sample of 34 nations in the 1950s and 51 countries in the 1960s. Out of all the variables, the author's conclusions indicate that foreign aid has the greatest positive impact on economic growth.

In one of the studies conducted for the Western Balkan region, Erić (2017) used a linear regression model to analyze the impact of EU official development assistance (ODA) on GDP per capita. The results showed that, although 75% of EU ODA reflects a strong commitment to promoting economic growth in the region, only 8% of the variation in GDP per capita can be attributed to changes in ODA. As a conclusion, the author points out that, despite the positive effect, the impact of EU ODA on GDP per capita is minimal and negligible.

Fazily (2014) argues that ODA can support developing and conflict-affected nations by bridging the savings-investment gap, but only if directed to countries with strong institutions and policies that foster economic growth.

Elbadawi et al. (2008), Hirvonen (2005), (Ganić, 2022) suggest that aid is unlikely to revive economic growth in conflict-affected countries if they have weak institutions, misallocated resources, or limited absorptive capacity. Burnside and Dollar (2000) echo this view, arguing that countries with sound fiscal, monetary, and trade policies are better equipped to effectively utilize ODA and invest it in ways that promote economic growth.

Dollar and Kray (2002) propose that ODA can enhance economic growth and development when paired with effective policies and strong institutions. Countries with robust policies and high-quality public institutions have seen a 2.7% increase in GDP per capita, with Botswana emerging as one of Africa's fastest-growing nations (Carlsson et al. 1997).

According to Sachs (2005), the issue of developing countries caught in a negative cycle of economic growth can be resolved by increasing the amount of official development assistance (ODA). But in two additional studies, On this account, Easterly (2006) and Moyo (2009) reject this idea since they argue that ODA often does not deliver the necessary financing for growth and can also hinder the process.

A study done on a sample of 95 countries by Yiew and Lau (2018) explains that the relationship between aid and growth is inverted U shaped since development progress is not linear. However, the authors identified that foreign aid could have a negative effect on economic growth at low-income levels and a positive effect at higher income levels. Similar to the previous study, Gyimah-Brempong et al. (2012) also come up with similar conclusions and a U-shaped relationship between economic growth and foreign aid. They claimed that when aid hits between 6.6% and 14.4% of GDP, it starts to positively impact economic growth based on a panel of data from 77 different nations.

Arellano et al. (2009) agree with Easterly (2006) and Moyo (2009), arguing that ODA fails to boost economic growth by leading to consumption rather than investment. However, some scholars believe ODA benefits by increasing savings, which can drive investment and growth. Begley (1978) explains the direct link between savings and ODA, while Hansen and Tarp (2000) note that ODA positively affects the relationship between savings and investment, potentially increasing both.

Addison and McGillivray (2004) argue that conflict-affected countries need substantial financial resources for recovery, as they often lose infrastructure, production, and savings. Therefore, it is crucial for developed nations to channel their resources into these countries, particularly through financial flows and technology, to support economic recovery.

Trinh (2014) examined the impact of foreign aid on economic growth in Vietnam from 1993 to 2012, finding a positive and significant relationship. Aid significantly benefited Vietnam, especially in infrastructure, macroeconomic management, and human capital. However, Trinh Tra noted issues with aid effectiveness, including high volatility, unpredictability, absorptive capacity constraints, and rent-seeking behaviour.

The study demonstrated that foreign aid has a neutral influence on economic growth, which turns negative when institutional elements are taken into consideration. The ARDL model was used to assess the link between these variables. Furthermore, the detrimental effects of foreign aid on economic growth were mitigated by the interaction between institutional factors and foreign aid.

Foreign aid and economic growth have been found by some academics to be negatively correlated (Mallik, 2008; Mitra and Hossain, 2013; Azam, 2014; Mitra et al., 2015). Also, Dreher and Langlotz (2015) examined the relationship between aid and growth for 96 nations between 1974 and 2009 and concluded that help had no influence on economic growth.

The prior literature study suggests that there may or may not be a strong correlation between the pace of economic growth and the rate of increase in foreign aid, even though they do not coincide. This highlights the uncertainty surrounding the connection between economic growth and foreign aid, as supported by several empirical results.

It is impossible to overstate the role that sound institutions and economic freedom play as a bridge between foreign aid and economic progress (Abate, 2022). His study's findings demonstrated that rather than obtaining large amounts of money from donors, developing nations must strengthen their institutional frameworks and economic circumstances.

Hoxhaj and Qehaja (2024) investigated the impact of foreign aid on the economic growth of the Western Balkans (2009-2021) and concluded that it had no significant effect. Trade openness is positively related to growth, while gross investments, although positive, were not significant, which indicates the complexity of their role in the region.

As the preceding literature analysis indicated, there has been a lot of interest in assistance research throughout the years in several different parts of the world, but not much in the Western Balkans. Nevertheless, a notable lacuna in the range of these investigations was noted for the area. None of the earlier research we analyzed included all the countries named in the Western Balkans region, which is made up of six countries. In contrast, this study includes all 6 countries of the Western Balkans.

3. RESEARCH METHODOLOGY

The studies used data on official development assistance (ODA) and real GDP that came from the World Bank Indicators database. This study uses time series analysis to look at the relationship between official development assistance and real GDP for Western Balkan nations from 1995 to 2022. Real GDP and ODA data are used in the study using logarithmic values for econometric analysis. The paper first employed ADF and Phillips-Perron (PP) unit root tests to stabilize the time series. The unit tests are used to make sure that the data for the chosen model's variables are consistent.

To do this, one begins with the alternative hypothesis that the data series is stationary; in the absence of this, the null hypothesis, which holds that a unit root exists, is correct.

In other words, it suggests that the series is non-stationary and susceptible to random walks or trends.

The study tests the following hypotheses (Baltagi, 2005):

H0: The series has a unit root and is not stationary.

H1: There is no unit root in the series, and it is stationary.

The following is a proposed functional formula for the variable under investigation in this study:

$$GDP = f(\text{FAID}, \text{FDI}) \quad (1)$$

Equation 1 uses the GDP variable to calculate economic growth and FAID as a stand-in for foreign aid. The control variable, foreign direct investment (FDI) is incorporated into the estimation model to lessen the dependence on FAID (Ndambendia and Njoupouognigni, 2010; Yiew, T. H., & Lau, E. 2018; Ganić et al., 2016; Mamuti and Ganić, 2019). It is anticipated that the control variable, FDI, which represents a measure of external capital, will be positive.

The long-run relationship between the variables was investigated using Johansen's (1988) cointegration test once it was established that the variables had the same degree of stationarity.

$$x_t = A + \sum \Pi_i x_{t-1} + \varepsilon_t \quad (2)$$

The vector x_t (nx1) represents non-stationary variables, A is the matrix of constants, Π is the matrix of coefficients, and ε_t (nx1) represents errors assumed to follow white noise with a normal distribution. "i" denotes the lag order. Johansen's (1988) approach offers two likelihood ratio tests, and in this study, we will use the Trace test to determine the number of cointegrating vectors.

In addition, a Granger causality test utilizing an error correction model was carried out to examine the causal association among these variations. Before being employed in an econometric time series analysis, the series must be stationary. It is possible to determine that there is a genuine relationship between the series even when there isn't one if non-stationary series are employed.

A Granger causality test was employed to ascertain whether human development and economic growth are influenced by one another. This test is frequently used to investigate causality between two series; Granger originally proposed it. Thus, to determine if economic growth and human development are influenced by one another, the Granger test was used. As a result, the following equation represents the causal link between the variables.

Equation 3: Foreign aid drives economic growth:

$$\text{LNGDP}_{i,t} = \beta_0 + \sum_{j=1}^m \beta_j \text{LNGDP}_{i,t-j} + \sum_{j=1}^m \alpha_j \text{LNFAID}_{i,t-j} + \sum_{j=1}^m \gamma_j \text{FDI}_{i,t-j} + v_{i,t} \quad (3)$$

Equation 4: Economic growth drives foreign aid:

$$\text{LNFAID}_{i,t} = \beta_0 + \sum_{j=1}^m \beta_j \text{LNFAID}_{i,t-j} + \sum_{j=1}^m \alpha_j \text{LNGDP}_{i,t-j} + \sum_{j=1}^m \gamma_j \text{FDI}_{i,t-j} + v_{i,t} \quad (4)$$

Equation 5: FDI drives economic growth:

$$LNFDI_{i,t} = \beta_0 + \sum_{j=1}^m \beta_j LNFDI_{i,t-j} + \sum_{j=1}^m \alpha_j LNGDP_{i,t-j} + \sum_{j=1}^m \gamma_j LNFAID_{i,t-j} + v_{i,t} \quad (5)$$

Where β_0 refers to the intercept, $\sum_{j=1}^m$ presents sum over the lagged terms from 1 to m, while α_j , β_j and γ_j are lagged coefficients.

4. EMPIRICAL ANALYSIS

The integration order of the variables is analyzed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. The results for the unit root and first difference tests are presented in Table 1.

Table 1 Unit root and stationarity test

Variables	Intercept		Trend and Intercept	
	t-Statistic	Prob.	t-Statistic	Prob.
LnGDP				
ADF	10.8955	0.5379	8.03271	0.7826
PP	20.0606	0.0659	10.4667	0.5751
d. LnGDP				
ADF	50.7132	0.0000	43.6815	0.0000
PP	86.6570	0.0000	69.4189	0.0000
LNFAID				
ADF	30.2431	0.0026	18.3712	0.1049
PP	43.0514	0.0000	30.9377	0.002
d. LNFAID				
ADF	71.6866	0.0000	30.9377	0.0020
PP	125.144	0.0000	346.188	0.0000
FDI				
ADF	22.8093	0.0000	15.2431	0.2285
PP	33.6065	0.0002	22.1217	0.0362
d.FDI				
ADF	72.6320	0.0000	68.7565	0.0000
PP	33.5066	0.0008	328.471	0.0000

Source: Authors' research

Table 1 shows the results of the ADF and PP unit root testing. It presents the estimation results in both level and first difference form for the selected variables: LNGDP, LNFAID, and FDI based on the ADF and PP tests. The findings of both statistical tests demonstrate that, at the 5% significance level, the null hypothesis cannot

be rejected, meaning that each LN GDP series was non-stationary in level. The variables are therefore differentiated once, and the results of the ADF and PP tests show that all series become stationary and at the I (1) after differentiation.

Inverse Roots of AR Characteristic Polynomial

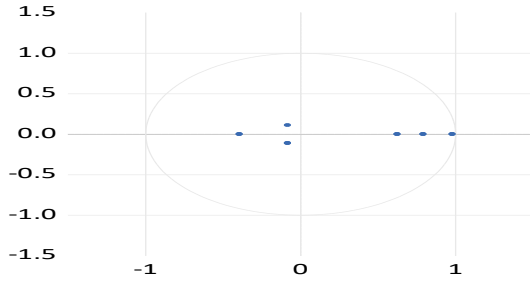


Figure 1: Inverse roots of AR Characteristics polynomial

Source: Authors' research

As can be seen in Figure 1, the model is stable, and the variables are stationary since all the inverse roots of the AR characteristic polynomial fall inside the unit circle. As a result, the developed model is appropriate since it meets stability requirements.

In this study, a cointegration test was performed and a suitable lag length was established. Out of a maximum of four possible lags, the ideal lag length was three (i.e., $m = 3$), chosen based on the final prediction error (FPE), the Schwarz Information Criterion (SIC), and the Hannan-Quinn Information Criterion (HQIC). Table 2 illustrates how HQIC, FPE, Akaike's Information Criterion (AIC), and Schwarz's Bayesian Information Criterion (SBIC) all point to the best number of lags for the analysis.

Table 2 Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-444.7862	NA	1.198712	8.694877	8.771617	8.725959
1	-199.1777	472.1405	0.012119	4.100538	4.407497*	4.224867*
2	-191.0228	15.20146	0.012326	4.116947	4.654125	4.334522
3	-179.8075	20.25284*	0.011821*	4.073932*	4.841329	4.384754
4	-171.4769	14.55829	0.012002	4.086930	5.084546	4.490999

Source: Authors' research

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

The AIC was chosen for study because it had the lowest value. Setting the parameters for the lag's duration is crucial before moving on to the Granger Causality Analysis. The lag length criteria are displayed in Table 2, and the best lag length criteria was found to be 3 based on the Akaike information criterion (AIC).

The presence of long-term cointegration in the panel among the observed variables is indicated by the Johansen Fisher and maximum eigenvalue cointegration tests (in the case with an unbounded constant), which reject the null hypothesis that there is no cointegration between variables (Table 3). These findings imply that the economic growth variable may be impacted by the long-term patterns of foreign aid.

Table 3: Johansen Fisher Panel Cointegration Test

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
None	37.92	0.0002	29.42	0.0034
At most 1	19.97	0.0676	15.37	0.2218
At most 2	17.66	0.1263	17.66	0.1263

Source: Authors' research

* Probabilities are computed using asymptotic Chi-square distribution.

The results of the Granger Causality Test are given in Table 4. According to our findings, we found that the past value of economic growth can be a good predictor of FDI only in Albania, and not in the rest of the Western Balkans. In addition, the past value of FDI can help in the prediction of economic growth only in Bosnia and Herzegovina and not in the rest of the Western Balkans. Similarly, the test statistic of 3.01954 at the 10% level for North Macedonia reveals that past foreign aid can be a good predictor of FDI in that country, while there is no statistically significant predictive relationship for the remaining Western Balkan countries. Finally, based on our analysis, we discovered that only in Serbia does a variable related to foreign aid show statistically significant predictors of economic growth (7.18927 at the 1% level), whereas only in Bosnia and Herzegovina does the reverse relationship between economic growth and foreign aid (t-statistics: 3.81106 at the 5% level) shows evidence of being present.

Table 4 Granger Causality Test

	ALB	B&H	MNG	NMAC	SRB	KOS
LNGROWTH does not Granger Cause FDI	4.65438**	0.61634	2.44210	0.32776	0.20027	1.28147
FDI does not Granger Cause LNGROWTH	2.46068	3.18610*	0.23289	1.58511	0.52448	1.31429
LNFAID does not Granger Cause FDI	0.94341	0.18404	0.30205	3.01954*	0.22705	0.07790
FDI does not Granger Cause LNFAID	0.03184	0.86847	0.79759	0.82131	0.71236	2.69020
LNFAID does not Granger Cause LNGROWTH	0.23196	1.63723	1.68626	2.04187	7.18927***	0.04665
LNGROWTH does not Granger Cause LNFAID	0.09763	3.81106**	1.63323	0.14560	1.06805	0.54843

Source: Authors' research

5. CONCLUSION

The complex relationship between foreign aid and economic growth has been extensively studied theoretically and empirically in many regions across the world. However, this study has focused on the Western Balkans. This study's empirical research, which included Granger causality tests and several empirical unit root tests, offers detailed insights unique to the Western Balkans.

The statistical analysis reveals notable disparities and imbalances between foreign aid and economic growth across the countries in the region. Specifically, in Serbia, a statistically significant causal link between economic growth and foreign aid was identified. This means that foreign aid was a significant predictor of economic growth in Serbia. In contrast, Bosnia and Herzegovina displayed the opposite relationship, where economic growth significantly predicted foreign aid. Additionally, in other Western Balkan nations, such as North Macedonia and Albania, the relationship between foreign direct investment (FDI) and economic growth was found to be less stable and more erratic.

These results can be explained by several factors. First, because of the war in Ukraine and the migration crisis, there were redistributions of funding to other nations and areas

as well as changes in priority due to changes in the geopolitical landscape. Thus, the amount of funding available to the Western Balkans is decreasing. Second, the post-war recovery of these nations—particularly Kosovo and Bosnia and Herzegovina—illustrated how economic development and entry into the Euro-Atlantic integrations contributed to a decrease in the region's reliance on foreign aid, demonstrating the erratic and weak impact of foreign aid on economic growth. Thirdly, the region is now seen as capable of being independent of foreign aid due to changes in donor policies brought about by geopolitical shifts. This is because all the countries in the region have undertaken major structural reforms that have allowed them to base their economic growth on their own capacities for production rather than on aid.

REFERENCES

- Abate, C. A. (2022). The relationship between aid and economic growth of developing countries: Does institutional quality and economic freedom matter? *Cogent Economics & Finance*, 10(1). <https://doi.org/10.1080/23322039.2022.2062092>.
- Addison, T., & McGillivray, M. (2004). Aid to conflict-affected countries: lessons for donors. *Conflict, Security & Development*, 4(3), 347–367. <https://doi.org/10.1080/1467880042000319926>
- Azam, M. (2014). Foreign aid and economic growth: lessons for Pakistan. *J. Appl. Eco. Sci.* IX 2(28), 165–18
- Babalola, S., & Shittu, W. (2020). Foreign aid and economic growth in West Africa: examining the roles of institutions. *International Economic Journal*, 34(3), 534-552
- Baltagi, B.H. (2005) *Econometric Analysis of Panel Data*. 3rd Edition, John Wiley & Sons Inc., New York.
- Dreher, A., & Langlotz, S. (2015). Aid and growth. New evidence using an excludable instrument. CEPR Discussion Paper 10811. Heidelberg.
- Dollar, D. & Kraay, A. (2002). Growth Is Good for the Poor, *Journal of Economic Growth*, Springer, vol. 7(3), pages 195-225, September.
- Elbadawi, I. A., Kaltani, L., & Schmidt-Hebbel, K. (2008). Foreign aid, the real exchange rate, and economic growth in the aftermath of civil wars. *The World Bank Economic Review*, 22 (1), 113–140.
- Erić, O. (2017). Analysis of the effects of EU Official Development Assistance to the Western Balkans. *ACTA ECONOMICA* Volume XV, No. 26 / June 2017. Retrieved from: <http://www.ae.ef.unibl.org/broj26/e-ActaEconomica-broj26-Eric.pdf>
- Fazily, M. R. (2014). *Official Development Assistance (ODA) and Economic Growth in Afghanistan*. Graduate School of Development Studies in Hague. Downloaded as: file:///C:/Users/Jasmin/Downloads/Mohammad-Rahman-Fazily.pdf

Ganić, M. (2021). Emerging Balkans and Its Recent Experience with Transition (Chapter 2) in the book: *Financial Globalization in the Emerging Balkans*, Palgrave MacMillan. https://doi.org/10.1007/978-3-030-65009-4_3.

Ganić, M. Ismić, B. and Sarajcic, S. (2016). Does Financial Deepening Spur the Economic Growth? Evidence from Bosnia and Herzegovina (June 7, 2016). *Journal of Economic Cooperation and Development*, Vol. 37, No. 1, 2016. Pp.131-158. Available at SSRN: <https://ssrn.com/abstract=2805896>

Ganić M. (2022). Does institutional quality matter for the IDP hypothesis? Evidence from emerging Europe. *Croatian Economic Survey*, 24(1), 83–113. <https://hrcak.srce.hr/279218>.

Gyimah-Brempong, K., Racine, J. S., & Gyapong, A. (2012). Aid and economic growth: Sensitivity analysis. *Journal of International Development*, 24(1), 17–33. <https://doi.org/10.1002/jid.1708>.

Hirvonen, P. (2005). Stingy Samaritans. Why Recent Increases in Development Aid Fail to Help the Poor. *Global Policy Forum*. August 2005.

[Hoxhaj, L.](#) and [Qehaja, D.](#) (2024). Foreign aid impact on the economic growth of the Western Balkans during 2009–2021", *International Journal of Development Issues*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJDI-09-2023-0217>.

Johansen, S. (1988). Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control*, 12, 231-254. [http://dx.doi.org/10.1016/0165-1889\(88\)90041-3](http://dx.doi.org/10.1016/0165-1889(88)90041-3).

Juselius, K., Møller, N. F., & Tarp, F. (2014). The long-run impact of foreign aid in 36 African countries: Insights from multivariate time series analysis. *Oxford Bulletin of Economics and Statistics*, 76(2), 0305–9049. <https://doi.org/10.1111/obes.12012>

Karras, G. (2006). Foreign aid and long-run economic growth: Empirical evidence for a panel of developing countries. *Journal of International Development*, 18(1), 15–28. <https://doi.org/10.1002/jid.1187>

Lee, J., & Alemu, A. M. (2015). Foreign aid on economic growth in Africa: A comparison of low and middle-income countries. *Journal of Economics and Sustainable Development*, 3(4), 449–462. <https://doi.org/10.17159/2222-3436/2015/v18n4a>

Mallik, G. (2008). Foreign aid and economic growth: A cointegration analysis of the six poorest African countries. *Economic Analysis and Policy*, 38, 251-260. [https://doi.org/10.1016/S0313-5926\(08\)50020-8](https://doi.org/10.1016/S0313-5926(08)50020-8).

Mamuti, A. and Ganić, M. (2019). Impact of FDI on GDP and Unemployment in Macedonia Compared to Albania and Bosnia and Herzegovina', *Creative Business and Social Innovations for a Sustainable Future*, 2019, pp. 167-173, 2019. Available at https://link.springer.com/chapter/10.1007/978-3-030-01662-3_19.

- Mitra, R., & Hossain, M. S. (2013). Foreign aid and economic growth in the Philippines. *Economics Bulletin*, 33, 1706- 1714.
- Mitra, R., Hossain, M. S., & Hossain, M. I. (2015). Aid and per-capita economic growth in Asia: A panel cointegration tests. *Economics Bulletin*, 35, 1693-1699.
- Ndambendia, H., & Njoupouognigni, M. (2010). Foreign aid, foreign direct investment and economic growth in subsaharan Africa: Evidence from Pooled Mean Group Estimator (PMG). *International Journal of Economics and Finance*, 2, 39-45.
- Papanek, G. (1973). Aid, Foreign Private Investment, Savings, and Growth in Less Developed Countries, *The Journal of Political Economy* 81, 120-130.
- Quibria, M.G. (2010). Aid effectiveness in Bangladesh: is the glass half full or half empty? department of economics, university of Illinois-USA, 245 Wohlers Hall. 26 April 2010.
- Sachs, J. (2005). *The End of Poverty: Economic Possibilities for our Time*. New York: The Penguin Press.
- Tarp, F. (2000). *Foreign aid and development: lessons learnt and directions for the future*: Routledge, New Fetter Lane London
- Trinh, T. (2014). Foreign aid and economic growth: The impact of aid on determinants of growth - The case of Vietnam. Available at <https://api.semanticscholar.org/CorpusID:40426773>.
- Yiew, T. H., & Lau, E. (2018). Does foreign aid contribute to or impeded economic growth? *Journal of International Studies*, 11(3), 21–30. https://www.jois.eu/files/2_493_Yiew_Lau.pdf

The Hydrogen Internal Combustion Engine: A Tool for Managing and Combating Carbon Emissions

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Abstract

Introduction: The hydrogen internal combustion engine is an important development in the transportation and energy sectors for managing and combating climate change, because fossil fuels produce polluting emissions, which is responsible for global warming and climate change.

Aim: The aim of this paper is to search for an alternative fuel, and to emphasize on the Hydrogen Internal Combustion Engine (HICE) as a new strategies, methods, and technologies that can manage and combat carbon emissions.

Method: This paper deployed simple literatures research to establish facts about the combustion characteristics of the HICEs, and its tribological characteristics in order to enhance the engine performanc as a measure to manage and combat climate change.

Findings: It was observed that NO_x emissions are ten times lower in the case of HICEs compared to gasoline engines. HC and CO were found to be insignificant for some traces of these emissions due to the combustion of lubricants. CO₂ emission content decreases with an increase in amount of hydrogen in diesel engine. At a maximum hydrogen value, the CO₂ emission content was found to be 11.6% lower.

Conclusion: Hydrogen fuel can be used in internal combustion engines with some modifications to the engine components. It can be used as an alternative fuel, both in spark ignition and in compression ignition engines

Originality and Value: The combustion product of the HICEs is the major causes of the deterioration of the engine lubricating oil, high frictional wear and the discharging of the metallic particles from the engines.

Key Words: Hydrogen Fuel, Hydrogen Internal Combustion Engine, Engine Wear and Lubrication.

Jel Codes: L60, L62, L90, L91, L99, T50, Y70,

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1. INTRODUCTION

In order to overcome the increasing environmental and energy problems, researchers are determined to search for alternative fuels and develop new combustion technologies, so as to improve the performance of the internal combustion engine and achieve more efficient and cleaner combustion. Vehicles using internal combustion engines will be in use for several decades. Therefore, to overcome the environmental and energy challenges associated with these engines, researchers are keenly interested in finding alternative fuels and developing new combustion technologies, so as to improve the performance and efficiency of the engines (IEA, 2021). This means that internal combustion engines (ICE) would still play a vital role in the transportation sectors and in the oil and gas industries (Sharma & Dhar, 2018). Therefore, improving the effectiveness of these engines is still required to increase their performance and to ensure environmental safety (Wong, & Tung, (2016), Mihara, (2017)).

Making a hydrogen-fueled internal combustion engine is not difficult, but running the engine efficiently is more challenging. The development of hydrogen internal combustion engines has remained stagnant even with continued efforts. The hydrogen environment affects the tribological behavior of materials such as transition metals and metals that react chemically (Holmberg, Andersson, & Erdemir, (2012)). Unlike the normal Internal Combustion Engine (IC) that uses other types of fuel as source of energy, this engine exhibits different characteristics and needs to be studied. Therefore, this paper aimed to study this engine using simple literatures research.

2. METHODOLOGY

This paper deployed simple literatures research to establish facts about the combustion characteristics of Hydrogen Internal Combustion Engine, and its tribological characteristics in order to enhance the engine performance as a measure to manage and combat its carbon emissions.

3. LITERATURE REVIEW

In IC engines, water tends to mix with the lubricating oil in the crankcase and forms sludge. The oil is also diluted by liquid gasoline that seeps through the piston rings and enters the crankcase, after the engine reaches operating temperature. The water and gasoline will evaporate, and if the crankcase is vented, it will escape into the air without harm (Forschung, Technik (2017)). While in a hydrogen engine, exhaust gases can also leak through the piston rings into the crankcase. Since hydrogen exhaust is water vapor, water may condense in the crankcase if effective ventilation is not available. Mixing water in the crankcase with engine lubricants reduces the engine's lubricating ability, resulting in a higher degree of engine friction wear. Also in gasoline engines, unburned fuel can seep into the engine through the piston rings and into the crankcase. Since

hydrogen has a lower energetic flammability value than gasoline, any unburned hydrogen entering the crankcase has a greater tendency to ignite (Dash et al., al (2022)). Therefore, hydrogen and water buildup in the crankcase can be prevented through effective crankcase ventilation.

Holmberg, Andersson, and Erdemir (2012) found that, out of the total amount of energy consumed by an engine, 33% of the energy is used through friction losses in various engine components. It was also noted that engine components consume the largest amount of energy through friction at a rate of 11.5%. This indicates that friction losses in internal combustion engines must be reduced to improve the engine efficiency. However, this can be done by improving the designs of the engine components, analyzing engine lubricants, and improving the engine lubrication system.

3.1 Hydrogen Internal Combustion Engine

The aim of introducing the hydrogen internal combustion engine (HICE) was to improve upon the concept of the gasoline internal combustion engine (ICE) which would outperform gasoline and diesel engines in terms of efficiency, energy density and environmental safety. The internal combustion engine is ideally suited for the transition to a hydrogen economy because it offers: high efficiency, high energy density, low cost, the ability to operate on dual fuel in a transitional phase, and high potential for rapid introduction to the mass market (Al-Baghdadi, (2021)). Therefore, the use of hydrogen as fuel in IC engines will have an important role to play in the transportation sector as shown in Figure 1.

Hydrogen is a good alternative fuel for spark ignition engine due to its desirable properties as shown in Table 1 (Verhelst, (2005)). When hydrogen fuel is sprayed with air to produce the combustible mixture for a spark ignition engine with an equivalence ratio below the poor flammability limits of gasoline, it causes a lower flame temperature and directly results in lower heat transfer to the walls, increased engine efficiency and lower exhaust NO_x emissions (Gillingham (2007), Toole and Heywood (2003), Glassman (1996)).

Compression ignition engines have the advantage of high thermal efficiency and durability. The only difficulty in using hydrogen in this engine is that it requires a relatively high self ignition temperature, making it very difficult to ignite without the use of an external source of ignition. (Tang et al. (2002), Homan, (1979)). Compression ignition engines cannot be operated with hydrogen as their primary fuel, because the engine compression temperature is insufficient to initiate combustion of the fuel in the combustion chamber, due to the high ignition temperature required for combustion (Saravanan, (2008), Gomez, Mikalsen, and Roskilly (2009), Naber, Siebers, (1998). Saravanan and Nagarajan (2010), Kurakyanitis, Namasivayam, and Crooks (2010)) . Therefore, the ignition assistant is required.

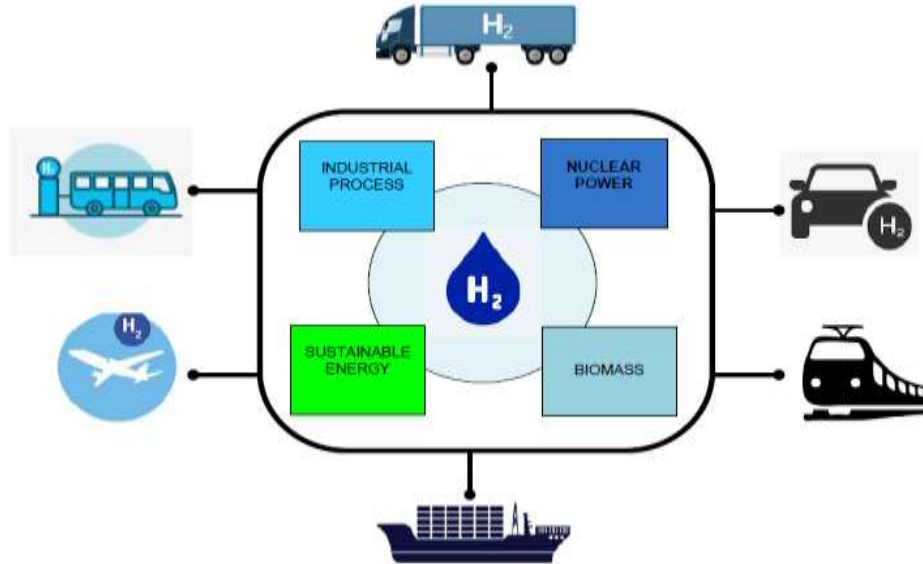


Figure 1. The Role of Hydrogen in the Automotive Sector (Furuhama and Fukuma, (1984))

Stepien (2021) noted that the main characteristics of hydrogen fuel compared to other fuels commonly used in internal combustion engines are as shown in Table 1 (Demetriou, & Tsugimura, (2017), Fukuda, & Sugimura, (2008)) . With the increased use of hydrogen as fuel, it has become necessary to improve the design of engine components that are in direct contact with friction.

Table 1. Properties of Hydrogen Compared to Gasoline, Diesel and Methane

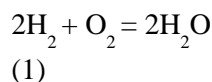
S/N	Property	Fuel			
		Hydrogen	Gasoline	Diesel	Methane
1	Carbon Content (Mass %)	0	84	86	75
2	Lower (Net) Heating Value (MJ/kg)	119.9	43.9	42.5	45.8
3	Density (at 1 Bar & 273K; kg/m ³)	0,089	730-780	830	0.72
4	Volumetric Energy Content (at 1 Bar & 273K; MJ/m ³)	10.7	33x10 ³	35x10 ³	33.0
5	Molecular Weight	2.016	~110	~170	16.043
6	Boiling Point (K)	20	298-488	453-633	111
7	Auto-Ignition Temperature (K)	853	~623	~523	813
8	Minimum Ignition Energy in Air (at 1 Bar & at Stoichiometry; mJ)	0.02	0.24	0.24	0.29

9	Stoichiometry Air/Fuel Mass Ratio	34.4	14.7	14.5	17.2
10	Quenching Distance (at 1 Bar & 298 K at Stoichiometry; mm)	0.64	~2	-	2.1
11	Laminar Flame Speed in Air (at 1 Bar & 298K at Stoichiometry; m/s)	1.85	0.37-0.43	0.37-0.43	0.38
12	Diffusion Coefficient in Air (at 1 Bar & 273 K; m ² /s)	8.5x10 ⁻⁶	-	-	1.9x10 ⁻⁶
13	Flammability Limits in Air (Vol%)	4–76	1–7.6	0.6–5.5	5.3–15
14	Adiabatic Flame Temperature (at 1 Bar & 298 K at Stoichiometry; K)	2480	2580	~2300	2214
15	Octane Number (R+M)/2	130+	86–94	-	120+
16	Cetane Number	-	13–17	40–55	-

3.2 Hydrogen Internal Combustion Engine Emissions

Combustion is known for its environmental pollution through emissions of hydrocarbons (HC) such as nitrogen oxides (NO_x) and carbon dioxide (CO₂) (Saranavan (2008)) .

The combustion of H₂ with O₂ in a hydrogen internal combustion engine gives water as a byproduct as shown in Equation 1:



The combustion of hydrogen with air also produces nitrogen oxides (NO_x) as shown in Equation 2:



During the combustion process in HICEs, the high temperature inside the combustion chamber leads to the formation of nitrogen oxide .This high temperature causes some of the nitrogen in the air to combine with the oxygen in the air. The amount of NO_x formation depends on the engine compression ratio, engine speed, ignition timing and air-fuel ratio (Sharma, Goyal & Tyag, (2015)).

The first attempt to develop a hydrogen engine was reported by Reverend W. Cecil in 1820. Cecil presented his work entitled “On the Application of Hydrogen Gas to the Production of Motion Powered Machines”. The engine itself operates on the vacuum principle, where atmospheric pressure pushes the piston back against the vacuum to produce power. The vacuum is created by burning the mixture of air and hydrogen, allowing it to expand and then cool (Hortova, (2016)) .

Compared to fossil fuels, the use of hydrogen in internal combustion engines has a number of other benefits (Ji, (2021)) including high diffusion, high combustion efficiency, high thermal efficiency, fast flame speed, and high combustion Temperature (Gao, (2020)). However, there are three inherent disadvantages including excessive NO_x emission (Wang et al. (2021)), lower output power (Gao, (2021)) and greater risk Abnormal fuel combustion (Dhyani, & Subramanian, (2019)), which could hinder the commercialization of hydrogen-powered fuels reciprocating piston engines. Specifically, adverse outcomes (Gao, (2022)) are one of the responsible factors In internal combustion engines, which is more likely to occur during the combustion of hydrogen-powered engines, This causes high risks of instability. Several technologies, including exhaust gas recirculation (EGR) (Gong, Si, & Liu, (2021)), direct injection (DI) (Yip, 2019)), lean combustion combined with turbochargers (Gurbüz, & Akçay, (2021)), done; However, there is a scarcity of this type of ICE designs, which may be essentially necessary Preventing disadvantages of hydrogen as fuel in these engines. Knocking, which is consider as one of the causes of abnormal combustion in engines, Shi (2021)). Large fluctuations in pressure in the combustion chamber, which negatively affects engine performance and potentially cause irreparable mechanical damage (Hosseini, & Butler, (2020)). According to research and engine octane number, hydrogen can be considered as Superior anti-knock fuel (Shi, 2021)).

3.3 Tribology of HICEs

Tribo-systems directly exposed to hydrogen are crucial with regard to excessive frictional wear, because they are exposed to hydrogen-chemical reactions with hydrides, and the protective oxide layers disappear respectively. Furthermore, liquid lubricants are often unworkable and deteriorate (Thomas, (2014)).

Mechanical friction in internal combustion engine takes up about 4%–15% of the total energy in the engine. Friction intensity are high on three main components of the engine (piston-ring-liner, the crankshaft and bearing, and the valve train) as shown in Figure 2 (Wong & Tung (2016) and Mehran, et al. (2018)). While Figure 3 shows the percentage wear of these components.

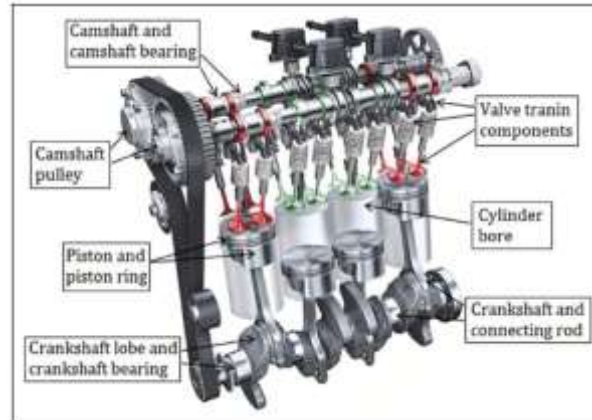


Figure 2. Engine Components with High Frictional Wear

In diesel engines, the combustion of engine lubricating oil affects particle formation and thus increases the amount of semi-volatile hydrocarbon species available for nucleation exiting the in exhaust pipe. In addition, ash residue combines with soot particles, and in some cases with a high metal-to-carbon ratio, metal vapors self-nucleate inside the engine to form an array of metal- rich nano-particles (Wang et al. (2021)).

Recent studies showed that metal particles emitted by internal combustion engines are mainly derived from the combustion of lubricating oil. This hypothesis was examined by investigating the composition of particles emitted by an internal combustion engine in the absence of fuel-derived soot. Previous studies of engine emissions have often focused on the relative amount of elemental and organic carbon emitted, because both are derived from the combustion of hydrocarbon fuels and oils. Recently, studies focused on the contribution of lubricating oil to the particle formation process and, the role of lubricating oil additives in particles formation (Sakurai , (2003)). The use of low-viscosity oil effectively reduces lubrication in internal combustion engines. However, low viscosity oil can increase friction and spasm under mixed lubrication limits. This is because the thin oil film can be easily broken, resulting in direct contact between engine components (Wong, & Tung, (2016), Mihara, (2017)).

4. DISCUSSION

HICEs play an important role in automotive markets. However, in order to continue to meet the wide range of market demands as an automobile engine, the

engine must be optimized. The importance of hydrogen as a fuel is its light weight and availability. When used as fuel, the combustion product is water, which can reduce environmental pollution. H_2 has a wide ignition limit range and strong combustion ability. The speed of flame spread is fast. Therefore, it can be used as a combustion catalyst to mix with other fuels to improve combustion performance in engines such as compression ignition engine.

Lubricating oil appears to be an important but under-recognized source of particulate emissions. One of the most effective ways to monitor the technical condition of the engine is trial disassembly diagnosis (TTD). Experimental diagnostics uses lubricants to obtain information about the condition of the mechanical system. Analytical testing of lubricants is an effective, low-cost tool that can be used to track fluid degradation and abnormal working conditions of any mechanical system. The results when interpreted correctly can be useful not only for optimizing engine components and lubricants, but for detecting mechanical faults in the mechanical system before the system fails.

Any mechanical system operating under abnormal working conditions that increase the normal wear and tear of friction between moving parts; also increases the rate of frictional wear and the amount of wear particles. These types of condition results to a significant increase in the concentration, and rate of accumulation of wear particles in the engine oil. The composition of molecules resulting from combustion and derived from lubricating oil in the engine can be studied. This will be done by examining emissions from an internal combustion engine powered by hydrogen fuel. This will help to increase the current knowledge about the role of lubricating oil in the formation of hydrogen and gasoline engine molecules.

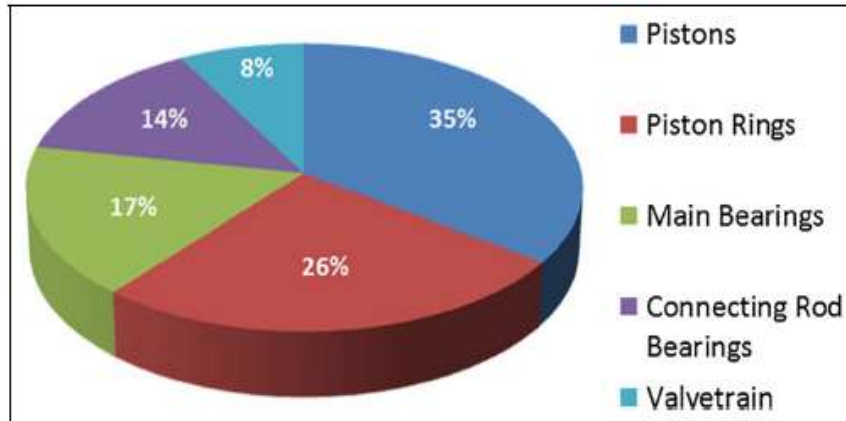


Figure 3 Percentage Wear of the Engine Components (Arup, (2017))

A hypothetical and theoretical plot of wear particles concentration in parts per million (PPM) per hour of operation illustrated by Naikan and Kapoor (2006) is shown in Figure 4. Wear particles continue to gradually increase, as the system continues to operate. In practice, this may not be possible due to the effect of engine oil consumption and replacement of lost engine oil. Renewing engine oil usually causes the wear particle concentration level in a normal engine to stop and remain constant. Newly overhauled engine assemblies tend to produce wear particles in high concentrations during the initial break-in period. During this period, evaluation may be difficult, as the formation of wear particles may be higher than normal.

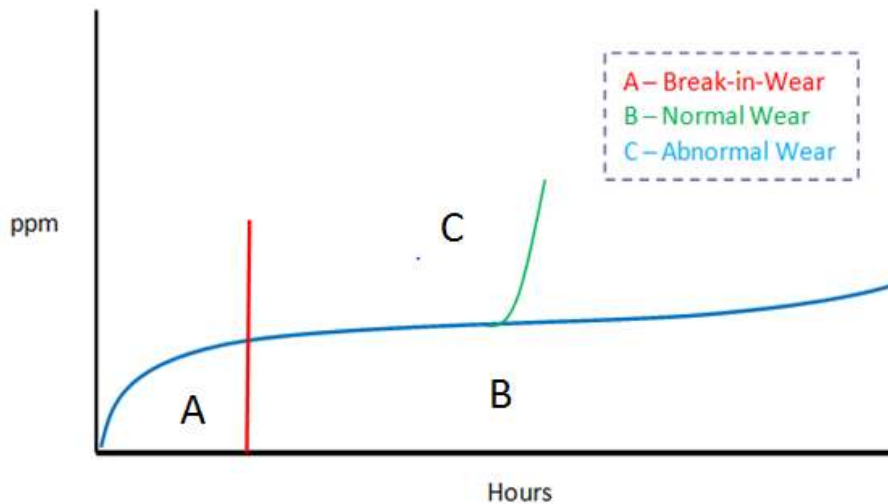


Figure 4. Wear Particle Concentration

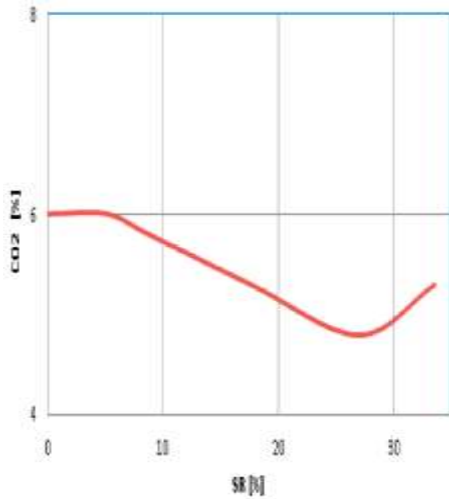
Fossil fuels are known to be important sources of air pollution that can increase the risk of asthma, bronchitis and other health challenges. However, most research has focused on fuel, rather than emissions from lubricating oil. The American Chemical Society (2007) noted that a hydrogen-powered engine emits higher levels of metal-rich molecules, and its lubricants are the primary source of these emissions. This has the potential to cause lung damage when inhaled for long periods.

Hydrogen is a suitable fuel for internal combustion engine, because of its characteristics such as fast flame speed, low ignition energy required, and high adiabatic temperature. These contribute to a rise in the temperature of the working fluid in the cylinder as well as to an increase in NO_x . With the utilization of hydrogen in internal combustion engines, pollutions are reduced, and engines performance are improves (Shadidi, Najafi, & Yusaf, (2021)).

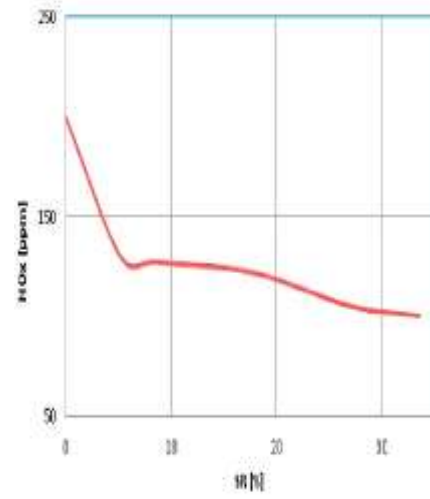
The combustion of hydrogen reduces the amount of carbon inside the engine cylinder of a hydrogen–diesel fuel compare to other fuels. The CO_2 emission content shown in Figure 5(a) decreases with an increase in amount of hydrogen in a diesel engine. At the Substitute Ratio (SR) of 27, the lowest CO_2 emission content was achieved, with 20% lower compare to other fuel. At a maximum hydrogen value, the CO_2 emission content was 11.6% lower. The value of the CO_2 increased at SR of 34% compare to at SR of 27%. The amount of NO_x and smoke emissions are most common in diesel engine. the reduction of NO_x and smoke emissions value were shown for all values of SR at 18%-34% (Figure 5 (b)). The emission level of the smoke decreases at all substitute ratios. While for the hydrogen and diesel fuel, the smokes number decreases as shown in Figure 5(c) (Gernat, et al. (2023)).

In summary, it can be stated that hydrogen internal combustion engine technologies can:

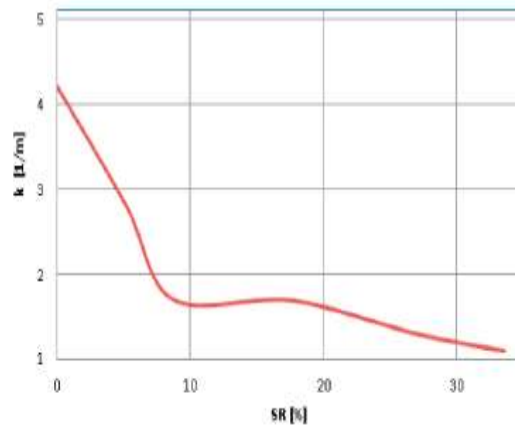
1. Respond to customer request regarding fuel efficiency and engine performance.
2. It can combat climate change and boost hydrogen production
3. Enable the development of vehicles that can be sold at a reasonable price.



(a)



(b)



(c)

Figure 5. (a) CO₂ Emission Level Versus Substitute Ratio. (b) NO_x Emission Level Versus Substitute Ratio. (c) Smoke Emission Level Versus Substitute Ratio. (Gernat, et al., (2023))

5. CONCLUSION

Fuel in the form of hydrogen is abundant, but not in a free state, and must be produced through various chemical processes. Hydrogen can be used in conventional gasoline-powered internal combustion engines by modifying the

design of the engine components. Literatures showed that hydrogen can be used as an alternative fuel, both in the case of spark ignition and in compression ignition engines. It was also noted that NO_x emissions are ten times lower in the case of hydrogen compared to gasoline. HC and CO were found to be insignificant except for some traces of emissions due to the combustion of lubricating oil on the cylinder walls.

The hydrogen internal combustion engine is an important development in the transportation and energy sectors, bringing convenience to human society and thus combating climate change. In order to meet a wide range of market demands as an automotive engine, the engine must be optimized to ensure high performance. However, it has been noted that HICE has a wide range of research areas that can be explored such as;

1. Design modification of the components of the Hydrogen Internal Combustion Engine.
2. Modification of cooling and ventilation of the Hydrogen Internal Combustion Engine..
3. Development of modified materials for components of Hydrogen Internal Combustion Engines.
4. Engine combustion chamber design.
5. Fuel system and pre-ignition analysis of the Hydrogen Internal Combustion Engine.

REFERENCES

Al-baghdadi, M. (2020). An Overview of Hydrogen as an Alternative Fuel. Encyclopedia. Available online: <https://encyclopedia.pub/revision/9798/v1> (accessed on 12 June 2023).

American Chemical Society (2007). Lubrication Oil Pollutes, Even in Hydrogen-fuel Vehicles. Science, 3rd October, 2023. Available at www.sciencedaily.com/release/2007/10/071001100109

Arup G. A Review of Automotive Engine Friction Reduction Opportunities through Technologies Related to Tribology. Trans Indian Ins Metals 2017; 70: 527–535.

Dash, S. K., Chakraborty, S., Roccotelli, M., Sahu, U. K. (2022). Hydrogen Fuel for Future Mobility: Challenges and Future Aspects. Sustainability 2022, 14, 8285. <https://doi.org/10.3390/su14148285>

Dhyani, V., Subramanian, K. A. (2019). Control of Backfire and NO_x Emission Reduction in a Hydrogen Fueled Multi-Cylinder Spark Ignition Engine using Cooled EGR and Water Injection Strategies. International Journal of Hydrogen Energy. 44, 6287–6298

- Dimitriou, P.; Tsujimura, T. (2017), A Review of Hydrogen as a Compression Ignition Engine Fuel. *International Journal of Hydrogen Energy*, 42, 24470–24486.
- Forschung B. M, W. & Technik G. H, (2007). European Commission Directorate-General for Research Unit Surface Transport.
- Fukuda, K., Sugimura, J. (2008). Sliding Properties of Pure Metals in Hydrogen Environment, *Proc. STLE/ASME, IJTC2008-71210*
- Furuhama, S. & Fukuma, T. (1984). *High Output Power Hydrogen Engine with High Pressure Fuel Injection, Hot Surface Ignition and Turbo-Charging*, Hydrogen Energy Progress V, Edited by T.N. Veziroglu and J.B. Taylor, Pergamon Press, Elmsford ; NY:1493
- Gao, J., Tian, G., Ma, C., Balasubramanian, D., Xing, S., Jenner, P. (2020). Numerical Investigations of Combustion and Emissions Characteristics of a Novel Small Scale Opposed Rotary Piston Engine Fuelled with Hydrogen at wide open Throttle and Stoichiometric Conditions. *Energy Convers. Manag.* 221, 113178.
- Gao, J., Xing, S., Tian, G., Ma, C., Zhao, M., Jenner, P. (2021). Numerical Simulation on the Combustion and NO_x Emission Characteristics of a Turbocharged Opposed Rotary Piston Engine Fuelled with Hydrogen under wide open Throttle Conditions. *Fuel*, 285, 119210
- Gao, J., Wang, X., Song, P., Tian, G., Ma, C. (2022). Review of the Backfire Occurrences and Control Strategies for Port Hydrogen Injection Internal Combustion Engines. *Fuel* **2022**, 307, 121553.
- Gillingham, K. (2007). *Hydrogen Internal Combustion Engines Vehicles: A Prudent Intermediate Step or a Step in a Wrong Direction*, Stanford University, Department of Management Science & Engineering, 2007; 1-28.
- Glassman, I. (1996). *Combustion*. Academic Press, Inc California, 1996.
- Gomes A. J. M., Mikalsen, R., Roskilly, A. P. (2009). An experimental study of a direct injection compression ignition hydrogen engine. *International Journal of Hydrogen Energy*, 34, 6516–6522. \
- Gong, C., Si, X., Liu, F. (2021). Combined Effects of Excess Air Ratio and EGR Rate on Combustion and Emissions Behaviors of a GDI Engine with CO₂ as Simulated EGR (CO₂) at Low Load. *Fuel* **2021**, 293, 120442.
- Gurbüz, H., Akçay, I. H. (2021). Evaluating the Effects of Boosting Intake-Air Pressure on the Performance and Environmental Economic Indicators in a Hydrogen Fueled SI Engine. *International Journal of Hydrogen Energy* **2021**, 46, 28801–28810.
- Holmberg, K., Andersson, P. and Erdemir, A., “Global Energy Consumption due to Friction in Passenger Cars,” *Tribology International*, 47, 2012, 221–234.

Homan, H. S., Reynolds, R. K., De Boer, P. C. T. & Mclean W. J. (1979). *Hydrogen-Fuelled Diesel Engine Without Timed Ignition*. International Journal of Hydrogen Energy, 1979; 4(4):315-325.

Hosseini, S.E., Butler, B. An Overview of Development and Challenges in Hydrogen Powered Vehicles. International Journal of Green Energy, 17, 13–37

Hurtova, S. (2016). Analysis of Engine Oils Using Modern Methods of Tribotechnical Diagnostics, 2016.

International Energy Agency. (2012). Energy Technology Perspectives 2012, International Energy Agency, 2012, 1-686.

Ji, H., Yang, C., Wang, J., Chang, S., Xin, K.. (2021). Experimental study of the effects of excess air ratio on combustion and emission characteristics of the hydrogen-fueled rotary engine. International Journal of Hydrogen Energy **2021**, 46, 32261–32272.

Korakianitis, T., Namasivayam, M. A., Crookes, J. R. (2010). Hydrogen Dual Fueling of Compression Ignition Engines with Emulsified Biodiesel as Pilot Fuel. International Journal of Hydrogen Energy **2010**, 35, 13329–13344.

Lee, D. G., Miller, A. L., Park, K., Zachariah, M. R. (2006). Effects of Trace Metals on Particulate Matter Formation in a Diesel Engine: Metal Contents from Ferrocene and Lube Oil. *International Journal of Automotive Technology* **2006**, 7, 667-673.

Mehran, Q. M., Faza, M. A, Bushroa, A. R. (2018).. A Critical Review on Physical Vapor Deposition Coatings Applied on Different Engine Components. Crit Rev Solid State Mater Sci 2018; 3: 158–175.

Mihara, Y. (2017). Research Trend of Friction Loss Reduction in Internal Combustion Engines,” Tribology Online, 12, 3, 82–88.

Naber, J. D., Siebers, D. L. (1998). Hydrogen combustion under diesel engine conditions. International Journal of Hydrogen Energy, 23, 363–371.

Naikan, V N A. & Kapur, S. (2005). Reliability Modelling and Analysis of Automobile Engine Oil. *Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering* 2006 220: 187. DOI: 10.1243/095440706X72637

Sakurai, H., Tobias, H. J., Park, K., Zarling, D., Docherty, K. S., Kittelson, D. B., McMurry, P. H.; Ziemann, P. J. (2003). On-line Measurements of Diesel Nanoparticle Composition and Volatility. *Atmos. Environ.* 37, 1199-1210.

Saravanan, N., Nagarajan, G., Sanjay, G., Dhanasekaran, C., Kalaiselvan, M. K. (2008). Combustion Analysis on a DI Diesel Engine with Hydrogen in Dual Fuel Mode. Fuel, 87, 3591–3599.

- Saravanan, N., Nagarajan, G. (2010). Performance and Emission Studies on Port Injection of Hydrogen with varied Flow Rates with Diesel as an Ignition source. *Appl. Energy*, 87, 2218–2229.
- Saranavan, N., G. Nagarajan, G. Sanjay, C. Dhanasekaran, K.M. (2008). An Experimental Investigation on Hydrogen as a Dual Fuel for Diesel Engine System with Exhaust Gas Recirculation Technique, *Renewable Energy*, 2008; 33(3):422-427.
- Shadidi, B., Najafi, G., Yusaf, T. (2021) A Review of Hydrogen as a Fuel in Internal Combustion Engines. *Energies* **2021**, 14, 6209. <https://doi.org/10.3390/en14196209>
- Sharma, P., Dhar, A. (2018). Effect of hydrogen supplementation on engine performance and emissions, *International Journal of Hydrogen Energy*. 43, 7570–7580.
- Sharma, S. K., Goyal, P. & Tyag, R. K. (2015). Hydrogen-Fueled Internal Combustion Engine: A Review of Technical Feasibility. *International Journal of Performability Engineering*, 11(5), 491-501
- Shi, H., Uddeen, K., An, Y., Pei, Y., Johansson, B. (2021). Multiple Spark Plugs Coupled with Pressure Sensors: A New Approach for Knock Mechanism Study on SI Engines. *Energy* 227, 120382
- Shi, H., Uddeen, K., An, Y., Pei, Y., Johansson, B. (2021). Statistical Study on Engine Knock Oscillation and Heat Release using Multiple Spark Plugs and Pressure Sensors., 297, 120746.
- Srinivasana, C.B., Subramanian, R. (2014). Hydrogen as a Spark Ignition Engine Fuel Technical Review. *International Journal of Mechanical & Mechatron. Engineering. IJMME-IJENS* **2014**, 14, 111–117.
- Stepien, Z. A. (2021). Comprehensive Overview of Hydrogen-Fueled Internal Combustion Engines: Achievements and Future Challenges. *Energies*, 14, 6504. <https://doi.org/10.3390/en14206504>
- Tanq, X., Kabat., D., Natkin, R., Stockhausen, W. & Heffel J.. (2002). *Ford P2000 Hydrogen Engine Dynamometer Development*, SAE Paper 2002-01-0242.
- Thomas G. (2014). Tribological Behaviour of Solid Lubricants in Hydrogen Environment. *BAM Federal Institute for Materials Research and Testing Germany*.
- Tull, E., & Heywood, J. (2003). Lean Burn Characteristics of a Gasoline Engine Enriched with Hydrogen from a Plasmatron Fuel Reformer, SAE Paper 2003-01-0630.
- Verhelst, S., Sierens, R., Verstraeten, S. (2006). A Critical Review of Experimental Research on Hydrogen-Fueled SI Engines; SAE International: Warrendale, PA, USA.
- Wang, D., Ji, C., Wang, S., Yang, J., Wang, Z. (2021). Numerical study of the premixed ammonia-hydrogen combustion under engine-relevant conditions. *International Journal of Hydrogen Energy* **2021**, 46, 2667–2683.

Wong, V. W. & Tung, S. C. (2016). Overview of Automotive Engine Friction and Reduction Trends—Effects of Surface, Material, and Lubricant-Additive Technologies, *Friction*, 2016, 1–28.

Wenjin, Q., Lihui, X., Qiang, C. (2023). Study on Combustion Characteristics of Diesel/Natural Gas/Hydrogen RCCI Engine. *Journal of Engineering for Gas Turbines and Power* FEBRUARY 2023, Vol. 145 / 021005-1

Yip, H. L., Srna, A., Yuen, A. C. Y., Kook, S., Taylor, R. A., Yeoh, G. H., Medwell, P. R., Chan, Q. N. A. (2019). Review of Hydrogen Direct Minjection for Internal Combustion Engines: Towards Carbon Free Combustion. *Appl. Sci.* **2019**, 9, 4842.

Bibliometric Analysis of Studies on The Role of Accounting Profession in Sustainability

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Abstract

Introduction: Sustainability basically aims to create a sustainable structure by examining the social, economic and environmental impacts of businesses. The accounting process plays an important role in obtaining the information required for businesses to achieve this goal. The accounting system makes it possible to obtain accurate and reliable information needed to prepare sustainability reports. The information produced by the accounting system is utilized in preparing reports related to the social, economic, and environmental categories that form the main dimensions of sustainability.

Aim: The primary aim of the research is to examine studies on the importance of the accounting profession in sustainability using bibliometric analysis. As a result of the literature review, the keywords for the research have been identified as "sustainability," "accounting," and "accountants."

Method: The bibliometric analysis method is a technique that provides an overview of a large number of academic studies. This technique enables the easy identification of information such as influential authors, publications and journals, countries and institutions, and the languages in which the research has been published. Additionally, it provides benefits in revealing the intellectual structure of a research field. In this context, the distribution of studies on the importance of the accounting profession in sustainability by year, country, subject, and language has been examined in detail. The data used in the research were accessed from the Scopus database. The keywords "sustainability", "accounting" and "accountants" were typed into the database and a total of 268 studies were obtained.

Findings: The analysis revealed that the year with the most publications (12.31%) and the highest number of citations (836) between 2000 and 2024 was 2023. It was also found that 82.84% of the published research consisted of articles, and United Kingdom was the country with the most publications (17.16%). According to the citation analysis, the most cited authors were Rob Gray.

Conclusion: The accounting system plays a vital role in providing reliable information needed for the preparation of sustainability reports, auditing these reports, and presenting them to relevant stakeholders. The analysis conducted for the research purpose shows that studies on the importance of the accounting profession in sustainability have been increasing over the years.

Originality and value: The literature review on the research topic revealed that no bibliometric analyses have been found. Consequently, this research is significant for tracking trends and developments related to the subject.

Key Words: Sustainability, Accounting, Accountants.

Jel Codes : M41

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1. INTRODUCTION

Sustainability is an approach based on the efficient use of natural resources and the protection of the environment while meeting current needs without jeopardizing the ability of future generations to meet their needs. In addition to environmental concerns, it also covers economic and social dimensions. At this point, in order to ensure sustainable development, these basic dimensions should be carried out in a balanced manner. The development of environmentally sensitive production and consumption habits both individually and socially, the efficient utilisation of resources and long-term thinking are the basic elements for a sustainable future.

Accounting practices are needed in balancing and measuring these three basic dimensions of sustainability. At this point, accounting has important duties in reporting the sustainability performance of an enterprise in a transparent manner. In particular, sustainability accounting is important in determining the social responsibilities and contribution to society by determining the environmental footprints of enterprises.

2. LITERATURE REVIEW

Petricica and Buboï (2024) examined the role of accountants and auditors in promoting sustainable development and their activities in the economic and financial field through a qualitative research. As a result of the study, it is emphasized that accountants and auditors make significant contributions to sustainable reporting by providing transparency in reporting environmental performance.

In another study, Petricica (2023) aimed to identify the contribution of accounting professionals to sustainable development and the key elements related to the effort in this field. As a result of the research, it was emphasized that sustainable approaches should be more integrated into accounting education programs.

Egan and Tweedie (2018) investigated the contributions of accountants in corporate sustainability. As a result of the research conducted with the case study method in businesses operating in Australia, it was found that accountants were more adaptable to early changes in line with cost efficiency and had difficulty interacting with more creative sustainability improvements.

Schaltegger and Zvezdov (2015) examined the role of accountants in managing sustainability information. As a result of the research, it was observed that they play an active role in obtaining and auditing sustainability information.

Mistry, Sharma and Low (2014) examined the perceptions of management accountants in accounting for sustainable development. As a result of this study conducted in New Zealand, they found that management accountants of small and medium-sized enterprises have a more limited role compared to accountants of larger enterprises.

Çalışkan (2012) examined the role of accounting and the accounting profession in sustainability through a literature review. As a result of the research, it was determined

that there are deficiencies in eliminating the problems in defining the relationship between sustainability and accounting.

Zveydov (2012) examined the role of accountants in sustainability from an incentive theory perspective. In the research, the importance of the accounting profession in sustainability practices is emphasized, and it is emphasized that the accounting profession should not only provide professional expertise but also play a good watchdog role.

3. RESEARCH METHODOLOGY

This section includes the purpose of the study, the methodology, how the data were obtained and the findings.

3.1. Purpose and Method of The Study

The main purpose of the research is to examine the studies on the importance of the accounting profession in sustainability by bibliometric analysis method. As a result of the literature review, the keywords of the research were determined as “sustainability”, “accounting” and “accountants”. In the research, the distribution of the studies on the importance of the accounting profession in sustainability according to years, countries, subject and language were examined in detail.

The data used in the research were obtained from the Scopus database. The research data were accessed from the Scopus database on 12.08.2024. The keywords “sustainability”, “accounting” and “accountants” were typed into the database and a total of 268 studies were obtained.

3.2. Findings

In this section, firstly, the research on the role of the accounting profession in sustainability in Scopus and then the bibliometric analysis and visuals obtained using the VOSviewer 1.6.20 program are included.

3.2.1. Descriptive Statistics

The distribution of the studies published in the scopus database between 2000 and 2024 within the scope of the aim of the research according to years, authors, countries and publishers is shown in Tables 1, 2, 3 and 4 below.

Table 1: Distribution of Publications by Year

Years	Frequency	Percentage (%)
2024	29	10,82
2023	33	12,31
2022	26	9,70
2021	32	11,94
2020	21	7,84
2019	15	5,60
2018	19	7,10
2017	14	5,22
2016	13	4,85
2015	12	4,48
2014	15	5,60
2013	13	4,85
2012	7	2,61
2011	6	2,24
2010	5	1,87
2009	5	1,87
2008	1	0,37
2006	1	0,37
2000	1	0,37

When Table 1 is examined, it is seen that the year with the highest number of publications is 2023 (33) with a rate of 12.31%, while the years with the least number of publications are 2000, 2006 and 2008 with a rate of 0.37%. In addition, it has been determined that research on the subject tends to increase over the years. (Note: Studies in the top 7 in 2024 are included.)

Table 2: Distribution by Country

Countries	Frequency	Percentage (%)
United Kingdom	57	%23,11
Australia	46	17,16
England	34	12,69
USA	23	8,58
Romania	22	8,21
Canada	18	6,72
New Zealand	15	5,60
Italy	13	4,85
Spain	11	4,10
Malaysia	10	3,73

Table 2 shows the distribution of research by country and the first 10 countries are shown. According to the table, it is seen that the most research on the subject was conducted in the United Kingdom with a rate of 17.16%.

Table 3: Distribution by Publishers

Publishers	Frequency	Percentage (%)
Emerald Grup	86	32,10
Taylor & Francis	32	11,94
Mdpi	27	10,10
Elsevier	25	9,33
Wiley	15	5,60
Edutura Ase	13	4,85
Springer Nature	13	4,85
Amer Accounting Assoc	8	2,99
Routledge	6	2,24
Int Business Information Management Assoc-Ibima	5	1,87

When the distribution according to publishing types is analyzed, Emerald group ranks first among the top 10 publishers with 32.10%, followed by Taylor & Francis with 11.94% and Mdpi group with 10.10%.

Table 4 Distribution by Research Types

Research Types	Frequency	Percentage (%)
Emerald Grup	86	32,10
Taylor & Francis	32	11,94
Mdpi	27	10,10
Elsevier	25	9,33
Wiley	15	5,60
Edutura Ase	13	4,85
Springer Nature	13	4,85
Amer Accounting Assoc	8	2,99
Routledge	6	2,24
Int Business Information Management Assoc-Ibima	5	1,87

When the researches on the subject are analyzed according to their types, it is seen that there are 7 different types of researches in total and the first type is the article type with a rate of 82.84%.

3.2.2. Citation Analysis

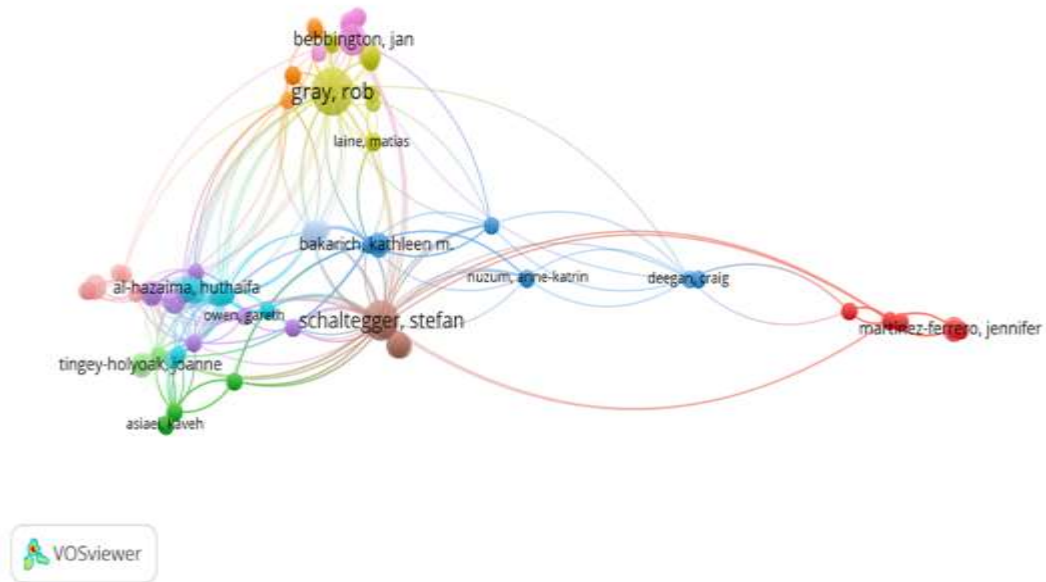
In this part of the study, the VOSviewer program was used for bibliometric mapping analysis of the data set obtained from the Scopus database. In the program, “citation-authors analysis”, “co-occurrence”, “citation-country analysis” were applied.

In order to reveal the citation structure of the studies examined within the scope of the purpose of the study at the level of authors, firstly, author citation (citation-authors) analysis was performed. The 5 most cited authors are shown in Table 5 and the author citation network map is shown in Figure 1:

Table 5: Top 5 Most Cited Authors

Yazarlar	Yayın Sayısı	Atıf Sayısı	Toplam Bağlantı Gücü
1.Gray, Rob	7	712	64
2.Bebbington, Jan	3	396	26
3. Romi, Adnrea M.	1	276	0
4.Martinez-Ferrero, Jennifer	2	688	7
5. Malpas, Jeff	1	122	5

Figure 1: Author Level Citation Map

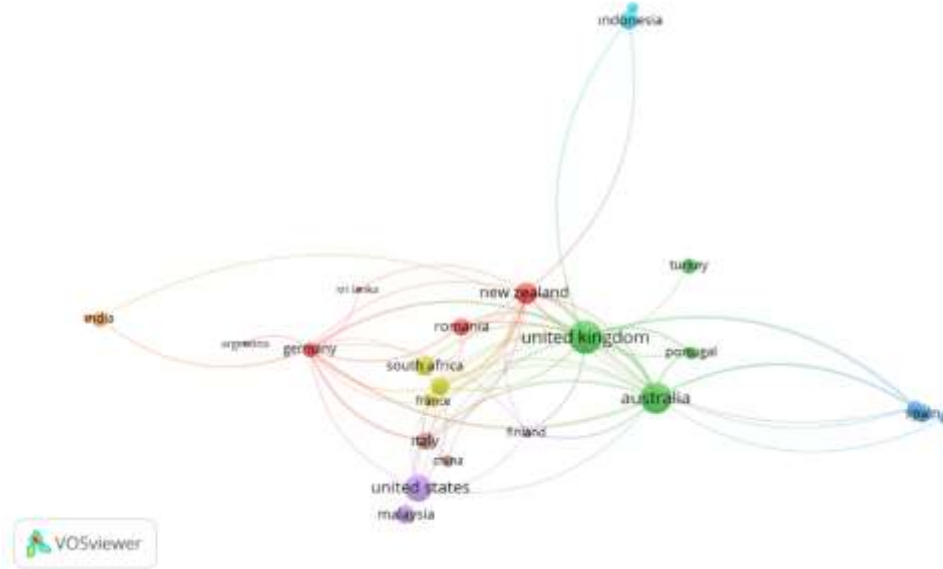


When Figure 2 is analyzed, it is observed that the most frequently repeated keyword sustainability is used together with other keywords such as accounting, sustainability accounting, sustainable reporting and financial sustainability. Country citation analysis (citation-country) was conducted to identify the countries with the highest number of publications and the highest number of citations in research on the subject. The results of the analysis are shown in Table Table 7 and Figure 3:

Table: Top 5 Most Cited Countries

Ülkeler	Yayın Sayısı	Atıf Sayısı	Toplam Bağlantı Gücü
1. United Kingdom	29	1201	65
2. Australia	26	704	42
3. New Zealand	12	313	34
4. Germany	6	91	26
5. Canada	9	143	23

Figure 3: Country Level Citation Map



According to the citation analysis at the country level, the country with the highest number of citations and publications is the United Kingdom. In Turkey, 6 publications were made on the subject and the total number of citations was found to be 49.

4. CONCLUSION

Nowadays, when bibliometric research is gaining momentum, researchers show great interest in this type of analysis. While this analysis offers new research areas to researchers, it is a functional type of analysis used for many purposes such as publication trends, determining the most cited authors and studies. In this study, bibliometric analysis method is used to examine the studies on the importance of the accounting profession in sustainability with bibliometric analysis method. As a result of the literature review, the keywords of the research were determined as “sustainability”, “accounting” and “accountants”. VOSviewer program was used for bibliometric mapping through Scopus database. A framework for studies on the importance of the accounting profession in sustainability is presented.

In the research, the distribution of studies on the importance of the accounting profession in sustainability according to years, countries, subject and language was examined in detail. The research data were accessed from the Scopus database on 12.08.2024. The keywords “sustainability”, “accounting” and “accountants” were entered into the database and a total of 268 studies were obtained.

In the research, it was observed that the first study on the subject was conducted in 2000 and the most studies were conducted in 2023; in addition, it was seen that the research on the subject tended to increase over the years. It was determined that the country that conducted the most research was the United Kingdom and the language of the majority of these studies was English. In addition, when we look at the types of journals in which the research is published, it is seen that the most publishing journal is Sustainability, the publishing group is Emerald Group, and the university is Bucharest University of Economic Studies. In addition, it was also observed that the majority of the studies were in the article type.

When the citation analysis is analyzed, it is observed that the most cited author is Rob Gray, the most used keywords are Sustainability, Accounting, Accounting Education, Sustainability Reporting, Sustainability Accounting, and the most cited country is the United Kingdom. Accordingly; the accounting system assumes important tasks in providing reliable information needed in the preparation of sustainability reports, auditing the prepared reports and presenting them to the relevant stakeholders. As a result of the analysis made in line with the purpose of the research, it is seen that the studies on the importance of the accounting profession in sustainability have been on an increasing trend over the years.

REFERENCES

- Özsözgün Ç, A. (2014). How accounting and accountants may contribute in sustainability?. *Social Responsibility Journal*, 10(2), 246-267.
- Egan, M., & Tweedie, D. (2018). A “green” accountant is difficult to find: Can accountants contribute to sustainability management initiatives?. *Accounting, Auditing & Accountability Journal*, 31(6), 1749-1773.
- Mistry, V., Sharma, U., & Low, M. (2014). Management accountants' perception of their role in accounting for sustainable development: An exploratory study. *Pacific Accounting Review*, 26(1/2), 112-133.
- Petricică, A. E. (2023). The Role of Accountants and the Accounting Profession in Achieving the Sustainable Development. In *Proceedings of the International Conference on Business Excellence* (Vol. 17, No. 1, pp. 752-762).
- Vintilă, A. E. P., & Dănăilă, A. B. (2024). The Role of Accounting and Audit in Sustainable Development. In *Proceedings of the International Conference on Business Excellence* (Vol. 18, No. 1, pp. 2154-2171).
- Schaltegger, S., & Zvezdov, D. (2015). Gatekeepers of sustainability information: exploring the roles of accountants. *Journal of Accounting & Organizational Change*, 11(3), 333-361.
- Zvezdov, D. (2011, October). Accounting for sustainable organisations: where is the accountant and why it matters?. In *EnviroInfo* (pp. 601-606).

Risk management as a requirement of ISO 9001

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Abstract

Introduction: Risk management is an important aspect of any business, especially in turbulent and unstable market conditions. Various risk management techniques can help organisations to make correct and timely decisions. Risks are often perceived as a threat or crisis, but they can also be an opportunity for improvement.

Aim: The aim of the article is to analyze risk management techniques, with a focus on identifying, analyzing and evaluating risks. The article deals with the possibilities and objectives of implementing risk management within ISO 9001 quality management system.

Method: Methodology is based on a review of the relevant literature with the aim of analyzing and comparing risk management methods.

Findings: Successful risk management requires an integrated approach that involves all levels of the organization and enables the organization to be better prepared for crises. Qualitative methods such as brainstorming, scenario analysis, HACCP and HAZOP analysis are suitable for identifying risks and determining the consequences. Quantitative methods such as Monte Carlo simulation, fault tree analysis and FMEA, on the other hand, are valuable tools for analyzing and evaluating risks.

Originality and value: This article provide an analysis and comparison of different risk management methods and shows how these methods can be applied in practice to improve the processes as a part of the ISO 9001 requirement.

Key Words: Risk Management; ISO 9001; Quality Management

Jel Codes: D81 L15

1. INTRODUCTION

The ISO 9000 series of standards is one of the most widely recognised quality management systems in the world. By implementing a quality management system and consistently monitoring and revising its requirements, organisations can achieve greater financial success and improve their services while increasing customer satisfaction, employee engagement and social outcomes (Vrtodušić Hrgović, et al. 2024; Tari et al., 2020; Djofack and camacho; 2017; Bouranta et al., 2017, Psomas et al. 2013). According to Britvić (2011), the impact of an implemented quality management system can provide numerous advantages over competitors that do not have such a system, which often manifests itself in two key effects: Cost impact and revenue impact. In 2015, the revision

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of the ISO 9001 standard introduced risk-based management as a requirement clause 6 (Planning), emphasising the increased need for risk management (ISO 9000:2015:52). The 6th clause of ISO 9001 defines methods and mechanisms for implementing measures to manage plans to achieve specific quality objectives. As a basis for planning, the organization must understand its context and identify risks in accordance with the ISO 9001:2015 standard (Bešker, et al. 2022).

Risk is defined “effect of uncertainty on objectives, it can be positive, negative or both, and can address, create or result in opportunities and threats.” (ISO 31000:2018:1). A positive deviation resulting from a risk can create an opportunity, but not all positive impacts lead to opportunities. The assessment of whether a harmful event could occur, the likelihood of its occurrence and the consequences of a potentially harmful event are all integral parts of risk. It is important to analyse the possibilities for exploiting the positive effects of a particular risk, rather than viewing the risk solely from a negative perspective (Gaži-Pavelić, 2015:31).

Despite the importance of risk management, the implementation of risk management systems in ISO 9001 certified organizations faces numerous challenges. These challenges include a lack of a systematic approach and the perception of risk management as merely an additional cost, which complicates the application of the standard’s requirements (Nascimento et al., 2020). Given these gaps, our study focuses on addressing these issues by enriching the existing literature through a review and systematisation of qualitative and quantitative risk management techniques and provides organisations with a comprehensive overview of the tools available to them. As such, this article contributes to a better understanding and implementation of risk management systems, which are essential for ensuring the sustainability and success of organisations in a dynamic business environment.

2. RISK MANAGEMENT

“Risk management is an important part of organizational management, it is defined as “coordinated activities to direct and control an organization with regard to risk” (ISO 31000:2018:1). Risk management, as a process, involves identifying, assessing, and monitoring risks, along with defining actions to mitigate their impact (Gaži-Pavelić, 2015). “The main purpose of risk-based thinking is to establish preventive management, which is crucial for the timely identification and elimination of both negative impacts and potential risks” (Vučinić & Luburić, 2022:39).

Implementing a risk management system increases the probability that the planned business objectives will be achieved. The activities associated with risk management require organisations to address specific risks. It is crucial to quantify the risks that could potentially prevent the organisation from achieving its desired potential. In order to minimise risks and maximise positive outcomes, it is necessary to develop a systematic and risk management process (Krčum et al., 2019:188).

According to ISO 31000:2018 (2018:8), "the risk management process involves the systematic application of policies, procedures and practices to the activities of

communicating and consulting, establishing the context and assessing, treating, monitoring, reviewing, recording and reporting risk". As a process, risk management helps organisations to identify potential risks and respond to them in a timely manner.

2.1. Risk management and ISO 9001

Increasing competition and more demanding customers continue to impact the implementation of quality management systems in both the manufacturing and service sectors. One of the most widely used and internationally recognized frameworks for quality management is the ISO 9001 standard, which ensures that organizations focus on the needs and expectations of their customers, design their processes to meet these requirements, and perform measurement and analysis to achieve continuous improvement (Vrtodušić Hrgović, 2018:36). Certification of a quality management system enhances competitiveness in the global market and can even be a prerequisite for establishing new business partnerships (Molina-Azarin et al. 2015). For companies, it is crucial to determine whether certification is beneficial and necessary. Making this decision requires clearly defining strategies, understanding market conditions and industry trends, and comprehending the time, cost, and resource demands for implementing an ISO 9001 quality system (Šuman et al., 2013).

ISO 9001:2015 emphasizes risk-based management as a critical element for achieving an effective quality management system. The ISO 9000 series is one of the most widely implemented quality management systems globally. By implementing, continuously monitoring, and revising their quality management systems, organizations can enhance business performance and increase customer satisfaction. The 2015 revision of ISO 9001 introduced risk-based management into its requirements, highlighting the growing necessity for effective risk management (ISO 9000:2015:52). According to Gołas et al. (2016:259), organisations should plan their activities in relation to risks and opportunities, integrate and implement these activities into the processes of the quality management system and evaluate the effectiveness of these measures.

2.2. Risk management and ISO 31000

ISO 31000 provides a comprehensive risk management framework that complements ISO 9001 by reinforcing the risk-based thinking required for effective quality management systems. ISO 31000 can help organizations set strategies, achieve objectives and make informed decisions that help protect and create value and resources (Nowak & Wójtowicz, 2015). A critical aspect of ISO 31000:2018 is its adaptability to different organizations, regardless of their size or industry (Hutchins, 2018). The advantages of this risk management system are in its simplicity and general applicability, making it suitable for implementation in different types of organizations (Kusuma et al., 2020). According to UcuNugraha (2019:142), the standard is designed to meet the needs of a wide range of stakeholders, including those involved in risk management policy, those who manage risks across the organization or within a particular segment, and those

who develop standards and guidelines for risk management, as well as those who determine how risks should be managed.

Proper implementation of ISO 31000:2018 offers organizations numerous benefits. Hutchins (2018) emphasizes that this standard can be more easily integrated into existing ISO management systems than any other risk management framework and is applicable to organizations in almost all industries. It improves the identification of both positive risks (opportunities) and negative risks (threats), improves financial reporting and cost efficiency, enhances stakeholder confidence and corporate governance, and provides a reliable basis for risk-based decision-making. In addition, ISO 31000:2018 helps to effectively allocate resources to risk management and mitigate the impact of risks.

However, Preda (2013) points out several challenges in implementing this standard, such as the additional cost of training staff and implementing the tools, the need for frequent revisions due to rapidly changing business conditions, the lack of a certification process, and the lengthy cycle for creating and updating the standard. Choo and Goh (2015) conclude that tailoring the risk management framework to the specific needs of the organization is critical and that the availability and sharing of stakeholder feedback throughout the implementation process is paramount.

2.3. Risk management techniques

According to (Grgurević, 2024:210) by applying the ISO 31010: 2019 risk management techniques, it is possible to assess the significance of individual risks to create preconditions for an adequate response before risks bring the organization into crisis. Which method of risk assessment the organization will decide on depends on its capabilities, but also on the activity the organization is engaged in. ISO/IEC 31010:2019 provides guidelines for the selection and application of risk assessment methods. Each technique (method) is assigned a specific purpose, such as risk identification, analysis and evaluation (shown in table 1), and it is up to the organization to decide which one to use.

In the literature (Kereta, 2004; Grgurević, 2023, ISO/IEC 31010:2019), risk management techniques and methods are often divided into qualitative and quantitative categories. Qualitative techniques use words or descriptive scales as a means of expression, while in quantitative techniques the consequences and probability are mathematically measurable and expressed in numerical values (Kereta, 2004). According to Grgurević (2023) each technique is unique and has a distinct application within the risk assessment process. It is advisable to integrate various techniques to obtain the most precise assessment, allowing organisations to make well-informed decisions regarding the next steps in handling risks.

The FMEA method (Failure Mode and Effects Analysis) focuses on the identification of failures, their causes and their effects on the system (or process). It provides input for corrective actions and/or monitoring programs (Perdigão et al., 2012). **Scenario analysis** is about constructing or developing scenarios and incorporating the content of these scenarios into the decision-making process (Maack, 2011). Scenarios are not meant to fully depict the future; instead, they emphasize key aspects of a potential

future and focus on the critical factors that will influence future developments (Kosow and Gaßner, 2008). **Fault tree analysis** is an analytical technique that is performed deductively based on the occurrence of undesirable events in order to determine the root cause. The fault tree itself is a graphical model of different combinations of faults that lead to the occurrence of predefined adverse events (Wessiani and Yoshio, 2018). **Monte Carlo simulation** is an algorithm that aims to predict all possible outcomes of the process to which it is applied and the probabilities of their occurrence (Crnjac Milić and Masle, 2013). This method “calculates the probability of results by performing multiple simulations with random variables” (ISO/IEC 31010:2019:35). **HACCP** (Hazard Analysis and Critical Control Point) is an internationally recognized system for ensuring food safety (Kushwah and Kumar, 2017). One of the most important components or principles of the HACCP system is the identification of critical control points and the establishment of critical limits. In addition, corrective actions should be established if a control point is not under control (Kushwah and Kumar, 2017). **HAZOP** (Hazard and Operability Studies), a systematic method for identifying potential hazards in the work process, helps organizations to identify potential hazards and operational problems related to deviations (Devčić-Jeras, 2020). **The Delphi technique** is a research approach to “collect judgments through a series of consecutive questionnaires. Participants take part individually but receive feedback on each other's answers after each series of questions” (ISO/IEC 31010:2019:33). **Brainstorming** is a “technique used in workshops to encourage imaginative thinking” (ISO/IEC 31010:2019:32). It is widely used in project planning and can be very useful in identifying risks. It is a simple but effective method to encourage people to think creatively in a group environment (Mileusnić Škrtić and Horvatinčić, 2014).

Table 1: Overview of Risk Management Techniques by Risk Assessment Phases and Method Type

Technique	Identification	Analysis			Evaluation	Qualitative	Quantitative
		Consequences	Likelihood	Level			
FMEA	+	+	+	+	+		+
Brainstorming	+					+	
HACCP	+	+			+	+	
Fault tree analysis		+	+				+
Scenario analysis	+	+	+	+	+		+
Delphi method	+					+	
HAZOP	+	+			+	+	
Monte Carlo simulation			+		+		+

Source: created by authors based on ISO/IEC 31010:2019, Grgurević (2023), Kereta, 2004

Based on the presented table, this article examines various risk management techniques with a focus on risk identification, analysis, and evaluation. It has been determined that FMEA and Scenario analysis are significant techniques due to their applicability in all phases of risk analysis, both of which are quantitative in nature. On the other hand, HACCP and HAZOP have proven useful for the identification and analysis of specific risks, particularly in terms of determining consequences, and are classified as qualitative methods. Brainstorming and Delphi method are primarily used for risk identification and belong to qualitative techniques. Monte Carlo simulation is singled out as a technique used for determining risk probability, highlighting its specific role in risk analysis. Fault Tree Analysis is used specifically for assessing the consequences and likelihood of risks, and it falls under quantitative methods. Each of these risk management techniques can have an important role in meeting the requirements of ISO 9001, and by integrating these methods into their quality management systems, organizations can more effectively identify, analyze, assess and manage risk. The combination of qualitative and quantitative approaches ensures that all aspects of risks are considered, enabling informed decision making and continuous improvement. In an environment where risk is both a challenge and an opportunity, these techniques provide the necessary tools to manage uncertainty and achieve sustainable success.

By applying risk assessment techniques outlined in ISO/IEC 31010:2019, specific threats and dangers to an organization can be effectively addressed (Grgurević, 2023). These techniques establish a solid groundwork for successful crisis prevention and management, helping the organization to better prepare for and navigate through crisis situations.

The importance of communication and sharing of risk-related information between employees and managers is emphasised in the requirements of ISO 9001, particularly in clauses 5 (Leadership) and 7 (Support) (Nascimento et al., 2020). This underlines that successful risk management requires a culture of open communication and shared responsibility within the organisation.

3. CONCLUSION

Risk is an integral part of business operations and can emerge in all business processes and activities within an organization. By responding to risks in a timely manner, risks can be either prevented or transformed into opportunities. Risk management facilitates decision-making processes and the achievement of more efficient business operations. Effective risk management is an important requirement of ISO 9001. To ensure that an organization can anticipate, identify and respond to risks, various risk management techniques are used, each fulfilling specific functions within the broader risk management process. These techniques are important not only for identifying potential threats, but also for analyzing, assessing and mitigating risks to ensure the continued success and resilience of the organization.

This study highlights the need for a deeper understanding of risk management practices in ISO 9001 certified organizations. Successful risk management requires an integrated approach that includes all levels of the organisation. There are a variety of methods and techniques that enable organisations to tailor their risk management strategies to their specific needs and conditions. FMEA and Scenario analysis are important quantitative methods that are used in all phases of risk analysis. HACCP and HAZOP, on the other hand, are qualitative methods that are particularly suitable for identifying and analyzing specific risks, with the focus on determining the consequences. Brainstorming and Delphi are also qualitative techniques that are primarily used for risk identification. Three-fold analysis can be used to assess the consequences and likelihood of individual risks, while Monte Carlo simulation is useful for calculating probabilities and evaluating risks. By using these methods strategically, companies can better manage potential risks and increase their overall resilience. Given these findings, there is a clear need for further research to find out what risk management methods are most successful in all organizations. It is critical to identify and understand the methods that are most effective in different organizational contexts, as well as the techniques that represent best practice in risk management.

In summary, while this study contributes to the existing literature, it also identifies gaps that should be explored further. A more detailed investigation into the reasons for the success or failure of specific risk management methods in ISO 9001 certified organizations is needed. This will provide valuable insights into best practices and help organizations to implement more effective risk management strategies.

REFERENCES

- Ardilo, A. (2022), "Risk Leadership and Emotional Intelligence on ISO 31000 Application's Effectiveness for Organisation", *Interdisciplinary Social Studies*, 1(6), 634-640.
- Bešker, M., Bešker, A., & Markulin Grgić, N. (2022), "Trodimenzionalni model procesnog upravljanja sigurnošću informacija", *Sigurnost: časopis za sigurnost u radnoj i životnoj okolini*, 64(2), 143-149.
- Bouranta, N., Psomas, E. L., & Pantouvakis, A. (2017), "Identifying the critical determinants of TQM and their impact on company performance: Evidence from the hotel industry of Greece", *The TQM Journal*, 29(1), 147-166.
- Britvić, J. (2011), "Moderni sustavi upravljanja u organizacijama", *Praktični menadžment: stručni časopis za teoriju i praksu menadžmenta*, 2(2), 72-80.
- Choo, B.S.-Y., & Goh, J.C.-L. (2015), "Pragmatic adaptation of the ISO 31000:2009 enterprise risk management framework in a high-tech organization using Six Sigma", *International Journal of Accounting & Information Management*, 23(4), 380-381.

- Crnjac Milić, D., & Masle, D. (2013), "Mogućnost primjene Monte Carlo metode na primjeru agroekonomskog problema prilikom donošenja odluka u uvjetima rizika", *Ekonomski vjesnik*, 26(1), 309-314.
- Devčić-Jeras, A. (2020), "HAZOP studije opasnosti i FMEA analize", *Iz prakse u praksu*, 11-17.
- Djofack, S., & Camacho, M. A. R. (2017), "Implementation of ISO 9001 in the Spanish tourism industry", *International Journal of Quality & Reliability Management*, 34(1), 18-37.
- Gošas, H., Mazur, A., & Gruszka, J. (2016), "Improving an organization functioning in risk conditions in accordance with ISO 9001: 2015", In *Proceedings of International Conference on Economics and Management Innovations*, 57, 19-23.
- Grgurević, D. (2024), "Overview of risk management tools and methods", *International Journal for Quality Research*, 18(1), 209-218.
- Hutchins, G. (2018), "ISO 31000:2018 Enterprise Risk Management", *CERM Academy Series on Risk Enterprise Management*, Portland.
- ISO 9000:2015 – Quality Management Systems – Fundamentals and Vocabulary (2015), HZN, 5th edition.
- ISO 9001:2015 – Quality Management Systems – Requirements (2016), HZN, 6th edition.
- ISO 31000:2018 – Risk management — Guidelines (2018), HZN, 6th edition.
- ISO/IEC 31010:2019 – Risk management – Risk assessment techniques (2019), HZN, 2nd edition.
- Kereta, J. (2004), "Upravljanje rizicima", *RRiF*, 14(8), 48-53.
- Kosow, H., & Gaßner, R. (2008), "Methods of Future and Scenario Analysis: Overview, Assessment, and Selection Criteria", Bonn.
- Krčum, M., Derado, I., Žanić-Mikuličić, J., & Brodarić, M. (2019), "How to manage risk – ISO standard 9001: 2015?", In *8th International Maritime Science Conference, Zbornik radova*, Budva, 187-191.
- Kushwah, A., & Kumar, R. (2017), "HACCP – its need and practices", *Acta Chemica Malaysia*, 1(2), 1-5.
- Kusuma, M. P., Novyanti, M., & Prasetyo, A. H. (2020), "Design and Implementation of Risk Management System: The Case of PT Lanisus", In *3rd Asia Pacific Management Research Conference*, Atlantis Press, 90.

Maack, J. N. (2011), "Scenario analysis: a tool for task managers", *Social analysis selected tools and techniques*, 36, 62-87.

Mileusnić Škrtić, M., & Horvatinčić, K. (2014), "Project Risk Management: Comparative Analysis of Methods for Project Risks Assessment", *Collegium antropologicum*, 1(1), 125-134.

Molina-Azorín, J. F., Tarí, J. J., Pereira-Moliner, J., Lopez-Gamero, M. D., & Pertusa-Ortega, E. M. (2015), "The effects of quality and environmental management on competitive advantage: A mixed methods study in the hotel industry", *Tourism Management*, 50, 41-54.

Nascimento, A. P. D., Santos, W. R. D., & Oliveira, M. P. V. D. (2020), "The risk mentality in organizations: an analysis of inserting risk management in ISO 9001 and ISO 14001: 2015 standards", *Gestão & Produção*, 27(2), 1-18.

Nowak, M., & Wójtowicz, Ł. (2015), "Risk management based on ISO 31000", *Central European Review of Economics & Finance*, 7(1), 51-61.

Perdigão, F., Jacinto, C., Lopes, S., & Matos, A. S. (2017), "ISO 9001: 2015 and its new requirement to address risk: a demonstration case-study", *International Journal of Systematic Innovation*, 4(4), 46-55.

Preda, C. (2013), "Implementing a risk management standard", *Journal of Defense Resources Management*, 4(1), 111-120.

Psomas, E. L., Pantouvakis, A., & Kafetzopoulos, D. P. (2013), "The impact of ISO 9001 effectiveness on the performance of service companies", *Managing Service Quality: An International Journal*, 23(2), 149-164.

Šuman, S., Kovačević, A., & Davidović, V. (2013), "Norme kvalitete – još uvijek neiskorišten potencijal", *Zbornik Veleučilišta u Rijeci*, 1(1), 291-306.

Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2020), "A taxonomy of quality standard adoption: Its relationship with quality management and performance in tourism organizations in Spain", *Journal of Tourism and Services*, 11(21), 22-37.

UcuNugraha, R. I. (2019), "Implementation of ISO 31000 for information technology risk management in the government environment", *International Journal of Advanced Science and Technology*, 28(6), 140-145.

Vrtodušić Hrgović, A. M., Milohnić, I., & Petaković, E. (2024), "TQM practices and their impact on performance in hotel companies", *Zbornik Veleučilišta u Rijeci*, 12(1), 321-337.

Vrtodušić Hrgović, A.-M. (2015), "Upravljanje rizicima i ISO 9001", *UHPA Revija*, 36-40.

Vučinić, M., & Luburić, R. (2022), "Fintech, Risk-Based Thinking and Cyber Risk", *Journal of Central Banking Theory and Practice*, 11(2), 27-53.

Wessiani, N. A., & Yoshio, F. (2018), "Failure mode effect analysis and fault tree analysis as a combined methodology in risk management", *IOP Conference Series: Materials Science and Engineering*, 337(1), 1-11.

Žabčić, M. (2023), "Uloga upravljanja rizicima u implementaciji standarda ISO 9001:2015", final thesis, University of Rijeka, Faculty of Tourism and Hospitality Management

Assessing TRNC Banks' Financial Strength and Risk Profiles: Insights from the Bankometer Method

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Abstract

Introduction: Banks and other financial intermediaries have an impact on development, especially in developing countries when there aren't many or any alternative sources of capital. Due in large part to the nation's constitution, the financial market in TRNC in particular is still expanding. Therefore, banks provide the capital that companies in these kinds of markets need to succeed and prevent them from missing out on profitable investment possibilities due to a lack of resources.

Aim: Using data from 2018 to 2020, the study's objective is to assess and contrast the solvency and financial soundness of eight banks in the Turkish Republic of Northern Cyprus (TRNC) using the Bankometer technique.

Method: To assess banks' financial health and gauge their capacity to settle debt, the Bankometer model was developed. Bankometer model was defined as an alteration of the standard CLSA and CAMELS stress test settings.

Findings: Foreign-capital banks in the TRNC are reported to perform better than local ones when banks are divided based on their capital categories. During the pandemic period, there was a modest fall in local banks' scores. In contrast, foreign banks also saw an increase in their average scores throughout this time.

Conclusion: As a result of the research, it was concluded that domestic banks showed improvement despite falling behind foreign-capital banks in overcoming the pandemic shock that occurred in the relevant period, that domestic banks experienced a rapid recovery despite these difficulties and were able to maintain their debt payment power with macroeconomic shocks.

Originality and value: The study is unique because of the data and methodologies employed.

Key Words: Bankometer, Financial Risk, TRNC.

Jel Codes: G21, G32.

1. INTRODUCTION

The banking industry acts as a mediator between the flow of funds needed for both production and consumption as well as the healthy development of the financial sector. As a result, it contributes significantly to economic growth. As there have been several instances in the past, banks, which essentially act as middlemen between people who

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provide and demand money through financial products, can also have an impact on the economy by carrying financial risks. As a result, a variety of analysis techniques are available to help estimate future financial risks that banks will take by examining their current financial situation. The debt payment capacity of banks, predicting firm failures and potential bankruptcy in advance, helps the internal management of banks and also plays a role in the formation of public policies.

There are two categories of hazards that banks face when trying to maintain their operations. Systematic risks resulting from non-bank effects are the first of them. Banks are unable to completely prevent the bad outcomes that could result from these outside factors. Systematic risks are risks that have types such as exchange rate, market, credit, liquidity and cannot be diversified or prevented (Medetoğlu, 2023). Banks can reduce or eliminate the effects of unsystematic risks. In order to prevent unsystematic financial risks in terms of sectoral sustainability, it is crucial that banks assess these risks and adopt the appropriate safety measures (Aksoy & Göker, 2018). Events like the 1974 oil crisis and the dissolution of the Bretton Woods system in the 1970s made risk factors crucial and necessitated their management. Unfavorable changes to the global banking system also necessitated the establishment of standards and risk-prevention measures (Medetoğlu, 2023). The Bankometer method is frequently preferred because it contains high accuracy elements, especially in correctly predicting bankruptcies in the banking sector (Bella & Radianto, 2020). Banks that are aware of the risk of financial failure should develop early intervention strategies by applying various prediction methods in order to minimize this risk and ensure a sustainable future. The objective of financial failure prediction models is to safeguard bank operations and enhance the stability of the financial system by implementing prompt measures and furnishing essential financial support (Tekin & Gör, 2022).

Eight banks in the TRNC, including local and foreign capital banks, had their financial stability and solvency assessed in this research. To comprehend the financial soundness of both local and foreign banks in the TRNC, it is crucial to examine how the banks performed in the face of macroeconomic shocks following the Covid-19 epidemic that transpired during the relevant time and the shifts in the *s*-score.

2. LITERATURE REVIEW

Çalış, Kevser, and Sakarya (2022) used the bankometer and z-score models to examine the debt payment capability and financial health of five participating banks in 2022—three of which are private and two of which are public banks—based on data from 2016 to 2020. Based on the analysis results, it was determined that public participation banks had a higher risk of bankruptcy than privately owned participation banks, and that there was a high potential for financial difficulties when the bankometer analyses of the participation banks used in the study were reviewed for the relevant years.

By using bankometer and altman-z score analysis on the data collected from the banks between 2012 and 2016, Aksoy and Göker (2018) looked at ten banks that were traded on the Borsa Istanbul. Ten commercial banks were found to have a low degree of financial risk and a high debt payment capability throughout the relevant time based on the study findings obtained using the bankometer approach.

Sakarya and Karakaş (2021) separated the banks into three groups based on capital and used the CAMELS and Bankometer methods to perform financial performance analysis in order to examine the financial performance of deposit banks that were operating in Turkey as of the end of 2019. After analyzing financial data from public, private, and foreign capital banks between 2010 and 2019, the researchers came to the conclusion that all bank groups were in a "Super solid" position and that the capital adequacy ratio was at its greatest point in the previous ten years.

In order to ascertain if the Bankometer approach can be utilized to examine financial distress, Africa (2018) developed a logistic regression model by building a sample using the available data of 111 banks listed on the Indonesian Stock Exchange between 2014 and 2016. The investigation revealed that the bankometer approach is a useful tool for businesses to utilize as a guide and that it may be used to identify financial problems.

Landjang and Tumiwa (2018) used the bankometer approach to investigate 19 private banks that operate in Indonesia based on their total asset size and studied the series of financial ratios that the IMF recommends. The three-year financial ratios of these 19 banks showed favorable changes, and the s-score findings showed that all of them were in super-solid status, according to the results of the bankometer investigation.

Kattel (2014) examined the financial soundness of Nepalese joint venture and private sector banks from 2007 to 2012. Kattel concluded that all banks were in a financially sound position and that the bankometer method would lower the risk of bankruptcy under operational internal management and supervision. According to the survey, joint venture banks had a worse financial robustness rate than private sector banks.

Between 2016 and 2022, Şahin and Yangil (2024) looked at the financial standing of 31 banks that were active in Turkey: 5 participation banks, 3 public capital, 8 private capital, and 15 foreign capital deposit banks. Each bank's S-Score, as revealed by the investigation, is over 70, a sign of sound financial standing, a high ability to pay off debt, and resilience to economic downturns. The study's conclusions also revealed that foreign capital banks perform better in this area and that deposit banks are a major factor in financial success.

The financial robustness of banks listed on the Pakistan Stock Exchange between 2006 and 2014 was determined by Ashraf and Tariq (2016). The Z-score model was used as a comparison tool to compare the outcomes of the study, which also looked at the stability and bankruptcy closeness of the banks. Although the two models produced outcomes that were almost identical, each model also found comparable things. According to the study, the Bankometer model is less expensive than more conventional stress testing techniques for evaluating the financial stability of banks. All banks covered

in the analysis were found to be financially healthy, with the exception of five banks listed on the Pakistan Stock Exchange.

Özbek, Hazar, and Babuşcu (2021) examined the 10 biggest deposit banks in Turkey in terms of total assets between 2011 and 2020, as well as the effect of the Covid-19 pandemic on the banks' financial stability. Based on the analytical results, they determined that the Covid outbreak did not significantly impact the ten major banks in the Turkish banking industry and that, as a consequence, the banks' financial stability was preserved. The survey discovered that Turkish banks were performing financially well, as it has in the past studies. This was because the banks had strong capital adequacy. Since the components of the Bankometer calculation technique are an analysis that ignores liquidity and concentrates on capital components, they advised that preparations should be made in the Bankometer method to examine liquidity as well.

The research by Permata and Purwanto (2018) evaluated the financial soundness of 23 banks listed on the Indonesia Stock Exchange by applying the Bankometer, Altman Z-Score, and CAMELS techniques in comparison. The study's findings indicate that the CAMELS approach is the most thorough and trustworthy way to evaluate the banking industry's financial stability. The Altman Z-Score and Bankometer approaches were assessed as complimentary techniques that may be applied to bolster the CAMELS model's findings and offer more data for analyses of financial health.

3. DATA AND METHOD

In this study, data from 8 banks from different capital groups between 2018 and 2020 were used to observe the financial quality level of banks in the TRNC. The banks whose data were used are given in the table below.

Table 1. Banks

Domestic Banks	Foreign Banks
CAPITAL BANK	T.C ZİRAAT BANKASI A.Ş.
KIBRIS İKTİSAT BANK	TÜRKİYE HALK BANKASI A.Ş.
CREDITWEST BANK	TÜRKİYE İŞ BANKASI A.Ş.
	TÜRK EKONOMİ BANKASI
	TÜRKİYE GARANTİ BANKASI A.Ş.

The Bankometer model was created to evaluate banks' financial standing and estimate their ability to pay off debt. It is widely acknowledged as a crucial instrument for guaranteeing the stability and long-term viability of the banking industry. This model, developed by Shar et al. (2010), was described as a modification of the conventional CAMELS and CLSA (Comprehensive Liquidity and Stress Analysis) stress test parameters. It was created in accordance with the recommendations made by the IMF in 2000 within the framework of reform and supervision policies for the banking sector.

When assessing the financial performance of banks, the Bankometer model seeks to produce findings with the highest level of accuracy while requiring the fewest possible parameters. In this regard, the model's development and application are intended to improve banks' capacity for more thorough risk profile analysis. It was noted that the accuracy results produced by the Bankometer model were comparable, particularly when contrasted with the outcomes of the CAMELS and CLSA models.

This is a powerful indication of the model's ability to safeguard financial stability and identify possible banking system vulnerabilities early on. This approach uses a score known as the solvency score (S-Score) to determine the strength of the bank. According to Rahman (2017), the approach is one of the techniques that will assist internal management in identifying bankruptcy issues. According to Qamruzzaman (2014), this model can be a useful tool for assessing the financial structure of banks, which can help manage risks in the banking industry more skillfully. The table below defines the variables that make up this model's content.

Table 2. S-Score Parameters

Parameters	Reference Range
Core Capital to Total Assets (CA)	$CA \geq 4\%$
Equity to Total Assets (EA)	$EA \geq 2\%$
Capital Adequacy Ratio (CAR)	$40\% \geq CAR \geq 8\%$
Non-Performing Loans to Total Loans (NPL)	$NPL \leq 15\%$
Expenses to Income (CIR)	$CIR \leq 40\%$
Loans to Total Assets (LA)	$LA \leq 65\%$
S-SCORE	<p>* It is not financially solid and has a limited ability to repay debt if the S-Score is less than 50.</p> <p>* S-score > 70 indicates strong financial standing and a high ability to repay debt.</p> <p>* If $50 < S\text{-Score} < 70$, Gray zone; no comments can be made about financial solidity and solvency.</p>

The S-Score model is given below.

$$S\text{-Score} = 1.5 * (CA) + 1.2 * (EA) + 3.5 * (CAR) + 0.6 * (NPL) + 0.3 * (CIR) + 0.4 * (LA)$$

4. FINDINGS

The views of the bank's senior management, investment consultants, all financial statements, supplementary data, annual reports, and reports from independent auditors are considered while examining its financial reports. To obtain superior quality results, the S-Score approach created by Shar et al. (2010) was applied to the analysis of these tables.

Table 3. S-Score Findings

Banks	2018	2019	Δ	2020	Δ
CAPITAL BANK	122,3695	121,1912	-0,01	147,1929	0,2146
KIBRIS İKTİSAT BANK	131,2212	124,8679	-0,048	126,7375	0,015
CREDITWEST BANK	121,709	115,5288	-0,051	122,4095	0,0596
T.C ZİRAAT BANKASI A.Ş.	168,8222	168,6484	-0,001	137,8159	-0,183
TÜRKİYE HALK BANKASI A.Ş.	176,8579	168,9979	-0,044	174,0793	0,0301
TÜRKİYE İŞ BANKASI A.Ş.	138,9726	137,5358	-0,01	138,5465	0,0073
TÜRK EKONOMİ BANKASI	122,8734	137,9567	0,1228	149,2523	0,0819
TÜRKİYE GARANTİ BANKASI A.Ş.	158,2401	175,4262	0,1086	193,1646	0,1011

The results indicate that banks' S-Scores have changed significantly over time. CAPITAL BANK and T.C. ZIRAAT BANKASI A.Ş. had a little decline in their S-Scores from the 2018–2019 period, suggesting a minor deterioration in their performance. During the same period, KIBRIS İKTİSAT BANK, CREDITWEST BANK and TÜRKİYE HALK BANKASI A.Ş. also experienced a decrease in their S-Scores. However, TÜRK EKONOMİ BANKASI and TÜRKİYE GARANTİ BANKASI A.Ş. increased their S-Scores during this period. These data indicate that the performances of both banks improved. During the 2019-2020 period, CAPITAL BANK and TÜRKİYE HALK BANKASI A.Ş. experienced notable increases in their S-Scores. While KIBRIS İKTİSAT BANK and CREDITWEST BANK showed slight improvements during this period, T.C ZIRAAT BANKASI A.Ş.'s S-Score experienced a significant decrease. TÜRKİYE İŞ BANKASI A.Ş. maintained its stability with a small increase in its S-Score, while TÜRKİYE GARANTİ BANKASI A.Ş. and TÜRK EKONOMİ BANKASI maintained their strong performance during this period. S-Score fluctuations for banks often indicate gains, weaknesses, and stability in their financial performance. The COVID-19 pandemic, particularly in 2020, had a major impact on banks' operations and exposed variations in their capacity for crisis management and financial resilience.

Table 4. Average Scores Based of Capital

Banks	2018	2019	Δ	2020	Δ
Average of Domestic Banks	125,0999	120,5293	-0,03654	132,1133	0,096109
Average of Foreign Banks	153,1532	157,713	0,029773	158,5717	0,005445

When banks are separated according to their capital groups, it is observed that foreign-capital banks in the TRNC perform better than local ones. A slight decline is observed in the scores of local banks during the pandemic period. As a different finding, foreign banks increased their average scores during this period as well.

5. CONCLUSION

Development is influenced by banks and other financial intermediaries, particularly in underdeveloped nations where there are few or no other sources of funding (Oncu, 2021). The financial market in TRNC in particular is still growing as a result of the nation's constitution. Banks therefore supply the funding that businesses require in these kinds of marketplaces, enabling them to thrive and avoiding the loss of lucrative investment opportunities owing to resource constraints. In this regard, the Bankometer approach was investigated in this study for banks in TRNC in order to observe the quality of management. It has been noted that bank financial results have changed throughout time. Furthermore, it was shown that foreign-capital banks had higher ratings than local banks. However, improvements were observed in the scoring in the following period, 2020. Therefore, it was determined that banks in TRNC quickly overcame the impact of the pandemic shock.

Overall analysis of the data shows that, both before and after the pandemic, TRNC banks' degree of financial soundness was kept within the targeted bounds. The bankometer technique was used to determine the aforementioned limitations. It was noted, in particular, that the banks included in the analysis's purview were able to preserve their financial stability and ability to pay off debt in spite of the macroeconomic volatility they encountered. This circumstance demonstrates how well the TRNC banking industry has handled a major world emergency like the Covid-19 outbreak. The fact that key bank financial metrics, such as asset quality, capital adequacy ratios, and liquidity management, remained stable during the crisis process speaks to the industry's resilience and the implementation of sound risk management practices. Plus, it might be argued that the regulatory actions and governmental policies put in place throughout this period helped to maintain the banks' financial structures, protecting the industry's overall health. Notwithstanding the unpredictability that characterized the world markets during

the pandemic, the fact that TRNC banks successfully navigated this challenging process shows the proficiency and adaptability of the banking industry in handling crises.

REFERENCES

- Africa, L. A. (2018). Bankometer Models for Predicting Financial Distress in Banking Industry. *Jurnal Keuangan dan Perbankan*, 22(2), 373-379.
- Aksoy, E. E. A. and Göker, İ. E. K. (2018). Bankacılık Sektöründe Finansal Risklerin Z-Skor ve Bankometer Metodları ile Tespiti: BİST’te İşlem Gören Ticari Bankalar Üzerine Bir Araştırma, *Muhasebe Bilim Dünyası Dergisi*, 20(2), 418-438.
- Ashraf, A., & Tariq, Y. B. (2016). Evaluating the Financial Soundness of Banks: An Application of Bankometer on Pakistani Listed Banks. *IUP Journal of Financial Risk Management*, 13(3).
- Bella, F., & Radianto, W. E. (2020). Bankruptcy Prediction of The Banking Sector Using Bankometer: Comparative Study Based on Company Size. In *Advances in Economics, Business and Management Research*, Volume 175: Proceedings of the 2nd International Conference on Business and Management of Technology (ICONBMT 2020),s.328
- Çalış, N., Kevser, M., & Sakarya, Ş. (2022). Katılım Bankalarının Finansal Sağlamlığının Bankometer ve Z-Skor Yöntemleriyle Analizi. *Adam Academy Journal of Social Sciences*, 12(2), 301-321. <https://doi.org/10.31679/adamakademi.1065747>
- Kattel, I. K. (2014). Evaluating The Financial Solvency of Selected Commercial Banks of Nepal: An Application of Bankometer. *Journal of Advanced Academic Research*, 1(1), 88-95
- Landjang., Xenia, I., S., & Tumiwa, J., (2018). Financial soundness evaluation of selected commercial banks in indonesia: an application of bankometer model. 3(5):28-39.
- Medetoğlu, B. (2023). Sermaye Yeterlilik Oranı ile Finansal Rasyolar Arasındaki İlişkinin Panel Veri Analizi ile Tespiti: Türk Bankacılık Sektörü Üzerine Bir Çalışma. *EKOIST Journal of Econometrics and Statistics*, (39), 172-182.
- Öncü, E. (2021). Balkan Ülkelerinde Banka Karlılığını Etkileyen Faktörler. *Anadolu ve Balkan Araştırmaları Dergisi*, 4(8), 479-492.
- Özbek, Ö. E., Hazar, A., & Babuşcu, Ş. (2021). Covid-19 Öncesi ve Sonrası Türk Bankacılık Sektörünün Bankometer Yöntemi İle Analizi. *Ufuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 10(20), 7-26.

Permata, M., & Purwanto, E. (2018). Analysis of CAMEL, Z-Score, and Bankometer in Assessment Soundness of Banking Listed on the Indonesia Stock Exchange (IDX) from 2012-2015. *Journal of Applied Economic Sciences*, 5(59),1311-1324

Qamruzzaman, M. (2014). Predicting Bankruptcy: Evidence from Private Commercial Banks in Bangladesh. *International Journal of Financial Economics*, 2(3), 114-121.

Rahman, Z. (2017). Financial Soundness Evaluation of Selected Commercial Banks in Bangladesh: An Application of Bankometer Model. *Research Journal of Finance and Accounting*, 8(2), 63-70.

Şahin, T., & Yangil, F. M. (2024). Katılım ve Mevduat Bankaları Finansal Sağlımlıklarının Bankometer Yöntemi ile Karşılaştırmalı Analizi. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, (68), 117-125.

Sakarya, Ş., & Karakaş, F. (2021). Türkiye’de Bankacılık Sektörünün Finansal Performansının Camels ve Bankometer Yöntemleriyle İncelenmesi. *Uluslararası İşletme, Ekonomi ve Yönetim Perspektifleri Dergisi*, 6(5).

Shar, A. H., Shah, M. A., & Jamali, H. (2010). Performance Evaluation of Banking Sector in Pakistan: An Application of Bankometer. *International Journal of Business and Management*, 5(9), 81.

Tekin, B. & Gör, Y. (2022). Finansal Başarısızlık Tahmin Modelleri ve Bankacılık Sektörü Mali Tabloları Üzerinden Bir Uygulama: Altman ve Springate Modelleri. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (40), 373-404.

The Influence of Risk Management on the Strategic Stability of the Insurance Industry in Kosovo: Navigating Market Fluctuations, Interest Rate Variability, and Economic Conditions

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Abstract

Introduction: The insurance industry in Kosovo operates in an environment characterized by economic volatility and regulatory challenges, making effective risk management essential for maintaining stability and competitiveness.

Aim: This paper examines the influence of risk management on the strategic stability of Kosovo's insurance industry, particularly in navigating market fluctuations, interest rate variability, and economic conditions. The study explores how insurance companies in Kosovo can mitigate the risks associated with market and economic changes, thereby ensuring their long-term sustainability.

Method: The research underscores the critical role of risk management practices in enhancing strategic decision-making and ensuring financial stability. This is achieved through the rigorous use of quantitative analysis and case studies, which lend credibility to the findings.

Findings: The research shows that insurers that proactively manage the risks associated with interest rate changes and market dynamics are better equipped to withstand economic pressures and capitalize on emerging opportunities. In addition, it is that even the most effective risk management strategies can be adapted to the unique circumstances of the insurance market in Kosovo.

Conclusion: In order to achieve sustainable development and resilience in the face of economic uncertainties, the paper concludes that it is imperative that insurance companies in Kosovo incorporate risk management into their fundamental strategic planning processes.

Originality and value: In the insurance sector, this research is a valuable contribution to the expanding risk management literature. Its usage is extremely high. It provides industry leaders with the necessary tools for success by providing practical knowledge to help them navigate the complexities of the Kosovo market.

Keywords: Risk management, interest rate, insurance companies.

JEL Codes: H19, G12, G22

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1. INTRODUCTION

Effective risk management is critical to the successful operation of law firms. Market acceptance and professional reputation built up over many years can be destroyed overnight by a major incident. Often such events could have been prevented if proper risk management systems had been put in place (Ingram, 2014).

Claims for the benefits of risk management are numerous. In financial services organizations, risk management has enabled a new focus on asset and earnings quality. In the corporate sector more generally, risk management has become perceived as integral to business strategy and to value creation. Risk management has been shifted from a back-office, transaction-veto defensive role into a fundamental part of the business model. Risk officers and chief risk officers have been created as champions of risk management, seeking to embed the risk management gospel within a broader organizational culture. In the public sector, risk management is becoming part of the way organizations challenge themselves in the absence of market mechanisms. And in all these settings it is widely accepted that the managed taking of risks is essential to progress and the creation of value with the exception of extreme enthusiasts for the precautionary principle (Power, 2004).

Although insurance is of primordial importance in domestic and domestic economies nationally, its role in the development process remains difficult to assess. Insurance, like other financial services, has grown in quantitative importance as well part of the general development of financial institutions, has become qualitatively more important due to the increase in risks and uncertainties in most societies. The economic importance of the insurance sector has been increasing as part of the liberalization of financial systems (including privatization) and the globalization and conglomeration of financial markets and during the 1990s, total insurance companies grew faster than bank assets (Outreville, 2012).

The insurance sector plays an important role within the financial sector in almost all developed and developing countries, contributing to economic development, increase of national wealth, efficient allocation of resources, reducing transaction costs, creating liquidity and enabling economies of scale in the investment activities. Factors that affect the profitability of insurance companies can be classified as internal or external factors. Due to their systemic nature, external factors affect the performance of the entire insurance sector to a certain extent. However, the differences in performance between individual companies operating in the same insurance sector can be explained by the influence of internal, firm-specific factors. Internal factors are dominant in determining financial results; they are specific to each company and are under the influence of the management. Profitability is one of the key determinants for success and a prerequisite

for increasing competitiveness and market share. Also, profits attract investors and improve the level of solvency. The financial performance of insurance companies is also relevant in the macroeconomic context, as the insurance industry contributes to fostering economic growth and stability (Drakulevski, 2021).

2. LITERATURE REVIEW

The importance of insurance institutions both for the stability of the public sector and for the entire economic system stems from the fact that these institutions perform the critical function, both from the point of view of society and the economy, of insurance coverage which allows risk management and ensures continuity of operation. The ability to ensure the unerring fulfillment of insurance coverage constitutes a synthetic indicator of the stability of the social-economic system. The performance of functions of critical importance for the stability of the public sector by the insurance sector is also related to the mechanism of long-term capital allocation, especially in the case of life insurance companies, which is invested in the financial market and the real economy. The investment activities of insurance companies have an impact on the stability of the public sector, in particular: By investing in instruments issued by the government, which is of particular systemic importance in the context of the debt crisis in many EU member states, Influencing the situation in the stock and bond markets, as well as transforming capital into investment in the real economy sector (Czerwińska, 2016).

A study conducted by (Pervan, 2010) investigates the determinants of the performance of insurance companies in the Republic of Croatia during the period 2003-2009. The analysis in the research provides additional insight into the impact of various variables such as: past profitability, size, ownership, expense ratio, industry concentration, market growth and inflation on the performance of insurance companies in a developing country. The findings of the study show negative and significant impact of expense ratio and inflation on profitability, and significant positive impact of past performance on current profitability. Also, the results show a higher level of profitability of domestically owned firms than foreign ones (Pervan, 2010).

The main results of the study of the main determinants of profitability of non-life insurance companies in Turkey in the period 2006-2013 show a positive correlation between the rate of growth of profitability and premium and a negative correlation with the age of the company. The results of the study have several implications: larger non-life insurance companies are more profitable compared to smaller ones, and lower insurance risk leads to higher profitability and lower liquidity means better results financial (Kaya, 2015).

Adams and Buckle's (2003) study conducts an empirical analysis of the determinants of financial performance of insurance companies in Bermuda, using a framework drawn from the organizational economics literature. From the analyzed period of 1993 to 1997, the findings show positive financial performance for companies with high leverage and low liquidity. Also, financial performance is positively related to underwriting risk, while size and scope of company operations are not significantly related to financial performance. These researchers are among the few to find a positive impact of underwriting risk on profitability (Adams, 2003).

3. META ANALYSIS

In continuation of the research in the third part of the chapter, a meta-analysis will be presented which will include the research of other authors on the topic of the impact of risk management on the strategic stability of the insurance industry. Initially, through the table, a summary of some works by different authors will be made, where the variables they have used in their research and the methods they have applied through econometric models and some of the most important findings or results of the studies.

Table 1. Summary of existing literature

Authors	Year	Variables	Methods	Findings
(Kiptoo, 2021)	2013-2020	Credit risk, market risk, operation risk, and liquidity risk, while financial performance was measured as ROA.	Descriptive statistics Hausman test, Random effects, Regression analysis.	The results showed that risk management significantly affects the financial performance of insurance firms. In particular, the results showed that credit risk negatively and significantly affects financial performance. The results also suggest that firms with a higher percentage of bad receivables than total receivables perform poorly. Therefore, insurance firms should put in place credit management strategies to ensure that receivables are collected within the stipulated time to avoid cases of non-performing receivables and thereby improve performance.
(Ahmed, 2011)	2001-2007	Size, leverage, tangibility, risk,	Regression analysis ,	The results of Ordinary Least Square (OLS) regression analysis

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		growth, liquidity and age.	Ordinary Least Square (OLS).	indicate that size, risk and leverage are important determinants of performance of life insurance companies of Pakistan while ROA has statistically insignificant relationship with growth, profitability, age and liquidity.
(Akotey, 2013)	2000-2010	Investment income, underwriting profit and the overall (total) net profit.	Panel regression.	The findings showed that while gross written premiums have a positive relationship with insurers' profitability from sales, their relationship with investment income is negative. Also, the results showed that life insurers have suffered huge underwriting losses due to over-trading and under-pricing. Further, the results revealed a more than a complementary relationship between underwriting profit and investment income towards increased overall profitability of life insurers.
(Malik, 2011)	2005-2009	ROA, age of company, size of company, volume of capital, leverage ratio and loss ratio.	Descriptive Statistics, Correlation, Regression Analysis.	The findings of this study contribute towards a better understanding of financing performance in Pakistan insurance companies. ROA and five variables that represent age of company, size, volume of capital, leverage and loss ratio were developed to test which factor best explains profitability of Pakistani insurance companies. Result shows that there is no relationship between profitability and age of the company and there is

				significantly positive relationship between profitability and size.
(Shiu, 2004)	1986-1999	Liquidity, Interest rate, Profits, Inflation.	Descriptive statistics, Heteroskedasticity, Autocorrelation, Multicollinearity.	The main results of the study indicate that insurer performance is statistically significantly positively related to liquidity, interest rate level and underwriting profits, whereas performance is negatively related to unexpected inflation. These variables are regarded as determinants of general insurer performance.

Source: Meta-analysis compiled by authors (2024)

From the review of existing literature, we can conclude that in most studies by different authors, risk management significantly affects the financial performance of insurance firms. Through these studies analyzed in the meta-analysis section, it has been emphasized that credit risk has a negative and significant impact on financial performance. Therefore, insurance firms should put in place credit management strategies to ensure that receivables are collected within the stipulated time to avoid cases of non-performing receivables and thereby improve performance.

4. RESEARCH METHODOLOGY

Every research or analysis is carried out with a specific purpose in order for the research to be carried out as well as possible. The main purpose of this study is to analyze the impact of risk management on the strategic stability of the Kosovo insurance industry, especially on market fluctuations, interest rate variability and economic conditions.

The framework of the theoretical aspect of this research is based on different contemporary theories which include a wide literature by analyzing books, scientific works, articles but also publications by many authors in their analyzes in different parts of the world.

The research also reflects a good opportunity to examine problems in terms of interest rate changes, market fluctuations as well as economic conditions, a good opportunity for

insurance companies to mitigate the risks associated with market changes and economic ones, thus ensuring a longer-term sustainability.

For the realization of this model, we will work with secondary data, the source of which are the financial reports, balance sheet and cash flow for insurance companies in Kosovo, these results issued by the Ministry of Finance. The analysis of this research includes data for 8 insurance companies in Kosovo, for an eight-year period (2016-2023).

The research questions mean the following:

1. *How have Capital influenced the financial performance of insurance companies in Kosovo?*
2. *What dynamic correlation exists between interest rates and financial performance of insurance companies in Kosovo?*
3. *What effect do economic conditions have on the performance of insurance companies in Kosovo?*

The main hypotheses of the study are:

H1: Capital has positively influenced the economic performance of insurance companies in Kosovo.

H2: There is a positive dynamic correlation between interest rates and financial performance in insurance companies in Kosovo.

H3: Economic conditions have a positive impact on the volatility of financial performance in insurance companies in Kosovo.

Table 2. Description of the variables included in the econometric model

Variables	Acronym	Measuring	Evidence	Source of data
Return of assets	ROA	Net income/total assets	(Kiptoo, 2021), (Malik, 2011)	Annual Reports of insurance companies in Kosovo (2016 – 2023)
Return of capital	ROE	Net income/share capital	(Akotey, 2013), (Shiu, 2004)	Annual Reports of insurance companies in Kosovo (2016 – 2023)

Capital	CA	Share capital	(Akotey, 2013), (Malik, 2011)	Annual Reports of insurance companies in Kosovo (2016 – 2023)
Interest rates	IR	Total, % per annum – Kosovo	(Shiu, 2004), (Malik, 2011)	Annual Reports of Kosovo (2016 – 2023)
Inflation	IF	Annual growth rate-Kosovo	(Shiu, 2004), (Malik, 2011)	Annual Reports of Kosovo (2016 – 2023)

Source: Data calculation by authors (2024)

The research is reflected with two econometric models, which are linear models specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 (Capital)_{it} + \beta_2 (Interest\ rates)_{it} + \beta_3 (Inflation)_{it} + \gamma_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 (Capital)_{it} + \beta_2 (Interest\ rates)_{it} + \beta_3 (Inflation)_{it} + \gamma_{it}$$

Where:

ROA – Return of assets

ROE – Return of capital

CA – Capital

IR – Interest rates

IF – Inflation

The term return on assets (ROA) refers to a financial ratio that shows how profitable a company is relative to its total assets. An investment is an asset or item acquired for the purpose of generating income or appreciation, the longer the maturity time, the greater the risk, but the investment realizes greater returns.

Return on equity (ROE) is a measure of financial performance calculated by dividing net income by shareholders' equity. Because shareholders' equity is equal to a company's assets minus its debt, ROE is considered the return on net assets.

Equity is one of the most common financial ratios used by analysts to assess a company's financial health.

Inflation is the continuous increase in the general price level, where a currency unit buys less than in previous periods.

The interest rate is the amount of interest owed per period, in relation to the amount given, deposited or borrowed.

4.1. Comparative analysis of linear trends for Risk Management in the Strategic Stability of the Insurance Industry in Kosovo

In continuation of this study, we will perform a comparative analysis through linear trends applying the historical method for return on assets, return on capital, capital, inflation, interest rates for insurance companies in Kosovo. The main purpose of using linear trend analysis will be to compare the data over the years for each variable as well as draw important conclusions that will serve the objectives of this study. The data for these linear trend analyzes were obtained from the annual reports of insurance companies in Kosovo.

These data are reported on an annual basis, which are processed in the Microsoft Excel program and include the time period 2016-2023. First, we will analyze the linear trend between equity and return on equity.

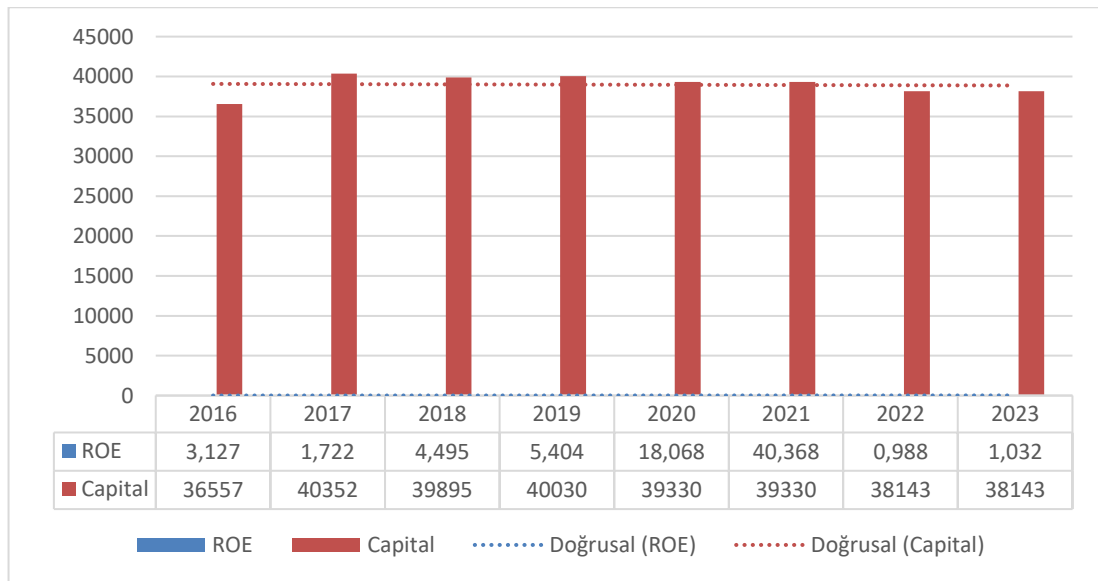


Figure 1. Graphic presentation of the linear trend (ROE, Capital)

Source: Authors' calculations in Microsoft Excel (2024)

In the figure above, the data on capital and return on capital are presented graphically. Where in the analyzed period 2016-2023 we see that we have a continuous

increase in capital, where with the increase in capital we see that there is also an increase in return on capital, which means that the insurance companies during this period have been in good financial condition, which shows that these companies have financial stability and good risk management.

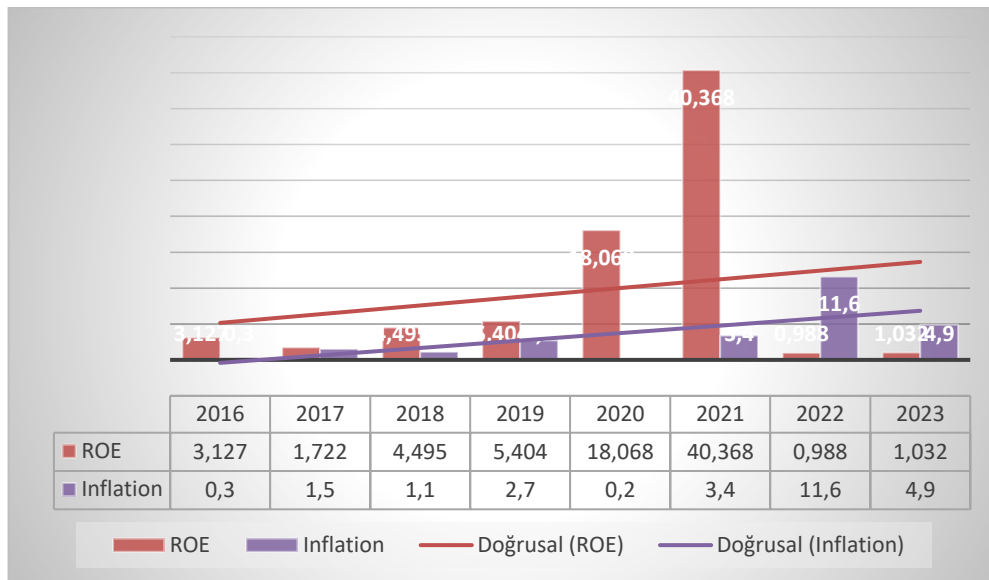


Figure 2. Graphic presentation of the linear trend (ROE, Inflation)

Source: Authors' calculations in Microsoft Excel (2024)

According to the data presented in the figure above, we can ascertain the impact of inflation on the return on capital. Regarding inflation, recognizing it as a negative phenomenon for the economy of a country, we see that in 2022 it has increased by 11.6%, which is thought to be the case of Covid-19, which has influenced the increase in market prices general, which brings both negative impact and concern for the country. The situation after this year has started to stabilize, this can also be seen in the inflation values during 2023, which is 4.9%.

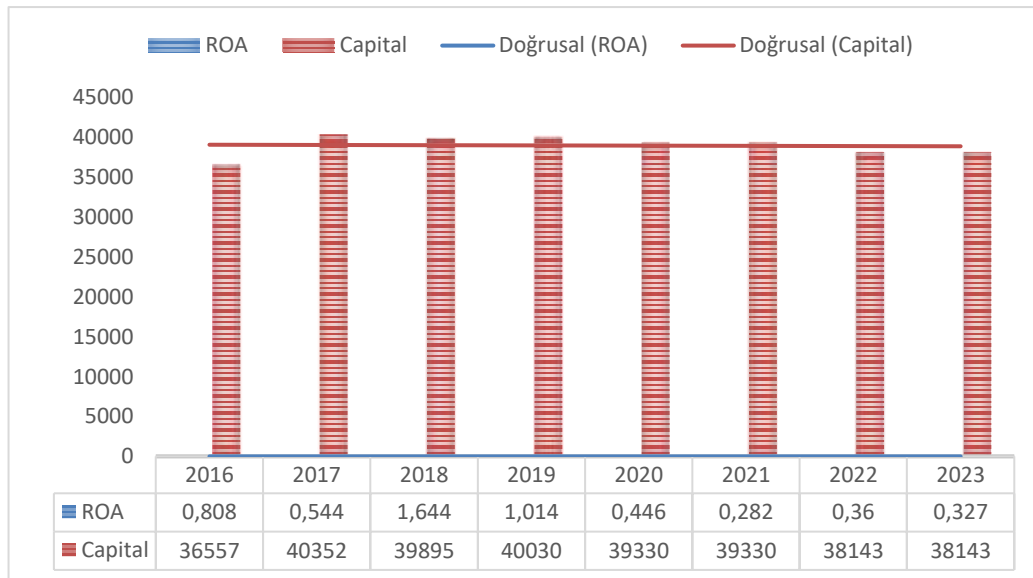


Figure 3. Graphic presentation of the linear trend (ROA, Capital)

Source: Authors' calculations in Microsoft Excel (2024)

Also, in a graphic presentation for insurance companies in Kosovo, we see that from 2016 to 2023, from the indicators that were taken into the study, starting from the return on assets, from which we see that there was an increase in 2018, where this increase, although it is easily greater than the previous year and the regression line also explains it. From this we find a higher ROA normally that would affect the efficiency of the assets.

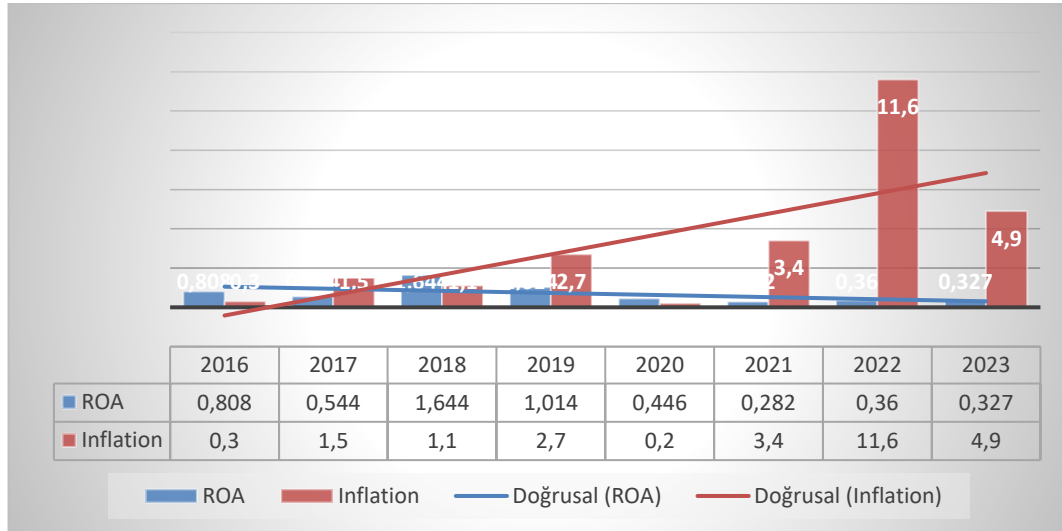


Figure 4. Graphic presentation of the linear trend (ROA, Inflation)

Source: Authors' calculations in Microsoft Excel (2024)

In continuation of the comparative analysis, we will analyze the effect of inflation on the return on assets for insurance companies in Kosovo. Where from the graphic presentation we can see that during the year 2022 there was an increase in inflation in value of 11.6%, which has affected the reduction of the return on assets, which means that a general increase in the level of prices during this period affect the reduction of return on assets for insurance companies in Kosovo.

5. CONCLUSION AND RECOMMENDATIONS

During the realization of this study, we had the opportunity to closely and in detail analyze the insurance companies in Kosovo, regarding the impact of risk management on the strategic stability of the insurance industry in Kosovo.

Research shows that insurers that proactively manage risks have good financial stability and have stable capital growth, which indicates that they have good financial performance. Therefore, insurance companies in Kosovo should establish capital and asset management strategies in order to improve the company's performance. The results also show that the management of the risk of high interest rates as well as the general increase in prices has a positive and significant effect on the performance of insurance companies.

Therefore, we recommend that directors and other interested parties establish appropriate strategies on risk management to increase financial performance. We also recommend that regulators and policymakers should come up with policies and regulations that will ensure that companies adopt appropriate risk management strategies to improve performance. The study also provides recommendations for managers and other interested parties regarding risk management mechanisms that can be adopted to increase the performance of a firm.

REFERENCES

- Adams, M. B. (2003). The determinants of corporate financial performance in the Bermuda insurance market. *Applied Financial Economics*, 133-143. doi: DOI: 10.1080/09603100210105030
- Ahmed, N. U. (2011). Determinants of performance: A case of life insurance sector of Pakistan. *International Research Journal of Finance and Economics*, 123-128.
- Akotey, J. O. (2013). The financial performance of life insurance companies in Ghana. *Journal of Risk Finance*.
- Czerwińska, T. (2016). Impact of Insurance Companies' Investment Policy on Risk Management in the Public Sector. 361-388. doi:https://doi.org/10.1007/978-3-319-30877-7_12
- Drakulevski, L. K. (2021). Risk Assessment Providing Solid Grounds For Strategic Management In The Insurance Industry. *European Scientific Journal*, 38. doi: https://doi.org/10.19044/esj.2021.v17n15p38
- Ingram, U.-A. (2014). *Risk Management in Law Firms*. UK- Academic.
- Kaya, E. Ö. (2015). The Effects of Firm-Specific Factors on the Profitability of Non-Life Insurance Companies in Turkey. *International Journal of Financial studies*, 510-529. doi:https://doi.org/10.3390/ijfs3040510
- Kiptoo, I. K. (2021). Risk management and financial performance of insurance firms in Kenya. *Cogent Business & Management*. doi:https://doi.org/10.1080/23311975.2021.1997246
- Malik, H. (2011). Determinants of Insurance Companies Profitability: An analysis of insurance sector of Pakistan . *Academic Research International* .

Outreville, J. F. (2012). The Relationship Between Insurance and Economic Development: 85 Empirical papers for a review of the literature. *Risk Management and Insurance Review*, 1-52. doi:DOI: 10.1111/j.1540-6296.2012.01219.x

Pervan, M. K. (2010). Determinants of Insurance Companies' Profitability In Croatia.

Power, M. (2004). "The risk management of everything", *The Journal of Risk Finance. Emerald Insight*, 58-65. doi:http://dx.doi.org/10.1108/eb023001

Shiu, Y. (2004). Determinants of United Kingdom General Insurance Company Performance. *British Actuarial Journal*, 1079-1110. doi: DOI: 10.1017/S1357321700002968

Artificial Intelligence in Green Marketing: A Systematic Literature Review

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Abstract

Introduction: Artificial Intelligence (AI) increasingly influences various aspects of our lives, including marketing. While there is substantial research on AI in marketing, studies on its role in sustainable or green marketing are limited.

Aim: This research aims to fill this gap by conducting a comprehensive analysis of the impact of AI on green marketing through a systematic literature review (SLR).

Method: In the study, approximately 19,000 academic articles have been reviewed which were published between 2014 and 2024, sourced from databases like Elsevier, Web of Science, Emerald, Ebsco, Scopus, and MDPI. The keywords used included 'AI,' 'green behavior,' 'sustainable behavior,' 'sustainable marketing,' 'green consumption,' 'green marketing,' and 'sustainable consumption.' The selection criteria were limited to peer-reviewed English articles with these keywords in their abstracts. After filtering, 25 articles were selected for detailed review.

Findings: The findings reveal that despite the limited number of studies directly addressing AI's role in green marketing, key concepts like purchase intention, personalization, online purchasing, and customer engagement are frequently discussed. The research also highlights that AI is generally seen as a tool that positively influences consumer behavior, with minimal focus on its potential negative impacts.

Conclusion: The study suggests that AI enhances green marketing efforts by increasing customer participation, emphasizing the significance of personalization, and influencing consumer purchasing behavior.

Originality and value: This research is the first comprehensive SLR on the intersection of AI and green marketing, indicating that this area is gaining attention, particularly in recent years.

Key Words: AI, Green Marketing, Sustainable Marketing

Jel Codes: M31, M39, Q01

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1. INTRODUCTION

Marketing is undergoing a revolution with new technologies and what brands offer to consumers. In addition to product and service marketing methods, consumer behavior has also changed considerably. Radical innovations are seen with the internet, big data transactions, mobile devices, and applications. Advancements in AI, the Internet of Things, and robotics have significantly influenced the field of marketing (Cheng & Jiang, 2022). For example, many brands are using many areas such as AI and robotic production to both limit labor costs and increase production efficiency (Wu & Monfort, 2023). In addition, retailers are also taking their place on social media platforms through AI to communicate better with their customers and develop long-term relationships (Weber & Schütte, 2019). In addition, ride-sharing companies such as Uber and Lyft are using technology with techniques such as geofencing and rating on social media. Another example is that brands such as Tesla and Volvo have introduced driverless test vehicles to the market to create value with consumers. Based on this, it is important to determine the effects of technological innovations, especially AI, on consumer behavior regarding applications and solutions. Technological innovations are evident not only in consumer behavior but also in data storage, analysis, and solutions. This offers marketers the opportunity to create value together with their customers (Grewal, Hulland, & Kopalle, 2020).

According to most studies in the literature, it is seen that when AI and marketing come together, they will achieve very successful work (Verma, Sharma, & Maitra, 2021). It is more efficient to respond to the rapidly changing needs of brands and the demands of consumers with AI-supported marketing solutions. The Chief Executive Officer of the Marketing AI Institute has promoted an original structure for the marketing mix. This structure, consisting of Planning, Production, Personalization, Promotion and Performance (5P), covers AI-supported marketing activities (Savelyeva, 2021; Chintalapati & Pandey, 2022).

On the other hand, the sustainability issue, which has made a big impact all over the world due to climate change, has also deeply affected marketing (Maibach, 2008). Brands have included sustainability in many areas, including green marketing strategies, energy-saving approaches and green packaging, green product, green distribution, and reasonable advertising strategies (Zhang & Zhao, 2012; Wandosell, 2021). Due to both environmental impacts and technological developments, the requirements and expectations of both the market and consumers have changed (Aldaihani, Islam, Saatchi, & Haque, 2024).

Based on the above information, how AI affects green marketing is the research question of this study. Since the concepts of green and sustainability are used synonymously in marketing literature, they are included in this way in the study. A SLR was conducted by determining the keywords with the questions of what the place of AI in sustainable marketing is and how has AI affected green marketing. In this context, this study aims to reveal the transformative effect of AI in green marketing through an

SLR. In addition, it plays an encouraging role in the use of AI in promoting sustainability and promises to advance sustainable business practices.

2. LITERATURE REVIEW

2.1. AI in Marketing

With technological developments such as AI, the Internet of Things, and big data analytics, digital solutions have emerged to retain and gain customers. AI is a technology used by businesses to analyze customer needs and respond to these needs quickly. Thus, in addition to the competitive advantage among marketers, alternative solutions that facilitate product and service offerings are also seen. Many business practitioners and scientists believe that AI is the future of society. AI is not limited to marketing but has begun to take place in many branches of law, economics, public administration, and businesses. In particular, with the advancement of Industry 4.0, technologies emerging with AI are increasing (Verma, Sharma, & Maitra, 2021). Following the revolutions in Marketing 3.0 and 4.0, Marketing 5.0 supports AI-focused methods. For example, it supports increasing customer satisfaction with technology-focused methods. Marketing 5.0, where digitalization is the focus, argues that AI applications should become widespread (Tulcanaza-Prieto, 2023; Gooljar & Issa, 2024; Movahed, 2024).

In terms of marketing, AI applications are quite advanced. Brands like Google with Google Assistant, Spotify, Under Armour, and Amazon with Amazon Lex are among those adopting AI-based platforms (Haleem & Javaid, 2022). With the use of AI-based platforms, customer interaction is increased market forecasting and automation is improved, and even sales forecasts can be made (Sangeetha & Priya, 2021). When we look at other areas of AI used in marketing, we see that people are distinguished by facial recognition for security purposes. AI can detect not only people but also objects. Thus, it is possible to analyze marketers. Brands can observe the moods of their customers and make product recommendations as a result (Prentice & Dominique, 2020; Cheng & Jiang, 2022).

When looking at digital marketing literature, it has been seen that AI is used to retain customers. For example, chatbots, smart emails, and interactive web designs are AI-supported strategies. Brands achieve their goals by aligning with consumers (Benabdelouahed, 2020). Thanks to AI, brands make online reviews from their social media accounts. In this way, it has become easier to put forward and present appropriate content to the target market. At the same time, they also provide a pleasant experience for customers (Krönke, 2020). It is also possible to predict marketing trends for brands that communicate suitable offers to customers through platforms such as websites and social media (Pradeep & Appel, 2018). In addition, AI can act as a savior for brands by detecting customers who want to cancel their subscriptions (Haleem & Javaid, 2022).

2.2. Green Marketing

The concept of green marketing, which emerged between the late 1980s and early 1990s (Singal, Garg, Singla, & Bhadal, 2013), is the marketing of environmentally safe products according to the AMA⁶⁷. Green marketing covers many processes from product changes to production changes. In this context, it is evaluated in a wide area such as packaging changes and changes in advertising. In some studies in the literature, it is also referred to as Environmental Marketing or Ecological Marketing (Singal, Garg, Singla, & Bhadal, 2013; Mishra & Payal, 2014). In another context, green marketing also covers all marketing activities carried out in a way that causes the least harm to the environment to minimize the impacts of global warming, solid wastes, the detrimental impacts of pollutants, and the increasing awareness of consumers (Mishra & Payal, 2014).

When marketing literature is examined, terms such as sustainable, environmentally friendly, and green are used with similar meanings. The common purpose of all terms is to represent brands that use recycled materials and reduce waste (Simula & Lehtimaki, 2009). Sustainability has three sub-dimensions and argues that products and services should be consumed more efficiently, considering all economic, social, and environmental factors (Seretny & Seretny, 2012). The development of green marketing can be classified into three distinct stages. The first stage is called ecological green marketing and all marketing activities are aimed at providing methods to environmental issues. The second stage is known as environmental green marketing, which includes a marketing approach that deals with pollution and waste issues. The third stage is sustainable green marketing, which represents its current state. For this reason, the American Marketing Association has interpreted this process in three ways. First, retailers should market environmentally safe products. Second, social marketing includes improving the quality and marketing of products that have negative environmental impacts. Finally, it is the application of sustainable methods in every step of the production, promotion, packaging, and wrapping of products due to ecological concerns (Singal, Garg, Singla, & Bhadal, 2013).

The aims of green marketing include ruling out the concept of waste, innovatively re-evaluating the product concept, and renewing prices by taking environmental costs into account. In addition, it is also necessary to make environmentalism profitable and to strengthen customer relations and strengthen brand reputation (Mishra & Payal, 2014).

2.3. AI in Green Marketing

Green marketing strategies due to climate change have become a key tool for brands aiming to attract consumers. Because consumers have become more environmentally conscious and trust in brands that implement sustainable activities is higher (Park, Perumal, Sanyal, Ah Nguyen, & Ray, 2022; Gleim, McCullough, Sreen, & Pant, 2023).

⁶⁷ AMA: American Marketing Association

For this reason, green marketing strategies positively affect consumers' purchase intentions (Osman, Othman, & Salahuddin, 2016; Jabeen & Khan, 2023). However, consumers' purchase intentions have changed with technological advances and environmentally conscious consumers are also included in this change (Gleim, McCullough, Sreen, & Pant, 2023; Aldaihani, Islam, Saatchi, & Haque, 2024).

Global developments and technological advances have caused a change in consumer behavior. Accordingly, various strategic concepts have developed in marketing practices (Kumar & Ramachandran, 2021). The United Nations (UN) is focused on bringing together AI applications and human-focused studies compatible with sustainable development goals. (Demaidi, 2023). As a result of studies examining green technologies within the scope of green marketing (Calasan & Slavkovic, 2021), Green marketing should be encouraged because products cause emissions into the environment, and life cycle analysis covers all processes related to pollution. (Molina-Murillo & Smith, 2005; Aydın, Nalbant, & Altuntaş, 2023). In addition, brand behaviors are important for understanding sustainability, and the advantages and challenges of digital marketing have also taken their place in the literature (Diez-Martin & Blanco-Gonzalez, 2019). Accordingly, personalization, green products, green marketing, AI systems in marketing relations, and developments in marketing communications have been among the topics examined in the literature (Bolesnikov & Stijacic, 2022; Rathore, 2019; Thangam & Chavadi, 2023; Bashynska, 2023).

3. RESEARCH METHODOLOGY

SLR has been a method used more frequently in the health field in the 2000s (Nightingale, 2009), but it has also been seen frequently in social sciences and marketing studies (Chintalapati & Pandey, 2022). SLR provides a systematic, transparent, and evidence-based presentation of findings by examining studies in the existing literature (Bocconcelli & Cioppi, 2018). As a result of a literature review with certain databases, inclusion and exclusion criteria are determined and then the information obtained is presented as a compilation study (Gossen & Ziesemer, 2019).

In the first stage of SLR, which is the planning of the review, it is necessary to first determine the problem (Rowley & Keegan, 2020; Chintalapati & Pandey, 2022). Studies on how much today's AI has changed marketing have attracted considerable attention, especially in the last 10 years. However, studies on how AI affects green marketing are quite few (Chintalapati & Pandey, 2022). Therefore, the fundamental problem of the study was to analyze what is included in the studies related to AI and green marketing.

The second part of the SLR includes the implementation of the review (Chintalapati & Pandey, 2022). In this context, inclusion and exclusion criteria were determined. In addition, relevant databases that are accessible and contain peer-reviewed articles were selected. The databases used in this regard are WOS, Science Direct, Elsevier, Emerald, Ebsco, Scopus, and MDPI. Table 1 shows the numbers obtained as a result of the SLR.

Inclusion Criteria:

- Only articles between the years 2014-2024.
- Articles containing only AND/OR "AI and green behavior", "AI and sustainable behavior", "AI and sustainable marketing", "AI and green consumption", "AI and green marketing", and "AI and sustainable consumption" keywords in the abstract section.
- Only articles published in academic journals and peer-reviewed scholarly articles.
- Only written articles in the English language.
- Marketing-related articles only.

Exclusion criteria:

- Duplicates were found using digital object identifiers.
- Non-English publications.
- Dissertation and conference papers.
- Other Languages.

Table 1: SLR made with the relevant keyword between 2014-2024.

keywords	WOS	Science Direct&elsevier	Emerald	EBSCO	Scopus	MDPI
1 AI and green behavior	288	1.187	365	4	49	12
2 AI and sustainable behavior	719	2.309	602	10	115	52
3 AI and sustainable marketing	460	407	668	1	28	67
4 AI and green consumption	392	700	228	14	47	14
5 AI and green marketing	185	438	417	6	6	2
6 AI and sustainable consumption	735	1.146	321	23	131	75
TOTAL	18.888	9.444	6.187	2.601	58	376

Then, the last part is about using the EndNote program to duplicate articles that were eliminated. Since 5,964 articles was still a very high number, the abstract section was selected in the EndNote program and the number of articles containing the relevant keywords was determined as 50. However, when the remaining 50 articles were examined one by one by the researchers, it was seen that some articles were not related to marketing. For example, since the words marketing, sustainable, and AI were used in engineering and health studies, the system automatically finds them. After reading the content of 50 articles, the number of articles that can be included in the SLR is seen as 25. For this reason, the article also presents an evidence-based method (Bocconcelli & Cioppi, 2018; Chintalapati & Pandey, 2022)

By examining 25 articles, the impact of AI on green marketing is often grouped under the following three headings, while studies related to areas such as operational efficiency, green labeling, green packaging, green attitude, customer attitude, and communication are also seen, albeit in small numbers.

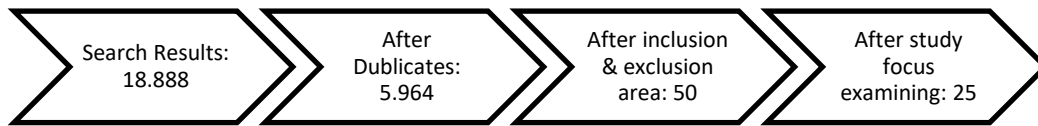


Figure 1. Literature search process.

3.1. Research Findings

The findings reveal that despite the limited number of studies directly addressing AI's role in green marketing, key concepts like purchase intention, personalization, online purchasing, and customer engagement are frequently discussed. The research also highlights that AI is generally seen as a tool that positively influences consumer behavior, with minimal focus on its potential negative impacts. The findings stated in the following paragraphs were written with articles compiled from an SLR.

(Aldaihani, Islam, Saatchi, & Haque, 2024) Focused on green marketing strategies, green attitudes, and green purchase intentions with the theory of planned behavior, and examined the impact of generative AI across generations. As a result, they showed that it has a favorable effect on the concepts of green advertising, green labeling, and green packaging. In fact, (Taylor, 2021) stated in their studies that concepts including social media and electronic word-of-mouth communication, influencer marketing, AI, local advertising, privacy, socially responsible advertising, and green advertising have changed with the advancement of technology. (Aydın, Nalbant, & Altuntaş, 2023) stated in their studies that AI technologies were used in digital transformation during the transition process brought by the European Green Deal and contributed to sustainable green marketing strategies. (Blanco-Morena & Gonzalez-Fernandez, 2024) Focused on the impacts of AI and sustainability activities on tourism marketing.

(Bolesnikov & Stijacic, 2022) Have addressed the effects of AI on green marketing in their studies through the fashion sector. In this context, consumers' attitudes towards sustainable fashion and their familiarity with the use of AI are considered very important. It has been observed that the AI approach to sustainability affects both consumers and brands. In other words, when ecological impact and production options are considered,

purchasing decisions shift towards the sustainable option. At the same time, brands change strategies and change their marketing communications and product designs.

(Cao & Shuailong, 2023) argued in their studies that AI technology is effective in environmental protection. They used the stimulus-organism-response theory and the theory of planned behavior to examine the mechanisms of action of customers' sustainable consumption behavior. In the study, it was seen that AI technology stimuli mediate the effect of sustainable consumption behavior and the value perceived by the customer and customer loyalty. (Chen, 2024) also argued that sustainable products have an important role in purchasing and stated that brands should follow environmentally friendly trends. In this context, he emphasized the necessity of using AI-supported technology to predict consumers' purchasing behavior and the effect of the consumer decision-making process.

(Frank, 2021) noted that brands are creating AI-powered products such as robots, capable of addressing environmental challenges through autonomous interactions with their environment including waste and pollutant cleanup and invasive species tracking, as well as autonomous learning. He discussed the role of these new developments in attracting customers. He noted that the influence of environmental benefits is more pronounced among women compared to men and stronger for products aimed at adults than for children. Another study focused on the impact of AI in restaurants, hotels, and airlines, indicating that it increases customer trust, brand engagement, and electronic word-of-mouth (eWOM). Indirectly, he emphasized that this is a sustainable method of implementation (Gajić, 2024). The combination of AI (AI) and green marketing offers significant promise for advancing sustainable business practices and consumer engagement (John, 2024).

(Gul, 2024) tried to understand the motivations of consumer behavior in developing regions in his studies. In the study, an innovative approach was demonstrated by combining food waste perceptions with AI analysis in the context of economic sustainability. It is seen that it is possible to transform sustainable consumption governance with human-centered AI. In the light of environmental imperatives and sustainable development, (Hermann, 2023), who focused on the dilemma of AI in marketing, advocated the gradual use of AI to approach sustainable consumption. For example, he stated that Amazon's AI-supported recommendation systems increased sales and also increased its carbon footprint. In addition, he also said that AI in marketing could encourage sustainability efforts in terms of supply and demand. On the other hand, (Schmidt, 2020) stated that AI supports sustainable development and also affects marketing.

Saying that green marketing increases global competitiveness with the development of AI (Lee, 2021; Prikshat, 2023), it has been stated that experiential marketing positively affects the perceived value and ongoing interactions of consumers. In addition, it is seen that it also has positive contributions to feelings of trust, loyalty, and satisfaction (Lee T. C., 2021). (Lee C. C., 2024) have demonstrated that, with the increasing prevalence of AI and growing public interest in environmental issues, live

online promotion of green products has emerged as a novel marketing strategy. According to the study, consumer green purchase intentions are positively affected by the rise and use of AI. (Calheiros-Lobo, 2023) Focused on an AI (AI) solution that enables SME owners to make more sustainable choices in their decisions to enter foreign markets. (Moise & Diaconu, 2023) Worked on how brands affect consumers in metaverse areas. (Nozari, 2021) In their studies, they worked on the fact that marketing activities based on the Internet of Things in fast-moving consumer goods (FMCG) products provide a clear vision for sustainable marketing. (Shyu, 2023) stated that with the developments in AI and green environmental awareness, consumers' purchasing behavior of fresh agricultural products has converted. In another sectoral study, the potential to reduce the tangible environmental footprint, outputs, and services was mentioned by evaluating AI-neuro-green marketing in the construction sector (Tuz, 2023).

It has been seen that consumers are eager for personalized recommendations for products and services when they make choices through AI. This positively affects their purchase intentions (Oke, 2024). (Rathore, 2017; Rathore, 2018; Rathore, 2019; Rathore, 2019) stated in their studies that AI (AI) technology is utilized to present ecological fashion and to devise innovative methods for effective marketing campaigns. They also emphasized the importance of AI-supported marketing strategies to increase customer engagement, reduce waste, and maximize resource use in the industry. In addition, by ensuring resource efficiency and increasing precise targeting, AI provides both ecologically responsible and economically viable operations. As a result, AI acts as a driving force for green marketing. An in-depth examination of AI applications, predictive analysis for efficient production, personalization to increase product life, and limiting waste are a few of them. (Wang, 2022) stated that AI-supported chatbots support customer service. Thus, customer relations are also positively affected. Personalization and interactive content have also been evaluated in this context (Zhygalkevych, 2022).

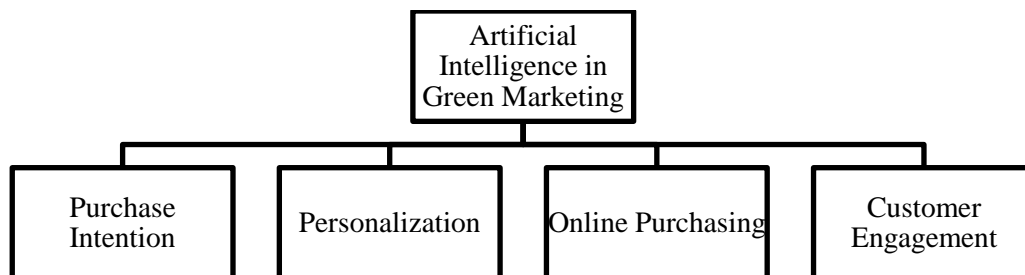


Figure 2: Results of Artificial Intelligence in Green Marketing

3.1.1. Purchase Intention

AI (AI) in consumer behavior research has significantly reshaped our understanding of purchase intention by influencing the decision-making process in various ways. Purchase intention, defined as an individual's readiness or plan to buy a product, is shaped by numerous internal and external factors. Traditional models, such as Ajzen's Theory of Planned Behavior (1991) and the Value-Belief-Norm Theory (Jansson et al., 2011), claim that purchase intention arises from attitudes, norms, and perceived behavioral control. However, AI now plays a pivotal role as a moderating factor, enhancing the strength of these relationships.

According to Aldaihani's, Islam's, Saatchi's, and Haque's study; how green marketing strategies can influence Generation Z's green purchase intentions has been investigated. Generation Z is more sustainability-oriented, and their purchasing decisions are shaped by brand familiarity, green consciousness, and a focus on eco-friendliness. AI technologies enhance the ability of brands to target these young consumers effectively by personalizing marketing efforts, analyzing consumer behavior, and offering tailored recommendations (Aldaihani, Islam, Saatchi, Haque, 2024). This personalized approach increases the likelihood of eco-friendly purchases, particularly when consumers are familiar with a brand's green initiatives.

Bolesnikov's, Stijacic's, Keswani's, and Brkljac's study explores how AI can optimize the purchasing experience in the sustainable fashion sector. AI contributes to enhancing the customer journey by offering tailored product recommendations based on consumer data analysis. By personalizing consumer interactions, AI tools like chatbots and virtual assistants help brands foster trust and satisfaction, which are crucial to boosting purchase intention (Bolesnikov, Stijacic, Keswani, Brkljac, 2022). In the sustainable fashion context, AI also provides detailed information about eco-friendly products, strengthening consumers' green values and promoting sustainable purchasing decisions. The study highlights AI's role as a key moderator between consumer attitudes and purchasing behaviors (Bolesnikov, Stijacic, Keswani, Brkljac, 2022).

It has been seen that AI contributes to purchase intention through personalization, enhancing consumer experiences by analyzing large datasets and offering tailored recommendations. AI technologies are shown to have a significant effect in collecting and analyzing data, which supports brands to better understand consumer preferences and tailor their marketing strategies (Chen 2024). By using AI-powered insights, companies can design effective green marketing campaigns that resonate with consumers, thereby enhancing purchase intentions (Chen, 2024).

3.1.2. Personalization

AI's capacity for real-time data processing further improves the personalization aspect of sustainable marketing. Tools such as AI-powered recommendation engines and chatbots offer instant, personalized interactions, allowing consumers to receive real-time product suggestions based on their sustainability preferences (Bolesnikov et al., 2022).

AI (AI) technologies, such as machine learning, natural language processing, and predictive analytics, hold transformative potential for green marketing by offering profound insights into consumer behavior (John, Varghese, 2024). These capabilities facilitate precise targeting and personalization, enabling businesses to enhance operational efficiencies (Ramesh, Kumar, 2022). By leveraging AI, companies can gain a deeper understanding of the preferences and needs of sustainability-conscious consumers, allowing them to anticipate market trends effectively and align their strategies accordingly. This approach not only supports the optimization of marketing efforts but also aids in minimizing the environmental impact of business operations (Smith, 2021).

Personalization serves as a powerful mechanism for enhancing sustainability, with AI (AI) playing a significant role in this process by delivering tailored recommendations to consumers (Rathore, 2019). By employing machine learning algorithms designed to examine individual purchasing behaviors, historical purchases, and browsing patterns, AI can propose items that resonate with a customer's distinct style and preferences (Rathore, 2019). This approach not only increases customer satisfaction but also ensures an extended lifespan for each garment, as consumers are more inclined to retain and utilize clothing that aligns with their aesthetics over extended periods (Patel, 2012).

3.1.3. Online Purchasing

AI technologies enhance online shopping experiences by providing personalized recommendations based on user data, such as past purchases and browsing history. These personalized suggestions not only improve customer satisfaction but also encourage consumers to consider sustainable options, thereby facilitating greener purchasing behaviors (Cao, Liu, 2023). The studies highlight that consumers are prone to purchase eco-friendly products when AI tailors recommendations to their preferences (Huang et al., 2023; Zhang et al., 2022).

The integration of AI in live marketing significantly impacts online shopping behaviors live marketing strategies utilize AI to analyze viewer preferences and behaviors during live streams, allowing for personalized content delivery. This real-time interaction not only boosts engagement but also promotes sustainable products, as brands can effectively highlight eco-friendly options during these events, encouraging consumers to make greener purchasing decisions (Lee, Pan, and Song, 2024).

In summary, the literature cooperatively underscores the transformative effect of AI on online purchasing behaviors, particularly in fostering sustainable consumption patterns. By leveraging AI technologies, brands can effectively engage consumers, promote eco-friendly products, and contribute to a more sustainable marketplace.

3.1.4. Customer Engagement

Lee and Peng, (2023) emphasize the transformative potential of AI in creating personalized experiences for consumers. The authors argue that AI technologies facilitate businesses to examine customer data effectively, which allows for tailored marketing strategies that appear to environmentally conscious consumers (Lee and Peng, 2023). This personalized approach not only improves customer engagement but also cultivates emotional connections, resulting in greater loyalty to sustainable brands.

Similarly, AI can facilitate real-time interactions between brands and consumers, enhancing the customer experience in sustainable marketing contexts (Ramesh & Kumar, 2022). John and Varghese (2024) suggest that AI-driven tools, such as chatbots and recommendation systems, can provide consumers with personalized content and eco-friendly product suggestions, that align with their values. This integration of AI not only boosts customer engagement but also encourages sustainable purchasing behaviors, creating a win-win situation for both consumers and brands.

Moreover, Rathore (2017) further elaborates on the role of AI in enhancing customer engagement within the sustainable fashion industry and argues that AI allows for the customization of marketing messages based on individual preferences and shopping behaviors, thereby creating a more engaging shopping experience. Additionally, Rathore (2016) explores how AI can streamline customer interactions and improve satisfaction by providing relevant, timely information about sustainable practices and products. Together, these arguments underscore the critical role of AI in facilitating deeper customer engagement and promoting sustainability in various marketing contexts.

4. CONCLUSION

This study investigated how AI shapes green marketing. The authors tried to determine subheadings related to green marketing and AI through an SLR. AI will continue to take place and develop in many areas of our lives. It is expected that AI will shape marketing more and will be seen in other subheadings. Despite security concerns, the impact of AI on online purchasing, personalization, customer engagement, and purchase intention is seen positively. Moreover, it is expected to encounter more automation and intelligent systems, especially in online purchasing and personalization strategies. Within this framework, purchase intention and online purchasing are very crucial issues for marketers using personalization and customer engagement. On the other hand, using AI is a new paradigm for marketers and they should adopt new strategies to gain customers and competitive advantage. Furthermore, using AI not only simplifies consumers with a more convenient shopping experience but also facilitates the work of marketers. Since both sustainability and AI are very current and new topics, it can be considered as an early study and it is expected that the scope of the study will expand after a while.

Another outcome of this study is personalization. Personalization studies value consumers' personal and behavioral data. In this context, personalization also requires consumers' customer engagement which represents the last finding of this paper. Because it is possible to create a personalized experience together. Personalization and customer participation are achieved through customer comments, purchasing data, and interaction through social media channels. Therefore, these activities enhance customer satisfaction and brand loyalty. Although we see that personalization studies are at the focal point of marketing today, they also intersect with fields such as computers and psychology and require the use of AI. Within the framework of this paper, personalization strategies are supported by artificial intelligence, big data and small data, machine learning, and deep learning. For this reason, we argue that this study should be analyzed based on blockchain as well as artificial intelligence in the future.

REFERENCES

- Ajzen, I. (1991). The Theory of planned behavior. *Organizational Behavior and Human Decision Processes*.
- Aldaihani, F., Islam, M., Saatchi, S., & Haque, M. (2024). Harnessing green purchase intention of generation Z consumers through green marketing strategies. *Business Strategy & Development*, e419.
- Aydın, S., Nalbant, K., & Altuntaş, C. (2023). AI IN DIGITAL TRANSFORMATION AND SUSTAINABLE GREEN MARKETING STRATEGIES IN THE EUROPEAN GREEN DEAL PROCESS. *İMGELEM*, 467-492.
- Bashynska, I. (2023). AI-Driven Personalization in Advertising: Transforming Consumer Engagement through Sustainability and Circular Economy. *Scientific Journal of Bielsko-Biala School of Finance and Law*, 27(4), 106-112.
- Benabdelouahed, R. &. (2020). The use of AI in social media: opportunities and perspectives. *Expert journal of marketing*, 8(1), 82-87.
- Blanco-Morena, S., & Gonzalez- Fernandez, A. (2024). Big data in tourism marketing: past research and future opportunities. *Spanish Journal of Marketing*, 28(3), 266-286.
- Bocconcelli, R., & Cioppi, M. (2018). SMEs and marketing: a SLR. *International Journal of Management Reviews*, 20(2), 227-254.
- Bolesnikov, M., & Stijacic, M. (2022). Perception of Innovative Usage of AI in Optimizing Customer Purchasing Experience within the Sustainable Fashion Industry. *Sustainability*.

Calasan, V., & Slavkovic, R. (2021). Application of green tools in green marketing. *Serbian Journal of Engineering Management*, 6(1), 72-77.

Calheiros-Lobo, N. V.-Y.-O. (2023). SME internationalization and export performance: A systematic review with bibliometric analysis. *Sustainability*.

Cao, P., & Shuailong, L. (2023). The impact of AI technology stimuli on sustainable consumption behavior: Evidence from ant forest users in China. *Behavioral Sciences*, 13(7).

Chen, C.-W. (2024). Utilizing a Hybrid Approach to Identify the Importance of Factors That Influence Consumer Decision-Making Behavior in Purchasing Sustainable Products. *Sustainability*, 16(11).

Cheng, Y., & Jiang, H. (2022). Customer–brand relationship in the era of AI: understanding the role of chatbot marketing efforts. *Journal of Product & Brand Management*, 31(2), 252-264.

Cheng, Y., & Jiang, H. (2022). Customer–brand relationship in the era of AI: understanding the role of chatbot marketing efforts. *Journal of Product & Brand Management*, 31(2), 252-264.

Chintalapati, S., & Pandey, S. (2022). AI in marketing: A SLR. *International Journal of Market Research*, 38-68.

Demaidi, M. (2023). AI national strategy in a developing country. *AI & SOCIETY*, 1-13.

Diez-Martin, F., & Blanco- Gonzalez, A. (2019). Research challenges in digital marketing: sustainability. *Sustainability*, 11(10).

Frank, B. (2021). "AI-enabled environmental sustainability of products: Marketing benefits and their variation by consumer, location, and product types. *Journal of Cleaner Production*.

Gajić, T. E. (2024). Tourists' Willingness to Adopt AI in Hospitality—Assumption of Sustainability in Developing Countries. *Sustainability*, 16(9).

Gleim, M., McCullough, H., Sreen, N., & Pant, L. (2023). Is doing right all that matters in sustainability marketing? The role of fit in sustainable marketing strategies. *Journal of Retailing and Consumer Services*, 70.

Gooljar, V., & Issa, T. (2024). Sentiment-based predictive models for online purchases in the era of marketing 5.0: a systematic review. *Journal of Big Data*, 11(1).

Gossen, M., & Ziesemer, F. (2019). Why and how commercial marketing should promote sufficient consumption: a SLR. *Journal of Macromarketing*, 39(3), 252-269.

- Grewal, D., Hulland, J., & Kopalle, P. (2020). The future of technology and marketing: A multidisciplinary perspective. *Journal of the Academy of Marketing Science*, 1-8.
- Gul, K. F. (2024). Participatory Visual Methods and AI-Driven Analysis for Sustainable Consumption Insights. *Sustainability*, 16(16).
- Haleem, A., & Javaid, M. (2022). AI (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3, 119-132.
- Hermann, E. (2023). AI in marketing: friend or foe of sustainable consumption? *AI & SOCIETY*, 1975-1976.
- Huang, M., & Mohamad Saleh, M. (2023). The moderating effect of green advertising on the relationship between gamification and sustainable consumption behavior: A case study of the Ant Forest social media app. *Sustainability*, 15(4).
- Jabeen, R., & Khan, K. (2023). Buy green only: Interplay between green marketing, corporate social responsibility, and green purchase intention; the mediating role of green brand image. *Business Strategy & Development*, 6(3), 503-518.
- Jansson, J., Marell, A., & Nordlund, A. (2011). Exploring consumer adoption of a high involvement eco-innovation using value-belief-norm theory. *Journal of Consumer Behaviour*, 10(1), 51-60.
- John, A. (2024). TRANSFORMATIVE POTENTIAL OF AI IN GREEN MARKETING. *MMR Vol. 2(1) Bi-Annual Journal*.
- Krönke, C. (2020). AI and social media. *Regulating AI*, 145-173.
- Kumar, V., & Ramachandran, D. (2021). Influence of new-age technologies on marketing: A research agenda. *Journal of Business Research*(125), 864-877.
- Lee, C. C. (2024). How Live Marketing Affects Green Purchase in the Age of AI?. *Emerging Markets Finance and Trade*, 1-20.
- Lee, T. C. (2021). Green experiential marketing, experiential value, relationship quality, and customer loyalty in environmental leisure farm. *Frontiers in Environmental Science*.
- Maibach, E. (2008). Communication and marketing as climate change–intervention assets: A public health perspective. *American journal of preventive medicine*, 488-500.
- Mishra, P., & Payal, S. (2014). Green marketing: Challenges and opportunities for business. *BVIMR Management Edge*, 7(1).
- Moise , D., & Diaconu, A. (2023). Metaverse Marketing–The Future of Sustainable Marketing. *European Journal of Sustainable Development*, 12(4).

Molina-Murillo, S., & Smith, T. (2005). How much is too much? Exploring life cycle assessment information in environmental marketing communications. *Business & Professional Ethics Journal*, 24(1), 199-223.

Movahed, A. (2024). Opportunities and Challenges of Marketing 5.0. *Smart and Sustainable Interactive Marketing*, 1-21.

Nightingale, A. (2009). A guide to SLRs. *Surgery (Oxford)*, 27(9), 381-384.

Nozari, H. S.-J.-N. (2021). The ideas of sustainable and green marketing based on the internet of everything—the case of the dairy industry. *Future Internet*, 13(10).

Oke, T. T. (2024). The role of AI in shaping sustainable consumer behavior: a cross-sectional study of Southwest, Nigeria. *International Journal of Research and Scientific Innovation*, 10(12).

Osman, A., Othman, Y., & Salahuddin, S. (2016). The awareness and implementation of green concepts in marketing mix: A case of Malaysia. *Procedia Economics and Finance*, 35, 428-433.

Park, J., Perumal, S., Sanyal, S., Ah Nguyen, B., & Ray, S. (2022). Sustainable marketing strategies as an essential tool of business. *American Journal of Economics and Sociology*, 81(2), 359-379.

Patel, N. (2012). Why fashion needs AI: An environmental perspective. *Journal of Environmental Science & Technology*, 36(4), 219-227.

Pradeep, A., & Appel, A. (2018). AI for marketing and product innovation: Powerful new tools for predicting trends, connecting with customers, and closing sales. *John Wiley & Sons*.

Prentice, C., & Dominique, L. (2020). The impact of AI and employee service quality on customer satisfaction and loyalty. *Journal of Hospitality Marketing & Management*, 29(7), 739-756.

Prikshat, V. I. (2023). AI-Augmented HRM: Literature review and a proposed multilevel framework for future research. *Technological forecasting and social change*.

Ramesh, R., & Kumar, P. (2022). AI in Customer Segmentation: A sustainable approach. *Journal of Marketing Analytics*, 10(3), 201-215.

Rathore, B. (2017). Sustainable Fashion Marketing AI-Powered Solutions for Effective Promotions. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 4(2), 70-80.

- Rathore, B. (2018). Emergent perspectives on green marketing: the intertwining of sustainability, AI, and the metaverse. *Int. J. New Media Stud. Int. Peer Rev. Scholar.*, 5(2), 22-30.
- Rathore, B. (2019). AI and the Future of Ethical Fashion Marketing: A Comprehensive Analysis of Sustainable Methods and Consumer Engagement. *Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal*, 5(2), 14-24.
- Rathore, B. (2019). From Trendy to Green: Exploring AI's Role in Sustainable Fashion Marketing. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 6(2), 12-22.
- Rowley, J., & Keegan, B. J. (2020). An overview of SLRs in social media marketing. *Journal of Information Science*, 46(6), 725-738.
- Sangeetha, D., & Priya, D. (2021). Techniques using AI to solve stock market forecast, sales estimating, and market division issues. *The journal of contemporary issues in business and government*, 27(3), 209-215.
- Savelyeva, N. K. (2021). "Smart Technologies" as a Mechanism for Regulating Bank Competition in Cross-Border Markets. In " Smart Technologies" for Society, State and Economy. *Springer International Publishing.*, 1322-1330.
- Schmidt, W. C. (2020). Fintech and Tokenization: A legislative study in Argentina and Spain about the application of Blockchain in the field of properties. *ADCAIJ: Advances in Distributed Computing and AI Journal*, 9(1).
- Seretny, M., & Seretny, A. (2012). Sustainable marketing-a new era in the responsible marketing development. *Foundations of Management*, 4(2), 63-76.
- Shyu, C. S. (2023). The Impact of Consumer Loyalty and Customer Satisfaction in the New Agricultural Value Chain. *Agriculture*, 13(9).
- Simula, H., & Lehtimaki, T. (2009). Managing greenness in technology marketing. *Journal of Systems and Information Technology*, 11(4), 331-346.
- Singal, R., Garg, A., Singla, S., & Bhadal, I. (2013). Green marketing: challenges and opportunities. *International Journal of Innovations in Engineering and Technology*, 2(1), 470-474.
- Smith, J. (2021). Personalizing Green Marketing with AI. *Sustainability Marketing Review*, 45-60.
- Taylor, C. R. (2021). The future of advertising research: New directions and research needs. *Journal of Marketing Theory and Practice*, 51-62.

Thangam, D., & Chavadi, C. (2023). Impact of Digital Marketing Practices on Energy Consumption, Climate Change, and Sustainability. *Climate and Energy*, 39(7), 11-19.

Tulcanaza-Prieto, A. (2023). Influence of customer perception factors on AI-enabled customer experience in the Ecuadorian banking environment. *Sustainability*, 15(16).

Tuz, A. &. (2023). The Preliminary Step Towards Conceptual Model for the AI-Neuro-Green Marketing in the Architectural Engineering and Construction Industry. *Journal of Technology in Architecture, Design, and Planning*, 145-155.

Verma, S., Sharma, R., & Maitra, D. (2021). AI in marketing: Systematic review and future research direction. *International Journal of Information Management Data Insights*, 1(1).

Wandosell, G. (2021). Green packaging from consumer and business perspectives. *Sustainability*, 13(3).

Wang, X. L. (2022). How does AI create business agility? Evidence from chatbots. *International journal of information management*, 66.

Weber, F., & Schütte, R. (2019). State-of-the-art and adoption of AI in retailing. *Digital Policy, Regulation and Governance*, 21(3), 264-279.

Wu, C., & Monfort, A. (2023). Role of AI in marketing strategies and performance. *Psychology & Marketing*, 484-496.

Zhang, B., Hu, X., & Gu, M. (2022). Promote pro-environmental behaviour through social media: An empirical study based on Ant Forest. *Environmental Science & Policy*, 216-227.

Zhang, G., & Zhao, Z. (2012). Green packaging management of logistics enterprises. *Physics Procedia*, 900-905.

Zhygalkevych, Z. Z. (2022). Features and tendencies of the digital marketing use in the activation of the international business activity. *International Journal of Computer Science and Network Security*, 77-84.

Appendix 1 based on the above: Publications reviewed as part of the SLR

1. Aldaihani, F. M. F., Islam, M. A., Saatchi, S. G., & Haque, M. A. (2024). Harnessing green purchase intention of generation Z consumers through green marketing strategies. *Business Strategy & Development*, 7(3), e419.
2. Chen, C. W. (2024). Utilizing a Hybrid Approach to Identify the Importance of Factors That Influence Consumer Decision-Making Behavior in Purchasing Sustainable Products. *Sustainability*, 16(11), 4432.

3. AYDIN, S., NALBANT, K. G., & ALTUNTAŞ, C. AI IN DIGITAL TRANSFORMATION AND SUSTAINABLE GREEN MARKETING STRATEGIES IN THE EUROPEAN GREEN DEAL PROCESS.
4. Frank, B. (2021). AI-enabled environmental sustainability of products: Marketing benefits and their variation by consumer, location, and product types. *Journal of Cleaner Production*, 285, 125242.
5. Moreno, S. B., Fernández, A. M. G., & Gallego, P. A. M. (2024). Big data in tourism marketing: past research and future opportunities. *Spanish journal of marketing-ESIC*, 28(3), 2.
6. Gajić, T., Ranjbaran, A., Vukolić, D., Bugarčić, J., Spasojević, A., Đorđević Boljanović, J., ... & Rakić, S. R. (2024). Tourists' Willingness to Adopt AI in Hospitality—Assumption of Sustainability in Developing Countries. *Sustainability*, 16(9), 3663.
7. Bolesnikov, M., Popović Stijačić, M., Keswani, A. B., & Brkljač, N. (2022). Perception of innovative usage of ai in optimizing customer purchasing experience within the sustainable fashion industry. *Sustainability*, 14(16), 10082.
8. Gul, K., Fasih, S., Morande, S., & Ramish, M. (2024). Participatory Visual Methods and AI-Driven Analysis for Sustainable Consumption Insights. *Sustainability*, 16(16), 6956.
9. Cao, P., & Liu, S. (2023). The impact of AI technology stimuli on sustainable consumption behavior: Evidence from ant forest users in China. *Behavioral Sciences*, 13(7), 604.
10. Hermann, E. (2023). AI in marketing: friend or foe of sustainable consumption?. *AI & SOCIETY*, 38(5), 1975-1976.
11. John, A. P., & Varghese, S. TRANSFORMATIVE POTENTIAL OF AI IN GREEN MARKETING.
12. Lee, T. C., & Peng, M. Y. P. (2021). Green experiential marketing, experiential value, relationship quality, and customer loyalty in environmental leisure farm. *Frontiers in Environmental Science*, 9, 657523.
13. Lee, C. C., Pan, C., & Song, Y. (2024). How Live Marketing Affects Green Purchase in the Age of AI?. *Emerging Markets Finance and Trade*, 1-20.
14. MOISE, D., DIACONU, A., NEGESCU, M. D. O., & Mihai, D. I. N. U. (2023). Metaverse Marketing—The Future of Sustainable Marketing. *European Journal of Sustainable Development*, 12(4), 260-260.
15. Nozari, H., Szmelter-Jarosz, A., & Ghahremani-Nahr, J. (2021). The ideas of sustainable and green marketing based on the internet of everything—the case of the dairy industry. *Future Internet*, 13(10), 266.
16. Rathore, B. (2017). Sustainable Fashion Marketing AI-Powered Solutions for Effective Promotions. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 4(2), 70-80.
17. Rathore, B. (2018). Emergent perspectives on green marketing: the intertwining of sustainability, AI, and the metaverse. *Int. J. New Media Stud. Int. Peer Rev. Scholar. Index. J*, 5(2), 22-30.
18. Rathore, B. (2016). AI and the Future of Ethical Fashion Marketing: A Comprehensive Analysis of Sustainable Methods and Consumer

Engagement. *Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal*, 5(2), 14-24.

19. Rathore, B. (2019). From Trendy to Green: Exploring AI's Role in Sustainable Fashion Marketing. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 6(2), 12-22.
20. Shyu, C. S., Yen, C. C., & Lin, C. S. (2023). The Impact of Consumer Loyalty and Customer Satisfaction in the New Agricultural Value Chain. *Agriculture*, 13(9), 1803.
21. Taylor, C. R., & Carlson, L. (2021). The future of advertising research: New directions and research needs. *Journal of Marketing Theory and Practice*, 29(1), 51-62.
22. Tuz, A., & Sertyeşilişik, B. (2023). The Preliminary Step Towards Conceptual Model for the AI-Neuro-Green Marketing in the Architectural Engineering and Construction Industry. *Journal of Technology in Architecture, Design and Planning*, 1(2), 145-155.
23. Wang, X., Lin, X., & Shao, B. (2022). How does AI create business agility? Evidence from chatbots. *International journal of information management*, 66, 102535.
24. Yadav, A., & Sondhi, H. (2023, March). SLR on sustainable marketing and AI. In *2023 10th International Conference on Computing for Sustainable Global Development (INDIACom)* (pp. 583-588). IEEE.
25. Zhygalkevych, Z., Zalizniuk, V., Smerichevskyi, S., Zabashtanska, T., Zatsarynin, S., & Tulchynskiy, R. (2022). Features and tendencies of the digital marketing use in the activation of the international business activity. *International Journal of Computer Science and Network Security*, 22(1), 77-84.

An Analysis of Middle School Students' Attitudes towards Stem and Problem-Solving Skills from Various Perspectives*

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Abstract

Introduction: STEM Education (Science, Technology, Engineering, Mathematics), which aims to equip individuals with knowledge, skills, research, and inquiry through an interdisciplinary approach, is regarded as a crucial tool for economic development and leadership in the scientific field.

Aim: The purpose of this study is to examine the attitudes towards STEM and problem-solving skills of students in the 5th, 6th, 7th, and 8th grades from various perspectives.

Method: The research was conducted during the 2023-2024 academic year in three public middle schools located in the Eyyübiye district of Şanlıurfa. The study group consists of 600 middle school students (n5th grade = 70, n6th grade = 221, n7th grade = 207, n8th grade = 102). In this study, the "Attitude Towards STEM Test" was employed to measure the students' attitudes towards STEM, the "Problem-Solving Skills Scale" was used to assess their problem-solving skill levels, and the "Demographic Information Form" was utilized to collect demographic data. The relational survey method was applied, and the data were analyzed using the SPSS software package.

Findings: The analysis of the data revealed that there is no significant difference in the levels of middle school students' attitudes towards STEM and their problem-solving skills based on whether they have taken elective science application courses, whether they follow a scientific journal, or where science activities and experiments are conducted. However, a significant difference was found in the levels of attitudes towards STEM and problem-solving skills based on the frequency of science activities and experiments.

Conclusion: The findings indicate that there is no significant difference based on whether students take elective science application courses, follow a scientific journal, or the location where science activities and experiments are conducted. Therefore, developmental efforts should be made in these areas. However, given the significant difference in STEM attitudes and problem-solving skills related to the frequency of science activities and experiments, it is essential to continue emphasizing and prioritizing these activities.

Originality and value: The findings of this study may contribute to identifying the current situation and facilitating its improvement.

Key Words: STEM, Problem Solving Skills, Science, Secondary School students.

Jel Codes: JEL-I and JEL-Z

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1. INTRODUCTION

Nations can only sustain themselves as long as they keep up with scientific and technological advancements and changes. This has led to an increased demand for qualified individuals. The 21st century calls for individuals who are creative, critical, inquisitive, curious, capable of analytical thinking, and able to make effective decisions.

For our country to reach the desired level, it is essential to keep pace with developments in science and technology and to remain open to innovations in education, in line with the requirements of the 21st century. Reports on educational policies indicate that STEM education is considered a necessity in our country, yet the lack of work in this area has been identified as a problem. STEM education (Science, Technology, Engineering, Mathematics), which aims to equip individuals with knowledge, skills, research, and inquiry from an interdisciplinary perspective, is regarded as a crucial tool for economic development and leadership in the scientific field (Lacey and Wright, 2009).

2. LITERATURE REVIEW

Nations can only remain resilient as long as they keep pace with scientific and technological advancements. This has created a growing demand for qualified individuals. The 21st century expects a qualified individual to be creative, critical, inquisitive, curious, capable of analytical thinking, and able to make effective decisions. For our country to reach the intended level, it is essential to follow developments in science and technology and to embrace innovations in education in line with the requirements of the 21st century. In reports published regarding educational policies, the necessity of STEM education has been emphasized in our country, yet the lack of sufficient efforts in this field has been identified as a significant issue. STEM Education (Science, Technology, Engineering, Mathematics), which aims to equip individuals with knowledge, skills, research capabilities, and a questioning approach from an interdisciplinary perspective, is regarded as a crucial tool for economic development and leadership in the scientific arena (Lacey and Wright, 2009).

General Purposes of Science

STEM Education: Although STEM carries deep functional significance, it stands for Science, Technology, Engineering, and Mathematics—a multidisciplinary educational approach. Unlike traditional education, this approach aims to integrate these fields in a connected manner, imparting them to students in a cohesive way. In essence, STEM serves as a bridge that transforms theoretical knowledge into practical, applicable skills (Dugger, 2010).

STEM Activities: In the context of research, STEM activities encompass processes that

include the disciplines of science, technology, engineering, and mathematics. These activities foster inquiry, curiosity, imagination, planning, designing, testing, problem-solving, collaboration, and communication (Pekbay, 2017).

Creativity: In the coming years, it is anticipated that routine tasks and even the resolution of daily problems will increasingly be handled by AI-powered machines. Consequently, state and private sector institutions are expected to no longer employ humans for well-defined, digitized tasks. Thus, it becomes imperative for young people to be able to create innovative syntheses and pave new paths in emerging job sectors (Pekbay, 2017).

Collaborative Work: In this era, where the complexity and volume of information in every profession are rapidly increasing, collaboration with others has become indispensable for completing tasks. The ability to "work together" and to "organize collaborative efforts" has emerged as a crucial skill.

Problem-Solving: When a problem arises, the ability to promptly prioritize and address it is one of the foremost competencies of the 21st century. A person must employ their creativity, critical thinking, and collaborative skills when solving a problem. Problem-solving ability generally involves the steps of "identifying/analyzing the problem," "generating alternative solutions," "planning the most suitable solution," "implementing it," and "evaluating the outcome."

3. RESEARCH METHODOLOGY

The aim of this research is to examine the attitudes of middle school students in 5th, 6th, 7th, and 8th grades towards STEM and their problem-solving skills in relation to various variables.

3.1. Research Model and Hypothesis

This study aims to examine the attitudes towards STEM and problem-solving skills of middle school students in 5th, 6th, 7th, and 8th grades, integrated with the science curriculum, across various variables. The research employs a relational survey model, which allows for the quantitative description of the population through research conducted on a selected sample (Cresswell, 2012, p. 376). Correlational research seeks to determine the extent of one or more types of relationships. In this approach, it is essential that the researcher does not influence the process beyond the application of the necessary tools for data collection (Büyüköztürk et al., 2018, p. 16). Studies using the relational survey model aim to identify the relationships between two or more variables.

1. Among the attitudes of 5th, 6th, 7th, and 8th grade students towards STEM: 1.1. Is there a significant difference based on whether they have taken an elective science applications course?

1.2. Is there a significant difference based on whether they follow a scientific magazine?

1.3. Is there a significant difference based on where science class activities and experiments are conducted?

1.4. Is there a significant difference based on the frequency of conducting science class activities and experiments?

2. Among the problem-solving skills of 5th, 6th, 7th, and 8th grade students: 2.1. Is there a significant difference based on whether they have taken an elective science applications course?

2.2. Is there a significant difference based on whether they follow a scientific magazine?

2.3. Is there a significant difference based on where science class activities and experiments are conducted?

2.4. Is there a significant difference based on the frequency of conducting science class activities and experiments?

3.2. Data Analysis

The "STEM Attitude Test" was used to measure attitudes towards STEM, the "Problem-Solving Skills Scale" was employed to assess problem-solving skill levels, and the "Demographic Information Form" was utilized to gather personal information.

3.2.1. Demographics

The research was conducted during the 2023-2024 academic year with 600 middle school students studying in the Eyyübiye district of Şanlıurfa.

3.2.2. Demographic Characteristics Survey

A survey created by the researchers was administered to gather information on the students' demographic characteristics. Through this survey, data were collected on students' gender, type of school, frequency and level of technology use, parents' educational background, family income, report card grades in science, mathematics, and technology design courses, as well as their level of interest in science, mathematics, technology design, and information technology courses.

3.2.3. STEM Attitude Test

The STEM Attitude Scale was developed by the Friday Institute for Educational Innovation (2012) to assess the attitudes of 6th-12th grade students towards science, technology, engineering, and mathematics. The scale consists of 37 items and was developed in a 5-point Likert format, with responses ranging from "Strongly Agree (5)" to "Strongly Disagree (1)." The scale allows for a minimum score of 37 and a maximum score of 185. The internal consistency coefficients for the factors that make up the scale are as follows: Mathematics, $\alpha = .90$; Science, $\alpha = .89$; Engineering and Technology, $\alpha = .90$; 21st Century Skills, $\alpha = .92$. The scale, adapted into Turkish, was initially administered to a sample of 1,323 students from 6th, 7th, and 8th grades. The collected data were entered into the SPSS 22.0 software package, and reverse-coded items were adjusted for scoring. To assess the reliability of the 37 items on the STEM Attitude Scale

(SYTÖ), the Cronbach's Alpha coefficient was calculated. The internal consistency coefficients were found to be .86 for the Mathematics factor, .87 for the Science factor, .86 for the Engineering and Technology factor, and .70 or above for the 21st Century Skills factor and the overall scale, providing evidence of the scale's reliability.

3.2.4. Problem-Solving Skills Test

The Problem-Solving Skills Assessment tool, developed by Heppner and Peterson (1982) and adapted by Savaşır and Şahin (1997), is a Likert-type scale consisting of 35 items scored between 1 and 6. The possible responses to each item range from "I always behave this way" to "I never behave this way." The total score on the scale can range from 32 to 192. In the reliability study, the overall internal consistency coefficient of the scale was found to be .90, with coefficients for the subscales ranging from .72 to .85. The item-total score correlations ranged from .25 to .71. The test-retest reliability coefficients for the subscales were between .83 and .89. The construct validity study revealed three factors: Confidence in Problem Solving ($\alpha = .85$), Approach-Avoidance ($\alpha = .84$), and Personal Control ($\alpha = .72$). The correlation coefficients between these three factors ranged from .38 to .49 (as cited in Savaşır & Şahin, 1997). The Turkish adaptation of the scale was conducted by Şahin, Şahin, and Heppner (1993). In a reliability study involving 244 university students, the internal consistency coefficient was calculated as .88. The split-half reliability correlation coefficient was found to be .81. For validity, criterion-related validity was used, with a correlation of -.33 between the total score of the scale and the Beck Depression Inventory, and a correlation of -.45 with the STAI-T total scores. Factor analysis revealed that the scale consists of six factors: "Impulsive Approach" ($\alpha = .78$), "Reflective Approach" ($\alpha = .76$), "Avoidant Approach" ($\alpha = .74$), "Evaluative Approach" ($\alpha = .69$), "Confident Approach" ($\alpha = .64$), and "Planned Approach" ($\alpha = .59$) (as cited in Savaşır & Şahin, 1997). This study utilized the adaptation conducted by Şahin, Şahin, and Heppner (1993). The analysis of data collected in this study yielded an internal consistency coefficient of $\alpha = .75$ for the overall scale.

3.2.5. Analysis Results

In this section, the findings related to middle school students' attitudes towards STEM, measured by the "Attitude Towards STEM Test," and their problem-solving skill levels, assessed by the "Problem-Solving Skill Scale," are presented in sequence.

3.2.5.1. Findings and Interpretations Regarding the Differences in Problem-Solving Approaches of Middle School Students Based on Their Participation in Science Applications Courses

To determine whether students' problem-solving approaches differ based on their participation in science applications courses, the assumption of normality was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, revealing that the data did not follow a normal distribution. Since the normality assumption was violated, the non-

parametric alternative to the independent samples t-test, the Mann-Whitney U test, was employed to assess differences in the problem-solving approaches of middle school students based on their participation in science applications courses. The results of the Mann-Whitney U test are presented in Table 1.

Table 1. *Mann-Whitney U Test Results Regarding the Mean Ranks of Problem-Solving Approaches Based on Middle School Students' Participation in Science Applications Courses*

	Participati on in Science Applicatio ns Course	n	Mean Rank	U	z	p
Impulsive Approach	Yes	34	101242.50	40161.5	-1.67	.098
	No	25	78457.50			
Deliberative Approach	Yes	34	103087.50	42012.5	0.773	.439
	No	25	76612.50			
Avoidant Approach	Yes	34	99974.00	38899.0	-2.26	.023
	No	25	79726.00			
Evaluative Approach	Yes	34	103314.00	42239.0	-0.66	.505
	No	25	76386.00			
Self-Confident Approach	Yes	34	102258.00	41183.0	-1.17	.242
	No	25	77442.00			
Planned Approach	Yes	34	103340.00	42265.0	-0.65	.514
	No	25	76360.00			

As seen in Table 1, the results of the Mann-Whitney U test conducted to determine whether middle school students' problem-solving approaches differ based on their

participation in science applications courses indicate no significant differences. Specifically, there were no significant differences in the impulsive approach ($U=40,161.5$; $z=-1.67$; $p=.098$; $p>.05$), deliberative approach ($U=42,012.5$; $z=-0.773$; $p=.023$; $p>.05$), avoidant approach ($U=38,899$; $z=-2.26$; $p=.505$; $p>.05$), evaluative approach ($U=42,239.0$; $z=-0.66$; $p=.505$; $p>.05$), self-confident approach ($U=41,183.0$; $z=-1.17$; $p=.242$; $p>.05$), and planned approach ($U=42,265.0$; $z=-0.65$; $p=.514$; $p>.05$) dimensions based on whether students had taken the science applications course.

3.2.5.2. Findings and Interpretations Regarding the Differences in Problem-Solving Approaches of Middle School Students Based on Their Scientific Journal-Reading Habits

To determine whether students' problem-solving approaches differ based on their scientific journal-reading habits, the assumption of normality was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, revealing that the data did not follow a normal distribution. Since the normality assumption was violated, the non-parametric alternative to the independent samples t-test, the Mann-Whitney U test, was employed to assess differences in middle school students' problem-solving approaches based on their scientific journal-reading habits. The results of the Mann-Whitney U test are presented in Table 2.

Table 2. Mann-Whitney U Test Results for the Mean Ranks of Problem-Solving Approaches Based on Middle School Students' Scientific Journal-Reading Habits

	Scientific Journal-Reading Habits	n	Mean Rank	U	z	p
Impulsive Approach	Yes	53	298.30	16448.5	-0.69	.491
	No	4	313.95			
Deliberative Approach	Yes	53	299.69	17191.0	-0.12	.901
	No	4	302.52			
Avoidant Approach	Yes	53	300.98	16832.5	-0.40	.691
	No	4	291.96			
Evaluative Approach	Yes	53	302.79	15863.5	-1.14	.256
	No	4	277.05			
Self-Confident Approach	Yes	53	299.27	16967.0	-0.29	.768
	No	4				

	No	65	305.97			
Planned Approach	Yes	53	298.27	16432.0	-0.70	.483
		4				
	No	65	314.20			

As seen in Table 2, the Mann Whitney U test conducted to examine whether middle school students' problem-solving approaches differ according to their engagement with scientific journals revealed no significant differences across various dimensions. These include the impulsive approach (U=16448.5; z=-0.69; p=0.491; p>.05), the reflective approach (U=17191.0; z=-0.12; p=0.901; p>.05), the avoidant approach (U=16832.5; z=-0.40; p=0.691; p>.05), the evaluative approach (U=15863.5; z=-1.14; p=0.256; p>.05), the self-confident approach (U=16967.0; z=-0.29; p=0.768; p>.05), and the planned approach (U=16432.0; z=-0.70; p=0.483; p>.05). Thus, no differences were found in students' problem-solving approaches based on their engagement with scientific journals.

3.2.5.3. Findings and Interpretations Regarding the Differences in Middle School Students' Problem-Solving Approaches Based on the Location of Science Course Activities and Experiments

To determine whether students' problem-solving approaches vary depending on the location where science course activities and experiments are conducted, the assumption of normality was tested. The Kolmogorov-Smirnov test (p≤.001) was examined, and it was found that the data did not follow a normal distribution. Given the violation of the normality assumption, the Mann Whitney U test, a non-parametric alternative to the independent samples t-test, was employed to assess whether there are differences in middle school students' problem-solving approaches based on the location of science course activities and experiments. The results of the Mann Whitney U test are presented in Table 3.

Table 3. Mann Whitney U Test Results for the Average Ranks of Middle School Students' Problem-Solving Approaches Based on the Location of Science Course Activities and Experiments

The Location Where Science Course Activities and	n	Mean Rank	Kruskal-Wallis H	df	p
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		Experiments Are Conducted				
Impulsive Approach +	Classroom	57	297.02	4.66	2	.097
	Laboratory	14	374.43			
	Classroom + Laboratory		359.91			
Deliberative Approach	Classroom	57	298.61	1.43	2	.489
	Laboratory	14	345.36			
	Classroom + Laboratory	16	328.66			
Avoidant Approach	Classroom	57	298.24	2.24	2	.327
	Laboratory	14	325.21			
	Classroom + Laboratory	16	359.44			
Evaluative Approach	Classroom	57	299.60	1.87	2	.392
	Laboratory	14	359.75			
	Classroom + Laboratory	16	280.59			
Self-Confident Approach	Classroom	57	300.56	0.36	2	.833
	Laboratory	14	319.71			
	Classroom + Laboratory	16	281.47			
Planned Approach	Classroom	57	297.29	4.16	2	.125
	Laboratory	14	377.96			
	Classroom + Laboratory	16	347.00			

As shown in Table 3, the results of the Mann Whitney U test conducted to determine whether middle school students' problem-solving approaches differ based on the location of science course activities and experiments revealed no significant differences across various dimensions. These include the impulsive approach ($\chi^2(2, 600) = 4.66$; $p = 0.097$; $p > .05$), the reflective approach ($\chi^2(2, 600) = 1.43$; $p = 0.489$; $p > .05$), the avoidant approach ($\chi^2(2, 600) = 2.24$; $p = 0.327$; $p > .05$), the evaluative approach ($\chi^2(2, 600) = 1.87$; $p = 0.392$; $p > .05$), the self-confident approach ($\chi^2(2, 600) = 0.36$; $p = 0.833$; $p > .05$), and the planned approach ($\chi^2(2, 600) = 4.16$; $p = 0.125$; $p > .05$). Therefore, no differences were found in students' problem-solving approaches based on the location of the science course activities and experiments.

3.2.5.4. Findings and Interpretations Regarding the Differences in Middle School Students' Problem-Solving Approaches Based on the Frequency of Conducting Science Course Activities and Experiments

To determine whether students' problem-solving approaches vary according to the frequency of conducting science course activities and experiments, the assumption of normality was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, and it was found that the data did not follow a normal distribution. Due to the violation of the normality assumption, the Kruskal-Wallis test, a non-parametric alternative to the ANOVA test, was used to assess whether there are differences in middle school students' problem-solving approaches based on the frequency of conducting science course activities and experiments. The results of the Kruskal-Wallis H test are presented in Table 4.

Table 4. Kruskal-Wallis H Test Results for the Average Ranks of Middle School Students' Problem-Solving Approaches Based on the Frequency of Conducting Science Course Activities and Experiments

PCE subscales	The Frequency of Conducting Science Class Activities and Experiments	n	Mean Rank	Kruskal-Wallis H	df	p
Impulsive Approach	Always	41	241.73	6.85	3	.077
	Often	67	278.29			

Deliberative Approach	Sometimes	409	308.24	8.22	3	.042
	Never	83	309.31			
	Always	41	300.35			
	Often	67	243.66			
	Sometimes	409	308.65			
Avoidant Approach	Never	83	306.32	3.49	3	.322
	Always	41	269.90			
	Often	67	275.42			
	Sometimes	409	304.83			
	Never	83	314.55			
Evaluative Approach	Always	41	291.57	4.11	3	.249
	Often	67	262.24			
	Sometimes	409	305.16			
	Never	83	312.83			
	Always	41	313.00			
Self-Confident Approach	Often	67	252.67	8.18	3	.042
	Sometimes	409	300.56			
	Never	83	332.62			
Planned Approach	Always	41	313.32	4.39	3	.222
	Often	67	259.19			
	Sometimes	409	305.31			
	Never	83	303.83			

As seen in Table 4, the Kruskal-Wallis H test was conducted to determine whether middle school students' problem-solving approaches differ based on the frequency of conducting science class activities and experiments. The results revealed no significant differences in students' problem-solving abilities concerning the frequency of science activities and experiments in the dimensions of the hasty approach ($\chi^2(3,600) = 6.85$; $p = .077$; $p > .05$), avoidant approach ($\chi^2(3,600) = 0.32$; $p = .956$; $p > .05$), avoidant approach ($\chi^2(3,600) = 3.49$; $p = .322$; $p > .05$), evaluative approach ($\chi^2(3,600) = 4.11$; $p = .249$; $p > .05$), and planned approach ($\chi^2(3,600) = 4.39$; $p = .222$; $p > .05$).

However, a significant difference was observed in the reflective approach dimension ($\chi^2(3,600) = 8.22$; $p = .042$; $p < .05$) based on the frequency of conducting science activities and experiments. The post-hoc pairwise comparison test revealed that there was a significant difference in the frequency of conducting science activities and experiments between the "often" and "sometimes" categories in favor of the "never" category.

Additionally, a significant difference was found in the self-confident approach dimension ($\chi^2(3,600) = 8.18$; $p = .042$; $p < .05$) concerning the frequency of conducting science activities and experiments. The post-hoc test indicated that a significant difference existed between the "often" and "never" categories, again in favor of the "never" category.

3.2.5.5. Findings and Interpretations on the Differences Between Middle School Students' Attitudes Toward STEM and Their Participation in Science Applications Courses

To determine whether students' attitudes toward STEM differ based on their participation in science applications courses, the normality assumption was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, and it was found that the data did not meet the normal distribution assumption. Since the normality assumption was violated, the non-parametric alternative to the independent samples t-test, the Mann-Whitney U test, was used to assess whether there were any differences in middle school students' attitudes toward STEM based on their participation in science applications courses. The results of the Mann-Whitney U test are presented in Table 5.

Table 5. Mann-Whitney U Test Results for Middle School Students' Attitudes Toward STEM Based on Their Participation in Science Applications Courses

	Participati on in Science Applicatio ns Course	n	Mean Rank	U	z	p
Mathematics	Yes	34 9	106922.5	41402.5	-1.06	.286
	No	25 0	72777.5			
Science	Yes	34 9	109321.0	39004.0	-2.21	.027
	No	25 0	70379.0			
Engineering and Technology	Yes	34 9	104946.5	43378.5	-0.11	.906
	No	25 0	74753.5			
21st-century skills	Yes	34 9	106606.5	41718.5	-0.91	.361
	No	25 0	73093.5			

As seen in Table 5, the results of the Mann-Whitney U test conducted to determine whether middle school students' attitudes toward STEM differ based on their participation in science applications courses revealed the following: No significant

differences were found in the dimensions of mathematics ($U = 41402.5$; $z = -1.06$; $p = .286$; $p > .05$), engineering and technology ($U = 43378.5$; $z = -0.11$; $p = .027$; $p > .05$), and 21st-century skills ($U = 41718.5$; $z = -0.91$; $p = .361$; $p > .05$) concerning students' attitudes toward STEM based on their participation in science applications courses. However, in the science dimension ($U = 39004.0$; $z = -2.21$; $p = .027$; $p < .05$), a significant difference was observed in favor of students who had taken the science applications course, indicating that these students have more positive attitudes toward STEM in this particular dimension.

3.2.5.6. Findings and Interpretations Regarding the Differences Between Middle School Students' Attitudes Towards STEM and Their Engagement with Scientific Journals

To determine whether students' attitudes towards STEM differ based on their engagement with scientific journals, the normality assumption was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, and it was found that the data did not meet the normal distribution assumption. Due to this violation of normality, the Mann-Whitney U test, a non-parametric alternative to the independent samples t-test, was used to assess whether there is a significant difference in middle school students' attitudes towards STEM based on their engagement with scientific journals. The results of the Mann-Whitney U test are presented in Table 6.

Table 6. Results of the Mann-Whitney U Test for STEM Attitude Mean Ranks Based on Middle School Students' Engagement with Scientific Journals

	Scientific Journal-Reading Habits	n	Mean Rank	U	z	p
Mathematics	Yes	53	158472.0	15627.0	-1.31	.188
	No	4	21228.0			
Science	Yes	53	158292.5	15447.5	-1.45	.147
	No	4	21407.5			
Engineering and Technology	Yes	53	158637.5	15792.5	-1.18	.235
	No	4	21062.5			
21st-century skills	Yes	53	157461.5	14616.5	-2.08	.038
	No	4	22238.5			

As seen in Table 6, the Mann-Whitney U test results indicate that there is no significant difference in middle school students' attitudes towards STEM based on their engagement with scientific journals in the dimensions of mathematics ($U = 15627.0$; $z = -1.31$; $p = .188$; $p > .05$), science ($U = 15447.5$; $z = -1.45$; $p = .147$; $p > .05$), and engineering and technology ($U = 15792.5$; $z = -1.18$; $p = .235$; $p > .05$). However, in the dimension of 21st-century skills ($U = 14616.5$; $z = -2.08$; $p = .038$; $p < .05$), a statistically significant difference was found in favor of those who engage with scientific journals.

3.2.5.7. Findings and Interpretations Regarding the Differences Between Middle School Students' Attitudes Towards STEM and the Locations Where Science Class Activities and Experiments Are Conducted

To determine whether students' attitudes towards STEM differ based on the locations where science class activities and experiments are conducted, the normality assumption was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined, and it was found that the data did not meet the normal distribution assumption. Due to this violation of normality, the Mann-Whitney U test, a non-parametric alternative to the independent samples t-test, was used to assess whether there is a significant difference in middle school students' attitudes towards STEM based on the location of science class activities and experiments. The results of the Mann-Whitney U test are presented in Table 7.

Table 7. Results of the Mann-Whitney U Test for STEM Attitude Mean Ranks Based on the Locations Where Middle School Students' Science Class Activities and Experiments Are Conducted

	The Location Where Science Course Activities and Experiments Are Conducted	n	Mean Rank	Kruskal-Wallis H	df	p
Mathematics	Classroom	57	302.88	2.27	2	.328
	Laboratory	14	247.04			
	Classroom + Laboratory	16	262.38			

Science	Classroom	57	303.55	4.05	2	.132
	Laboratory	14	218.25			
	Classroom + Laboratory	16	263.72			
Engineering and Technology	Classroom	57	302.36	1.41	2	.492
	Laboratory	14	254.32			
	Classroom + Laboratory	16	274.63			
21st-century skills	Classroom	57	304.63	6.77	2	.034
	Laboratory	14	240.32			
	Classroom + Laboratory	16	205.97			

As seen in Table 7, the results of the Mann-Whitney U test, conducted to determine whether middle school students' attitudes towards STEM differ based on the locations where science class activities and experiments are conducted, revealed no significant differences in the dimensions of mathematics ($\chi^2(2, 600) = 2.22, p = .328; p > .05$), science ($\chi^2(2, 600) = 4.05, p = .132; p > .05$), and engineering and technology ($\chi^2(2, 600) = 1.41, p = .492; p > .05$). However, in the dimension of 21st-century skills ($\chi^2(2, 600) = 6.77, p = .034; p < .05$), a significant difference was found based on the locations where science class activities and experiments are conducted.

Nonetheless, in the post-hoc pairwise comparison tests following the Kruskal-Wallis test, Bonferroni adjustments were made to prevent the overall error from exceeding 5% (Bursal, 2019). Upon reviewing the adjusted significance levels from the post-hoc pairwise comparison tests (Mann-Whitney U), no significant differences were found between any variables.

3.2.5.8. Findings and Interpretations Regarding the Differences Between Middle School Students' Attitudes Towards STEM and the Frequency of Conducting Science Class Activities and Experiments

To determine whether students' attitudes towards STEM differ based on the frequency of conducting science class activities and experiments, the normality assumption was tested. The Kolmogorov-Smirnov test ($p \leq .001$) was examined for normality, and it was

found that the data did not follow a normal distribution. Since the assumption of normality was violated, the Kruskal-Wallis test, a non-parametric alternative to ANOVA, was used to identify if there are differences in middle school students' attitudes towards STEM based on the frequency of conducting science activities and experiments. The results of the Kruskal-Wallis H test are presented in Table 8.

Table 8. Kruskal-Wallis H Test Results Regarding the Mean Ranks of Middle School Students' Attitudes Towards STEM Based on the Frequency of Conducting Science Class Activities and Experiments

		The Frequency of Conducting Science Class Activities and Experiments	n	Mean Rank	Kruskal- Wallis H	df	p
Mathematics	Always	41	365.88	7.00	3	.072	
	Often	67	312.26				
	Sometimes	409	293.28				
	Never	83	294.30				
Science	Always	41	314.37	22.27	3	≤.001	
	Often	67	375.84				
	Sometimes	409	298.52				
	Never	83	242.57				
Engineering and Technology	Always	41	323.91	5.81	3	.121	
	Often	67	325.76				
	Sometimes	409	301.37				
	Never	83	264.27				
21st-century skills	Always	41	294.30	8.51	3	.036	
	Often	67	357.85				
	Sometimes	409	294.97				
	Never	83	284.50				

As seen in Table 8, the results of the Kruskal-Wallis H test conducted to determine whether middle school students' attitudes towards STEM differ based on the frequency of conducting science class activities and experiments show that there was no significant difference in the mathematics ($\chi^2(3, 600) = 7.00$; $p = .072$; $p > .05$) and engineering and

technology ($\chi^2(3, 600) = 0.32$; $p = .121$; $p > .05$) dimensions. However, in the science dimension ($\chi^2(3, 600) = 22.27$; $p \leq .001$; $p < .05$), a significant difference was found based on the frequency of conducting science activities and experiments. A paired comparison test revealed that this significant difference was between the "never" and "sometimes" and "often" categories, with the "never" category showing a disadvantage. In the 21st-century skills dimension ($\chi^2(3, 600) = 8.51$; $p = .042$; $p < .05$), a significant difference was also found based on the frequency of conducting science activities and experiments. The paired comparison test indicated that the significant difference was between the "sometimes" and "often" categories, with the "sometimes" category being favored.

4. CONCLUSION

4.1. Results and Discussion on the Differences in Middle School Students' Problem-Solving Approaches Based on Their Enrollment in Science Practices Courses

The study found that there was no significant difference in middle school students' problem-solving approaches based on whether they took the Science Practices elective course. This result can be interpreted as follows: The Science Practices elective course is typically taught by teachers according to the school's staffing norms. When taught by science teachers, the course is often supplemented with relevant content, such as problem-solving exercises. However, when taught by teachers of other subjects, this approach is not consistently applied. Therefore, it is unsurprising that taking or not taking this course does not lead to a significant difference in problem-solving skills.

4.2. Results and Discussion on the Differences in Middle School Students' Problem-Solving Approaches Based on Their Engagement with Scientific Journals

The study found no significant difference in middle school students' problem-solving approaches based on whether they follow a scientific journal. In a study by Selim (2013), the impact of scientific literacy on science education was examined, revealing that students are positively influenced by their families. Specifically, when scientific journals are read within the family, students' attitudes towards science classes improve. An increase in the rate of reading scientific journals has emerged as a potential variable that could influence problem-solving skills.

4.3. Results and Discussion on the Differences in Middle School Students' Problem-Solving Approaches Based on the Location of Science Class Activities and Experiments

The study found no significant difference in middle school students' problem-solving approaches based on the location where science class activities and experiments were conducted. The responses on the scales indicate that a large proportion of these activities were carried out in the classroom. As a result, it appears that simply conducting the activities is sufficient, and the location does not serve as a variable that influences problem-solving skills.

4.4. Results and Discussion on the Differences in Middle School Students' Problem-Solving Approaches Based on the Frequency of Conducting Science Class Activities and Experiments

The study found a significant difference in middle school students' problem-solving approaches based on the frequency with which they conducted science class activities and experiments.

4.5. Findings and Interpretations on the Differences in Middle School Students' Attitudes Towards STEM Based on Their Enrollment in the Science Practices Course

The study revealed no significant difference in middle school students' attitudes towards STEM based on whether they enrolled in the Science Practices elective course. This result can be interpreted as follows: The Science Practices course, which is offered as an elective, is typically taught according to teacher availability in schools. When taught by science teachers, the course is often supplemented with relevant activities like problem-solving. However, when taught by teachers of other subjects, this approach may not be consistently applied. Therefore, it is unsurprising that taking or not taking this course does not lead to a significant difference in students' attitudes towards STEM.

In a related study, Saçan (2018) developed a STEM curriculum for the Science Practices elective and examined its impact on seventh-grade students' scientific process skills, attitudes towards science and socioscientific issues, and perceptions of the process. The study, which employed a mixed-methods approach, included 78 students and lasted 19 weeks. The results indicated that students who participated in STEM activities showed positive improvements in their scientific process skills and attitudes towards socioscientific issues.

4.6. Findings and Interpretations on the Differences in Middle School Students' Attitudes Towards STEM Based on Their Engagement with Scientific Journals

The study found no significant difference in middle school students' attitudes towards STEM based on whether they follow a scientific journal. However, the literature presents

varying interpretations and findings on this topic. Science and technology are not confined to textbooks; they can be encountered in documentaries on television, news articles in newspapers, or articles in magazines. These media outlets are communication tools that influence students' lives in various ways. As Long and Steinke (1996) pointed out, environmental factors can influence individuals' behaviors, attitudes, values, and motivations. For instance, a child who watches a successfully conducted scientific experiment on television might develop a positive attitude towards science (Long & Steinke, 1996). Given that scientific journals are a form of media similar to television, it is expected that students who regularly follow a scientific journal with interest would also develop a positive attitude towards science.

4.7. Findings and Interpretations Regarding the Differences Between Middle School Students' Attitudes Towards STEM and the Locations Where Science Course Activities and Experiments Are Conducted

The research revealed that there is no significant difference in middle school students' attitudes towards STEM based on the location where science course activities and experiments are conducted. The responses on the scales indicated that the majority of the activities were carried out in the classroom environment. Consequently, it was concluded that the mere presence of activities is sufficient, and the location variable does not impact students' attitudes towards STEM.

4.8. Findings and Interpretations Regarding the Differences Between Middle School Students' Attitudes Towards STEM and the Frequency of Conducting Science Course Activities and Experiments

It was determined that there is no significant difference in students' attitudes towards STEM based on the frequency of conducting science course activities and experiments. The literature presents various interpretations and studies on this subject. Science courses are known to be based on experiments and observations. Because science courses rely on these methods, science is often referred to as "experimental science" (Kaptan, 1998). Laboratory work is among the effective methods used in science education (Erten, 1993). According to Staeck (1995), laboratory applications are one of the most preferred and effective methods, emphasizing students' mental activities and allowing them to work both individually and in groups. As Topsakal (1999) stated, science education should be a process based on learning through experience. Without experiential learning in science education, students may resort to rote memorization rather than truly understanding the concepts. Therefore, science education should be rooted in scientific inquiry, and teaching principles should be scientifically grounded. Learning fundamentally involves individuals' interaction with their environment, imparting attitudes, knowledge, and skills to students. These characteristics can lead to lasting changes in individuals (Özden, 2008). Through laboratory experiments, abstract

concepts are concretized, which enhances learning retention and enables students to apply their knowledge to everyday life (Kaptan, 1998). It has been observed that in laboratory courses, the factors that most influence students' science success include their attitudes, which reflect individual differences, and their levels of cognitive development (Budak, 2001).

5. RECOMMENDATIONS

To enhance the effectiveness of STEM education, it is recommended to develop a science applications textbook that includes STEM activities, ensuring consistency in implementation and increasing in-service training and interdisciplinary collaboration. The curriculum for science courses and experiments could be re-evaluated in terms of content, taking into account students' attitudes. To foster positive attitudes towards science experiments, the full potential of school laboratories should be utilized, and students' interaction times with experiments should be increased. Some activities in textbooks could incorporate problem-solving scenarios to encourage students to engage in research and make the science applications course more dynamic. As scientific journals often contain research and practical studies, they help to concretize knowledge and facilitate teaching. Therefore, various projects related to many topics in science could be developed to enhance problem-solving skills, and related activities could be expanded. Additionally, experiments could be used to further advance students' problem-solving abilities. Consequently, it is suggested that the curriculum include more outcomes related to STEM and problem-solving approaches. The findings of this study can contribute to identifying the current situation and taking necessary precautions. Future research could apply similar studies using different research methods at various educational levels. The students in this study were limited to three middle schools in a single district of Şanlıurfa. To diversify the sample, future research could select participants from across the country.

REFERENCES

- Budak, E. (2001). *Üniversite Analitik Kimya Laboratuvarında Öğrencilerin Kavramsal Değişimi, Başarısı, Tutumu ve Algılamaları Üzerine Yapılandırıcı Öğretim Yönteminin Etkileri*, Yüksek Lisans Tezi, Gazi Üniversitesi, Ankara.
- Dugger, E. W. (2010). *Evolution of STEM in the United States*. 6th Biennial International Conference on Technology Education Research, Australia.
- Erten, S (1993) Biyoloji Laboratuvarının Önemi ve Laboratuvarda Karşılaşılan Problemler. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 9, 315-330.
- Kaptan, F.(1998). *Fen Bilgisi Öğretimi*. Anı Yayıncılık. Ankara.

Lacey, T. A. & Wright, B. (2009). Occupational employment projectionsto 2018. *MonthlyLaborReview*, 82-109.

Long, M. & Steinke, J. (1996). The thrill of everyday science: images of science and scientists on children’s educational science programmes in the United States. *Public Understanding of Science*, 5, 101-119.

Özden, Y. (2008). *Öğrenme- Öğretme*. Pegem Yayıncılık. Ankara.

Pekbay, C. (2017). *Fen teknoloji mühendislik ve matematik etkinliklerinin ortaokul öğrencileri üzerindeki etkileri*. (Doktora tezi). Hacettepe Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara. <https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp>

Roberts, A. (2012). A justification for STEM education. *Technology and Engineering Teacher*, 71(8), 1-4.

Saçan, E. (2018). *Bilim uygulamaları dersi için FeTeMM merkezli bir öğretim Programı önerisi ve etkililiği* (Tez No: 494333). [Doktora, Hacettepe Üniversitesi]. Ulusal Tez Merkezi.

Selim, G. (2013). *Bilimsel dergilerin 7. sınıf öğrencilerinin bilimsel okuryazarlığına ve fen ve teknoloji dersine yönelik tutumlarına etkisinin araştırılması*. Yüksek Lisans Tezi. Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, İstanbul.

Taş, M. (2010). *Dinamik Matematik Yazılımı GeoGebra ile Eğrisel İntegrallerin Çözümlemesi*. Yüksek Lisans Tezi, İstanbul Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Topsakal, S. (2006). *Eğitim fakülteleri sınıf ve fen bilgisi bölümü öğrencileri ile sınıf ve fen bilgisi öğretmenleri için ilköğretim 6. 7. ve 8. Sınıflar fen ve teknoloji öğretimi*. Nobel YayınDağıtım. Ankara.

Yıldırım, B. (2013). *STEM Eğitimi ve Türkiye*, in *IV. National Primary Education Student Congress*. Nevşehir Hacı Bektaş University.

Yıldırım, B. (2013). *Amerika, AB Ülkeleri ve Türkiye’de STEM Eğitimi*, in *22rd NationalCongress of EducationalSciences*. Ulusal Eğitim Bilimleri Kurultayı Osmangazi Üniversitesi.

The Impact of Cash Conversion Cycle on Financial Performance in Manufacturing Firms

Mesut Doğan⁷⁰, Servet Say⁷¹

Abstract

Introduction: The purpose of cash management in businesses is to maintain sufficient liquidity to meet future needs and positively affect business profitability. One of the most basic principles in financing is to collect cash as quickly as possible. In this context, cash management is generally based on the cash conversion cycle (CCC). CCC refers to the period from the date the business pays for raw materials in the production process that begins with the purchase of raw materials to the date it collects its receivables. In order for the cash conversion cycle to benefit the financing of working capital, it must have a short or negative value. In order for this to happen, the receivables collection period and inventory holding period must be shortened, while the payment period for short-term debts must be extended. If these elements are taken into account in the cash conversion process, it will be possible for companies to be more successful in the market and gain competitive advantage.

Aim: The aim of this study is to investigate the effect of cash conversion cycles on the financial performance of companies operating continuously in Borsa Istanbul and in the manufacturing sector between 2014 and 2023.

Method: While return on assets is the dependent variable of the study as a financial performance variable, cash conversion cycle is included in the analysis as an independent variable. The companies in question were examined by performing multiple linear regression analysis.

Findings: According to the results obtained from the study, a statistically significant and negative relationship was found between return on assets and cash conversion cycle.

Conclusion : As a result of the analysis, cash conversion cycle (CCE) has a positive effect on company performance (ROA).

Originality and value: The original value of the study is the calculation of cash conversion cycles of firms operating in the manufacturing sector for the period 2014-2023 and the revealing of its relationship with financial performance.

Key Words: Cash Conversion Cycle, Financial Performance, Return on Assets

Jel Codes: G32, L25, G34

1. INTRODUCTION

Cash Conversion Cycle (CCC) in companies is an important indicator that measures the cash flow used to finance the activities of the business. This period covers the process from the company's stock purchase to product sales and customer collection. Cash

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conversion cycle helps the business optimize cash management and improve liquidity position. Cash Conversion Cycle in businesses refers to the process of managing cash flow in the business's operating cycle. A shorter CCC allows the business to accelerate cash flow and improve its financial health. To calculate the cash cycle of a company, the days payable outstanding (DPO) is obtained by adding the days inventory outstanding (DIO) and the days sales outstanding (DSO). DIO shows how long it takes, on average, for the company to sell its stocks and turn them into cash. This period measures the inventory management efficiency of the business. A shorter DIO indicates that the business is selling its inventory quickly and converting it into cash. DSO shows the average time it takes for the business to collect its receivables from customers. DSO period plays a critical role in the process of converting a business's sales into cash. A shorter DSO indicates that the business collects receivables from customers quickly. DPO shows the average time it takes the business to pay its debts to suppliers. A longer DPO indicates that the business is better able to manage cash flow by paying off debts later. In light of this information, cash conversion cycle plays a critical role in terms of liquidity management of the business (Kaya, 2019).

The aim of this study is to investigate the effect of cash conversion cycles on the financial performance of companies operating continuously in Borsa Istanbul and in the manufacturing sector between 2014 and 2023. In this context, in the first part of the study, explanations about the calculation of the cash conversion period are included. In the second section, there is a summary of the studies in the literature. Finally, the study was concluded with the conclusion section by presenting the findings of the study.

2. LITERATURE REVIEW

In the study conducted by Aytekin and Güler (2014), the relationship between cash conversion cycles and profitability of 26 companies operating in the BIST XTAST index between 2009 and 2012 was examined using a multiple linear regression model. As a result of the analysis, it was determined that companies with low stock holding period and long debt payment period have high profitability.

In the study conducted by Sayılğan (2016), the details of the calculation of the "weighted and inclusive CCC" method, which is recommended to eliminate the deficiencies of the traditional method, are explained through a hypothetical example. Also, "received cash in advances" and "given cash in advances" are not included in the conventional calculation method which are directly related to firm's production and sales activities. Outstanding days of each component must be weighted by a ratio of the related component's financial burden to net sales. Besides, "received cash in advances" and "given cash in advances" must be included into the calculations

Toplaoğlu and Nur (2016) analyzed the effect of cash conversion periods on the financial performance of 18 companies continuously operating in the Borsa Istanbul Corporate Governance Index between 2010 and 2014 using the multiple linear regression method. While return on assets and return on equity are dependent variables of the study as financial performance variables, cash conversion cycle was included in

the study as an independent variable. Separate models were formed for both dependent variables used in the analysis. While only cash conversion cycle variable was included to the model formed on the basis of return on assets statistically significantly and within a positive relationship, the natural logarithm of total assets was included to the model formed for the return on equity only as one of the control variables. Therefore, while a positive relationship between cash conversion cycle and return on assets was observed, no relationship between the return on equity and cash conversion cycle was observed.

The purpose of the study conducted by Karadeniz and Aydın (2023) is to analyze the cash conversion cycles of airline passenger transport companies internationally. For this purpose, days inventory outstanding, days sales outstanding, trade credit payment period and cash conversion cycle for the years 2016-2021 of 64 airline passenger transportation companies whose traded on the stock exchanges in the United States of America (USA), Asia-Pacific and European countries were calculated and analyzed comparatively. In the study, the relationships between the cash conversion cycle and its components were also evaluated by correlation analysis. As a result of the research, it was determined that the average of the cash conversion cycle was not long in general.

Eşelioğlu and Akben Selçuk (2024) examined the effect of cash conversion cycle on financial performance with the panel data analysis method, using the 2018-2022 data of companies listed in Borsa Istanbul. As a result of the analysis, it was concluded that there is an insignificant relationship between cash conversion cycle and return on assets and return on equity, and a significant but negative relationship with net profit margin. As the cash conversion cycle of the analyzed companies increases, they may experience problems in the turnover of their stocks and, accordingly, in collecting their receivables as a result of their sales, and they may encounter a cash impasse.

Also, the studies in the literature focus more on the relationship between cash conversion cycle and profitability. For example; Zakari and Saidu (2016) found a positive relationship between cash conversion time and profitability. On the other hand, Garanina and Petrova (2015); Chang (2018) found a negative relationship between cash conversion time and profitability

3. METHODOLOGY

The main objective of this study is to determine the effect of cash conversion cycle on financial performance. In the study, data from 72 manufacturing companies operating in Borsa Istanbul (BIST) between 2014 and 2023 were used. Return on assets (ROA) was used as the dependent variable in the study. This ratio is calculated as the net profit ratio within total assets. Cash conversion cycle (CCC), firm size (SIZE) and leverage ratio (DEBT) were used as independent variables. The following model was developed within the framework of the variables used in the study:

$$ROA_{i,t} = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 DEBT_{i,t} + \varepsilon_{i,t}$$

In the study, primarily Covariate-augmented Dickey Fuller (CADF) and CIPS unit root tests were applied. Later, PCSE, "Panel-Corrected Standard Errors" method was used. The Robust-PCSE method is used to correct standard error estimates in panel data analysis. This method corrects heteroscedasticity (variance not being constant) and autocorrelation (relationship between series) in both fractional and fixed effect models. Robust-PCSE provides more reliable standard errors, especially when there are differences in dependency and variance between observations in panel data. This makes model predictions more reliable.

4. FINDINGS

This section of the research includes empirical findings regarding the effect of cash conversion cycle on financial performance.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	810	-73,01	49,07	7,9197	10,40138
CCC	810	30,07	11420,64	285,2162	580,03408
SIZE	810	6,12	12,13	9,16	2,021
DEBT	810	7,47	440,13	54,4947	35,80814

Table 1 includes the descriptive statistics of the dependent and independent variables used in the study. According to the results, the average of ROA, which is a performance indicator, was calculated as 7.91%. Additionally, the CCC average was determined as 285.21.

Table 2. CADF and CIPS Unit Root Test Results

Variable(s)	CADF and CIPS test statistic for constant	
	first difference	first difference
ROA	-5.354***	-3.196***
CCC	-4.733***	-3.456***
SIZE	-5.853***	-2.974***
DEBT	-5.634***	-3.656***

Note: *, ** and *** denote significance at 10%, 5% and 1% level, respectively.

In Table 2, it was investigated whether the dependent and independent variables used in the study were stationary or not using CADF and CIPS tests. CADF and CIPS tests are second generation panel unit root tests used in case of CSD. In the analysis results, it is understood that all variables are stationary at the first difference. In other words, H0 "series have unit root" hypothesis is rejected.

Table 3. Correlation Analysis

	ROA
ROA	-
CCC	-0.287
SIZE	0.158
DEBT	-0.314

Table 3 shows the correlation analysis results in terms of the dependent and independent variables used in the study. According to the results, there is a negative relationship between CCC and ROA. In other words, as the cash conversion period lengthens, the profitability rate per asset decreases. There is also a positive relationship between firm size and ROA. Finally, a negative relationship was found between leverage ratio and ROA.

Table 4. Estimator Results

Variable(s)	Model 1
	ROA
CCC	-4.33*** (-1.54)
SIZE	6.53*** (0.81)
DEBT	-5.33*** (-1.73)
Observations	720
R-squared	0.358
Number of groups	72

Table 4 shows the PCSE estimator results for the impact of the CCE, SIZE and DEBT variables used in the study on firm performance. As a result of the analysis, cash conversion cycle (CCE) has a positive effect on company performance (ROA). In other words, as the cash conversion period increases in industrial enterprises, the profitability rate per asset decreases. In addition, firm size performance is positive; On the other hand, leverage affects the ratio negatively. In other words, the decrease in the use of foreign resources in assets and the increase in total asset size positively affect the profitability per asset.

5. CONCLUSION

The aim of this study is to investigate the effect of cash conversion cycles on the financial performance of companies operating continuously in Borsa Istanbul and in the manufacturing sector between 2014 and 2023. While return on assets is the dependent variable of the study as a financial performance variable, cash conversion cycle is included in the analysis as an independent variable. The companies in question were examined by performing multiple linear regression analysis. The original value of the study is the calculation of cash conversion cycles of firms operating in the manufacturing sector for the period 2014-2023 and the revealing of its relationship with financial performance. As a result of the analysis, cash conversion cycle (CCE) has a positive effect on company performance (ROA).

REFERENCES

- Aytekin, S. ve Güler, S. (2014). Nakit dönüş süresi ve karlılık arasındaki ilişkinin belirlenmesi: BİST taş ve toprağa dayalı sanayi endeksi'nde (XTAST) ampirik bir uygulama. KAU IIBF Dergisi, 5 (8), 79-98.
- Chang, C.C. (2018). Cash conversion cycle and corporate performance: global evidence. *International Review of Economics & Finance*, 56, 568-581.
- Eşelioğlu, H., Selçuk, A. E. (2024). Nakit dönüşüm süresinin finansal performansa etkisi: Borsa İstanbul'daki şirketler üzerine bir çalışma. *İzmir Yönetim Dergisi*, 5(1), 18-34.
- Garanina, T. & Petrova, O. (2015). Relationship between liquidity, cash conversion cycle and returns of russian companies. *Korporativnye finansy = Journal of Corporate Finance Research*, 9(1), 33-40.
- Karadeniz, E., & Aydın, C. (2023). Havayolu yolcu taşımacılığı şirketlerinin nakit dönüşüm sürelerinin analizi: uluslararası bir karşılaştırma. *Finans Ekonomi ve Sosyal Araştırmalar Dergisi*, 8(2), 400-421.
- Kaya, O. (2019). Nakit dönüşüm süresi ve işletme performansı arasındaki ilişki: Borsa İstanbul'da işlem gören firmalar üzerine bir inceleme. *İşletme Araştırmaları Dergisi*, 11(3), 45-62.
- Sayılgan, G. (2017). Ağırlıklı ve kapsamlı nakit dönüşüm süresi: varsayımsal veriler üzerinden bir örnek hesaplama. *Muhasebe ve Denetime Bakış*, 16(51), 1-14.
- Topaloğlu, E. E., & Nur, T. (2016). Nakit dönüşüm süresinin finansal performansa etkisi: kurumsal yönetim endeksinde bir uygulama. *Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi*(53), 304-317.
- Zakari, M. & Saidu, S. (2016). The impact of cash conversion cycle on firm profitability: evidence from nigerian listed telecommunication companies. *Journal of Finance and Accounting*, 4(6), 342-350.

Testing the Relationship Between Financial Soundness and Profitability in Banks

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Abstract

Introduction: Economic development in a country is closely related to the stable, healthy and efficient operation of the banking sector, which is an important element of the financial system. For this reason, the financial performance and financial soundness of banks can reflect the financial strength of a country. Banks stand out as the institutions with the largest share in the financial system. Banks have an important place as the largest segment that performs financial intermediation functions in transferring funds generated through savings to productive investments in an economy.

Aim: The aim of this study is to test the relationship between the financial soundness and profitability of banks operating in Turkey for the period 2014-2023 through panel data method.

Method: In the study, capital adequacy ratio was included in the analysis as an indicator of financial strength. Return on assets, return on equity and earnings per share ratios were used as profitability ratios. Panel data analysis method was used in the study.

Findings: As a result of the study, a statistically significant relationship was found between profitability and financial soundness in banks.

Conclusion: the independent variables have significant effects on profitability returns, and especially firm size and asset quality have positive effects and capital adequacy ratio has negative effects.

Originality and value: In this study, where the relationship between financial soundness and profitability in banks is tested, the unique value of the study is expressed in terms of calculating the capital adequacy ratios of banks operating in the BIST Bank index and revealing its relationship with profitability.

Key Words: Financial Soundness, Profitability, Banks

Jel Codes: C33, G20, G21

1. INTRODUCTION

Banks have an important place as the largest segment performing financial intermediary functions in transferring funds generated through savings to productive investments in an economy. Disruptions in the intermediary function of banks cause instability in the financial system. A crisis occurring in the banking sector can spread to the entire financial system and the real economy and turn into a local or global crisis. In

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this context, measuring the financial soundness of the banking sector and large banks that have a weight in the sector ensures that effective measures are taken against various risks and contributes to the soundness of the financial system (Gül and Bektaş, 2024).

One of the important elements of the financial system is banks. Banks are financial institutions that convert the funds they collect from real and legal persons into investment and consumption through loans. In addition, banks also contribute to wealth maximization with the financial services they offer (Kirimi et al., 2021).

Economic development in a country may be closely related to the stable, healthy and effective operation of the banking sector, which is one of the important elements of the financial system. For this reason, the financial performance of banks was compared with the banks' financial structure, management performance, corporate governance principles, sustainability and macroeconomic variables (Babihuga, 2007).

Banks, like other businesses, also use financial statements in performance evaluations. For banks, it is used to determine capital adequacy, asset structure and quality, liquidity status and risk, profitability and efficiency, interest and exchange rate risks as a result of the analysis rather than the information in the financial statements (Akgüç, 2012). In addition, financial statement analysis and comparisons with other banks in the sector are taken into consideration by banks because they produce information in terms of due diligence, producing information for bank management, partners and shareholders, using real data in decisions to be made, detecting and solving problems, and creating competitive advantageous areas (Seçme et al., 2009).

The aim of this study is to test the relationship between the financial soundness and profitability of banks operating in Turkey for the period 2014-2023 through panel data method. In this context, in the first part of the study, explanations about the banking system and financial soundness of the banks are included. In the second section, there is a summary of the studies in the literature. Finally, the study was concluded with the conclusion part by presenting the findings of the study.

2. LITERATURE REVIEW

Naceur and Omran (2011), in their study covering the period 1989 to 2005 for the Middle East and North African countries, investigated the effects of bank regulations, concentration, financial and institutional developments on commercial bank profitability; They found that bank-specific factors such as bank capital and credit risk have a positive impact on banks' profitability.

Berger and Bouwman (2013), in their study covering the period 1984 to 2010 for US banks, investigated how capital affects a bank's performance and market share and in what direction this effect is in crisis and non-crisis periods. The study results show that higher capital facilitates the survival of small banks in all crisis and non-crisis periods and contributes positively to their market shares; It shows that it has a positive effect on medium and large-scale banks, especially in times of banking crisis.

Brogi and Langone (2016), in their study covering the period 2007 to 2013 for European banks, investigated the relationship between capital adequacy, profitability and risk; They concluded that bank capital plays a very important role in keeping the banking sector strong against financial shocks.

Ozili (2017), in his study involving 200 African banks and covering the period 2004-2013, found that regulatory capital had a significant and positive effect on the profitability of some banks; He stated that increases in regulatory capital had a negative impact on some banks.

Kılıcı (2019) analyzed the relationship between capital adequacy and profitability in the Turkish Banking Sector. The purpose of the study is to test the relationship between capital adequacy and profitability in the banking sector during the period of 1980-2017 by using the annual data of Turkish banking sector. Dependent variables as ROE and NIM and independent variables as equity/total assets ratio and equity/deposit+non-deposit sources have been used in this study. The results of the study shows that there are longterm relationships between capital adequacy ratios and profitability indicators.

Arzova and Şahin (2023) investigated the effect of financial soundness variables on bank profitability in Turkey. In the study, banking data and inflation at the macroeconomic level for the period 2000-2019 are used in two models. The first model analyzes the return on assets, while the second model deals with the return on equity. In the research model, return on assets and return on equity are included in the research model as variables representing bank performance. Capital adequacy ratio and non-performing loans are the financial soundness variables in the model. According to Granger causality analysis, there is a bidirectional causality relationship between return on assets and capital adequacy ratio. Similar relationship exists between inflation and non-performing loans.

3. METHODOLOGY

The main purpose of this study is to determine the effect of financial soundness on profitability. In the study, data of 12 banks operating in Borsa Istanbul (BIST) between 2014 and 2023 were used. The dependent and independent variables used in the study are as follows;

- Return on Assets (ROA) = Net Profit/ Total Assets-**Dependent Variable**
- Return on Equity (ROE) = Net Profit/ Total Equity-**Dependent Variable**
- Earnings per share (EPS): Net Income to Shares Outstanding-**Dependent Variable**
- Size of Firm (SIZE) = Natural Log of Assets-**Independent Variable**
- Capital adequacy (CAR) = Total Debt/ Total Assets-**Independent Variable**
- Liquidity ratio (LR): Total Advances to Total Assets- **Independent Variable**
- Asset quality (AQ): NPLs to Total Loans- **Independent Variable**

The following models were developed within the framework of the variables used in the study:

$$ROA_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CAR_{i,t} + \beta_4 AQ_{i,t} + \varepsilon_{i,t}$$

$$ROE_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CAR_{i,t} + \beta_4 AQ_{i,t} + \varepsilon_{i,t}$$

$$EPS_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CAR_{i,t} + \beta_4 AQ_{i,t} + \varepsilon_{i,t}$$

In the study, primarily Covariate-augmented Dickey Fuller (CADF) and CIPS unit root tests were applied. Later, PCSE, "Panel-Corrected Standard Errors" method was used. The Robust-PCSE method is used to correct standard error estimates in panel data analysis. This method corrects heteroscedasticity (variance not being constant) and autocorrelation (relationship between series) in both fractional and fixed effect models. Robust-PCSE provides more reliable standard errors, especially when there are differences in dependency and variance between observations in panel data. This makes model predictions more reliable.

4. FINDINGS

This part of the research includes empirical findings on the effect of financial soundness on profitability.

Table 1. CADF and CIPS unit root test results

Variable(s)	CADF and CIPS test statistic for constant	
	first difference	first difference
ROA	-4.05***	-2.73***
ROE	-5.54***	-4.63***
EPS	-3.37**	-3.63***
SIZE	-4.27***	-3.64***
CAR	-5.73**	-2.26***
LR	-6.53***	-3.92***
AQ	-6.72***	-4.50***

Note: *, ** and *** denote significance at 10%, 5% and 1% level, respectively.

In Table 2, it was investigated whether the dependent and independent variables used in the study were stationary or not using CADF and CIPS tests. CADF and CIPS tests are second generation panel unit root tests used in case of CSD. In the analysis results, it is understood that all variables are stationary at the first difference. In other words, H0 "series have unit root" hypothesis is rejected.

Table 2. Correlation Analysis

	ROA	ROE	EPS
SIZE	0.195	0.178	0.139
CAR	-0.202	-0.193	-0.184
LR	0.297	0.286	0.195
AQ	0.302	0.314	0.214

Table 2 shows the correlation analysis results in terms of the dependent and independent variables used in the study. According to the results, there is a positive relationship between SIZE and ROA, ROE and EPS. In other words, as the total assets of banks increase, the profitability ratio per asset also increases. There is also a negative relationship between CAR and ROA, ROE and EPS. This indicates that as banks' equity capital strengthens, their performance also increases. Finally, a positive relationship was found between LR and AQ and ROA, ROE and EPS.

Table 3. Estimator Results

Variable(s)	Model 1	Model 2	Model 1
	ROA	ROE	EPS
SIZE	3.64*** (0.73)	3.22*** (0.64)	2.97*** (0.81)
CAR	-5.88*** (-1.99)	-6.04*** (-2.01)	-4.75*** (-1.35)
LR	5.87*** (0.55)	5.49*** (0.45)	2.56** (0.32)
AQ	6.77*** (1.54)	6.22*** (1.45)	4.86*** (0.97)
Observations	120	120	120
R-squared	0.298	0.275	0.216

Table 3 shows the PCSE estimator results for the effect of the SIZE, CAR, LR and AQ variables used in the study on bank performance (ROA, ROE and EPS). Three different models were developed in the study. As a result of the analysis, it was determined that SIZE, CAR, LR and AQ variables were effective on the financial performance of banks. Firm size positively affects ROA, ROE and EPS. In other words,

as asset size increases, the financial performance of banks increases. On the other hand, the CAR variable negatively affects bank performance in all three models. As the foreign resource utilization rate of banks increases, their performance decreases.

The LR variable also has a positive effect; It is significant for ROA and ROE, but has a lower significance level for EPS. In other words, increasing the liquidity ratio has a positive effect on performance. The AQ variable is also positive and statistically significant for ROA, ROE and EPS. Increasing the asset quality of banks positively affects their financial performance. R-squared values indicate the power of the model to explain the variance of the dependent variables. It was found to be 29.8% for ROA, 27.5% for ROE and 21.6% for EPS. This shows that the independent variables explain the variance of the dependent variables to a certain extent.

As a result, this analysis shows that the independent variables have significant effects on profitability returns, and especially firm size and asset quality have positive effects and capital adequacy ratio has negative effects.

5. CONCLUSION

The aim of this study is to test the relationship between the financial soundness and profitability of banks operating in Turkey for the period 2014-2023 through panel data method. In the study, capital adequacy ratio was included in the analysis as an indicator of financial strength. Return on assets, return on equity and earnings per share ratios were used as profitability ratios. Panel data analysis method was used in the study. In this study, where the relationship between financial soundness and profitability in banks is tested, the unique value of the study is expressed in terms of calculating the capital adequacy ratios of banks operating in the BIST Bank index and revealing its relationship with profitability. As a result of the study, a statistically significant relationship was found between profitability and financial soundness in banks.

REFERENCES

- Akgüç, Ö. (2012). Banka finansal tabloların analizi. İstanbul: Avcıol Basım ve Yayıncılık.
- Babihuga, R. (2007). Macroeconomic and financial soundness indicators: An empirical investigation. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=995618 (02.10.2024).
- Berger, A., & Bouwman, C. (2013). How does capital affect bank performance during financial crises?. *Journal of Financial Economics*, 109, 146–176.
- Brogi, M., & Langone, R. (2016). Bank profitability and capital adequacy in the post-crisis context. *Contributions to Economics*, 214, 95-109.
- Gül, S., & Bektaş, S. (2022). Türkiye’de faaliyet gösteren konvansiyonel bankaların finansal istikrar performanslarının finansal sağlamlık göstergeleri ile değerlendirilmesi:

entropi ve aras yöntemleri ile analizi. Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (49), 553-572.

Kılıcı, E. N. (2019). Türk bankacılık sektöründe 1980-2017 döneminde sermaye yeterliliği ve karlılık arasındaki ilişkinin analizi; Fourier yaklaşımı. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, (59), 61-73.

Kirimi, P. N., Kariuki, S. N., & Ocharo, K. N. (2020). Mediation effect of macro-economic factors on the relationship between banks' financial soundness and financial performance. *International Journal of Finance and Accounting*, 9(5), 99-109.

Naceur, S. B., & Omran, M. (2011). The effects of bank regulations, competition and financial reforms on bank's performance. *Emerging Markets Review*, 12, 1-20.

Ozili, P. K. (2017). Bank profitability and capital regulation: evidence from listed and non-listed banks in Africa. *Journal of African Business*, 18, 143-168.

Seçme, N. Y., Bayraktaroğlu, A., Kahraman, C. (2009). Fuzzy performance evaluation in Turkish banking sector using analytic hierarchy process and TOPSIS. *Expert Systems with Applications*, 36(9), 11699-11709.

The Impact of Human Resource Information Systems (HRIS) on Organizational Performance in the Hospitality Industry

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Abstract

Introduction: In today's rapid technological environment, organizations are facing the constant challenges of improving their business processes to others competitive and efficient. In this context, human resources information systems (HRIS) stood out as a key factor for improvement organizational performance.

Aim: The aim of the research is to highlight the importance of the HRIS, its evolution, structure, as well as the process of introducing these systems into the hospitality industry and the importance these systems can have on the hotel business. Also, the aim of this work is to determine the factors that influence the management's decision to adopt a human resources information system (HRIS) in hotel operations.

Method: For this research, an Internet survey was conducted, which was intended for hotel managers.

Findings: Research has shown that the human resources information systems are widespread enough in the hospitality industry.

Conclusion: Hotels can work more efficiently and effectively because the application of such systems and technologies contributes to saving time and money and simplifies the work of managers and employees.

Originality and value: This paper provides information on the prevalence of the application of modern ways of managing human resources in the hospitality industry, which are supported by modern information technologies and systems.

Key Words: human resources, information systems, HRIS, organizational performance, hospitality

Jel Codes: M15, O15, O34, Z03

1. INTRODUCTION

In today's rapid technological environment, organizations are facing the constant challenges of improving their business processes to others competitive and efficient. In this context, human resources information systems (HRIS) stood out as a key factor for improvement organizational performance.

Hospitality industry is an industry characterized by complexity and high by the level of interaction with people. Hotel guests expect not only comfort and quality accommodation, but also personalized service that often requires efficient human

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resource management. Human resource management in the hospitality industry often involves the coordination of many jobs, including receptionists, waiters and managers. Effective management of this diverse employee becomes key to ensuring an optimal experience for the guest.

The introduction of HRIS in hotel operations can bring several benefits which can significantly improve organizational performance. First and basic can be effective human resource management. HRIS makes it possible a centralized employee database, allowing for easy tracking their achievements, skills and training. This facilitates recruitment processes and selection, enabling better alignment of employee skills with job needs. Also, HRIS facilitates training and development processes, identification of needs for trainings, monitoring progress and evaluating the effectiveness of trainings.

One of the key aspects of HRIS is the ability to analyze and report. Through the collection and analysis of employee performance data, HRIS enables managers to better understand their strengths and areas for improvements. This data can serve as a basis for making decisions about rewards, promotions and further improvements of employees.

However, HRIS implementation cannot be without certain drawbacks. Technical challenges, such as integrating HRIS with existing systems and data protection, may require resources and expertise. In addition, changes in work culture and resistance to change can slow down the process implementation, requiring careful planning and communication with employees.

2. LITERATURE REVIEW

One of the main changes in organizations in the last few years is the increasing use of information and communication technology – ICT (Schermerhorn et al., 2005). Until the 1980s, the primary role of technology was reflected in the automation of business processes and the reduction of their execution time. In the last decade of the 20th and the beginning of the 21st century, the impact of ICT, as a significant factor for the organization's operations, has become a mandatory topic in the field of management (Galbraith, 2014; Daft, 2015).

Modern organizations base their business success and competitive advantage on the strategic management of human resources. In this sense, it is noticeable that ICT is positioned as a strategic partner in human resource management (HRM), and the level of acceptance and implementation is determined by the structure of the e-HRM system. Human resource management activities such as human resource planning (using modern quantitative methods and information systems), recruitment and selection of potential candidates via Internet, social networks and others (e-recruitment and e-selection), changing the nature of work - more extensive design of new jobs and redesign of existing ones, introduction of new jobs, acquisition of new knowledge and skills through professional trainings using e-learning and computer simulations - are only some of the forms of human resource management activities that have "undergoed" transformations through the application of ICT (Lazarević & Lukić, 2016). The main issue is defining the real implications and role of information systems in human resource management

(<https://www.intechopen.com/chapters/62362>). HRIS can be applied in several areas (<https://www.thehumancapitalhub.com/articles/information-systems-in-hr-whatmatters-the-most>):

1. Training and Development - Firms can use HRIS to support training and development programs. Human resources information systems can streamline the annual performance review process or compile a talent list of each employee, depending on the company's business needs.

2. Employee planning - HRIS can track vital employee data such as job positions and demographics. The number of employees in the previous year, average employee retention and employee data such as gender or age can be quickly determined through the report. This data can be reviewed more quickly in the case of recruitment and career planning.

3. Risk management - HRIS can also reduce risks and potential hazards. This is accomplished by maintaining records such as disciplinary warnings, safety training records, accident records, and workers' compensation claims.

2.1. The HRIS system

There are different definitions of human resources information systems (HRIS). According to Kovach and Cathcart (1999), HRIS is a systematic procedure for collecting, storing, maintaining, retrieving and validating data required for the organization of human resources, employee activities and organizational unit characteristics. On the other hand, HRIS can also be defined as an integrated system used to collect, store and analyze information regarding the organization of human resources consisting of databases, computer applications, hardware and software and which is necessary for the collection, recording, storage, managing, delivering, presenting and manipulating data for the HR function (Hendrickson, 2003). In addition, HRIS is the link between human resource management and information technology (IT).

HRIS may be aimed only at the HR department (Ruël et al., 2004), but the use of HRIS can provide numerous benefits not only to the HR function, but also to managers and the entire organization (Parry, 2009). HRIS enables the HR function to become more efficient and to provide better information when making decisions (Beadles et al., 2005). A typical HRIS consists of 4 to 5 application modules such as: compensation and equity tracking, which is considered the most important module, followed by the benefits administration module, the candidate flow module, and the HR control module (Yeung & Brockbank, 1995).

2.2. The structure of the HRIS system

The HRIS system consists of the following modules (Dhande & Mane, 2017):

1. Payroll module - automates the payment process based on employee time and attendance data, calculating various deductions and taxes and generating periodic payroll checks and employee tax reports.

2. Time and attendance module that takes into account the time and work of employees.

3. The benefits administration module provides a system for organizing administration and monitoring employee participation in benefit programs. This module covers insurance, repayments, profit sharing and retirement.

4. The human resource management module is a component that covers many aspects of human resources from job application to retirement. The system records basic demographic and personal data, deals with selection, training and development, management capabilities and skills, compensation planning records and other related activities. Human resources as a management function includes the recruitment, evaluation, compensation and development of employees in an organization.

5. Training module is a system that enables organizations to administer and monitor employee training and development. The system, commonly referred to as a "learning system" (LMS) allows HR to track employee education, qualifications and skills, as well as run web-based training and learning courses available to develop skills.

2.3. The impact of Human Resource Information Systems (HRIS) on Organizational Performance in the Hospitality Industry

Today, people travel to different destinations around the world. The hospitality industry faces many challenges in the development of its performance, which is characterized by the arrival and stay of tourists from different countries and the influence of different cultures. Investment in the hotel sector is an efficient business. A hotel's revenue and reputation largely depend on good service provided within a limited time frame. There are various factors that influence hotel performance, services and quality provided to tourists. Vital factors are the hotel's efficient human resources and efficient work systems (Kovach & Cathcart, 1999).

When talking about human resource management, one cannot fail to mention human resources information systems (HRIS). In other industries, HRIS has proven its ability in business management and employee development, so it can be said that HRIS is the solution to many HR problems. Moreover, in recent decades the world has seen rapid growth in the field of technology, and now many of these technologies can be successfully applied in human resource management. However, there is a small amount of research dealing with the application of HRIS in hotel business (Addis, 2003; Alomari & Elrehail, 2013; Alzghoul et al., 2016).

HRIS can have the following impacts on organizational performance in the hospitality industry:

1. Transformation from the concept of automation to the concept of productivity - automated work is one of the main goals of HRIS technology. This contributes to increasing the productivity of employees and a better working environment (Maheshwari et al., 2017).

2. Performance management - performance management of employees is essential for maintaining the quality of services provided to guests. In addition, performance monitoring can often be used to attract new employees and reduce high employee turnover. But, evaluating the performance of employees in a hotel is a challenging task due to the lack of procedures (Elrehail et al., 2016; Chang et al., 2019).

3. Corporate learning - the use of modern technologies in hotel will help improve the development of training and change the training process. For example, virtual reality (VR) can simulate a complex training environment and make the training process a fun process. Virtual reality technology is predicted to have a major impact on both practical and academic learning in the hospitality industry (Samadbeik et al., 2018).

4. Feedback and analytics tools - significant tools are available to enable hotel businesses to pay attention to employee feedback. Paying attention to employees on providing feedback will positively affect their satisfaction (Johnson, 2000; Mudor & Tooksoon, 2011).

5. Employment market - the use of automated recruitment systems will produce significant improvements in the recruitment process. For example, the use of e-mail will improve the recruitment process by specifying the recruitment checklist and documents that candidates should bring to the job interview. This will dramatically shorten the time of the recruitment process (Johnson, 2000).

6. People analysis application - today, data about the status and qualifications of employees becomes very important, because this information helps the HR department in making decisions about the capabilities and productivity of employees, which will directly affect the productivity of the organization. This database is used in the process of analyzing employee information called "People".

7. Analytics - data and the results of the analysis of these data are important in the formulation of quantitative or qualitative human resource management protocols, instead of classic reports on human resources, metrics and results. Now, human resources decisions become strategic decisions, because they depend on basic data that give a clear insight into the employees' personalities, practical training and skills (Shyaa, 2019).

3. RESEARCH METHODOLOGY

The aim of the research is to determine the prevalence of the application of modern methods of human resource management in the hospitality industry, which are supported by modern information technologies and systems. Also, the aim of the work is to highlight the importance of these systems for hotel business.

The research was conducted in the form of an Internet survey. The survey was intended for hotel managers. The survey was completed by a total of 48 respondents.

The survey consisted of 43 questions, of which 6 questions related to demographic data, 34 questions were on a Likert scale, and 3 questions were closed-ended. The Likert scale was used to measure the attitudes, opinions and perceptions of hotel managers

regarding the importance of using human resources information systems, where managers expressed their satisfaction/dissatisfaction on a scale from 1 to 5. The first part of the question referred to the respondents' demographic data such as gender, age, education, hotel where they are employed, work experience and the position they are employed in. The second part of the question referred to the examination of respondents' views on the activities where the human resources information systems is used the most, the level of HRIS impact on human resources activities and the level of savings that HRIS can have on human resources activities.

3.1. Research Hypothesis

The main hypothesis from which the research will start is the following:

H0: The use of human resources information systems (HRIS) is widespread enough in the hospitality industry.

In addition to the main hypothesis, three more hypotheses were defined:

H1: By using human resources information systems (HRIS), hotels can operate more efficiently and effectively.

H2: Human resources information systems (HRIS) contribute to better cooperation between sectors in hotels.

H3: Human resources information systems (HRIS) contribute to better cooperation between management and employees by providing more efficient and accessible communication channels.

3.2. Data Analysis

Out of 48 respondents, 28 are female and 20 are male. The largest number of respondents are between 20 and 30 years old, followed by respondents who are between 31 and 40 years old. The largest number of respondents have completed Bachelor studies (21 respondents (43.7%)), followed by persons with completed high school (19 respondents (39.6%)).

Table 1. Fields of HR activities in which HRIS is used the most

Activities	Frequency	Percentage
Professional development	40	83,3%
Job evaluation	25	52,1%
Time and attendance	24	50%
Safety and health at work	22	45,8%
Salary and payroll operations	25	52,1%
Human resources planning	33	68,8%
Human resources selection	28	58,3%
Duty assignment	7	14,6%
Performance appraisal	6	12,5%
Health and safety	17	35,4%

Management-employee relations	24	50%
Training and development operations	36	75%
Career planning	44	91,7%
Recruitment and selection	44	91,7%

HRIS can be used in the hospitality industry in the following areas: Professional development, Job evaluation, Time and attendance, Safety and health at work, Salary and payroll operations, Human resources planning, Human resources selection, Duty assignment, Performance appraisal, Health and safety, Management-employee relations, Training and development operations, Career planning and Recruitment and Selection. Respondents use HRIS the most in the following areas: Career planning and Recruitment and selection (91,7%), Professional development (83,3%), Training and development operations (75%), Human resources planning (68,8%), Human resources selection (58,3%), Job evaluation and Salary and payroll operations (52,1%) and Time and attendance and Management-employee relations (50%).

Table 2. The importance of the role that HRIS has on the hotel's HR activities

Activities	Not importan at all	Not that important	Neutral	Important	Very important
Recruitment & Selection	0	0	1	31	16
Training and development	1	2	6	29	10
Salary and Payroll operations	0	2	1	27	18
Professional development	0	3	4	30	11
Job evaluation	0	1	7	22	18
Time and attendance	1	0	5	28	14
Human resources planning	0	2	11	23	12
Performance appraisal	0	5	8	26	9
Management-employee relations	1	4	11	23	9
Career planning	0	3	12	27	6

When asked how important the role of HRIS is in certain HR activities, respondents answered that HRIS is extremely important in Recruitment & Selection (64,6%), Professional development (62,5%), Training and development (60,4%), Time and attendance (58,3%), Salary and Payroll operations and Career planning (56,3%) and Performance appraisal (54,2%).

Table 3. Relationship between different sectors in the hotel and between management and employees

Activities	Strongly disagree	Disagree	Neutral	Agree	Very agree
Cooperation between different sectors in hotels	1	5	12	2	28
Cooperation between management and employees	3	8	4	9	24

When asked if respondents agree that HRIS has contributed to better cooperation between different sectors in the hotel, 30 respondents agreed that it has, while one respondent disagreed with this statement.

When asked whether respondents agree that HRIS has contributed to better cooperation between management and employees, 24 of them stated that it did, while 3 respondents disagreed with this statement.

Table 4. The level of HRIS savings on various HR activities

Activities	Not important at all	Not that important	Neutral	Important	Very important
Saves time in HR planning	1	0	7	35	5
Reduction of time spent on hiring and selecting	0	0	7	36	5
Reducing training time	1	4	11	23	9

Information sharing saves time	1	4	12	27	4
Saves time in strategic HR	2	9	13	21	3
Saving time when maintaining records	1	7	12	23	5
Reduction of expenses in hiring and selecting	1	4	5	33	5
Saving money on training	0	7	7	26	8
Lowering documentation costs	0	3	20	23	2

When asked how much HRIS contributes to savings in certain HR activities, the respondents answered that HRIS contributes the most to HR planning (83,3%), reduction of time spent on hiring and selecting (85,4%) and reduction in expenses in hiring and selecting (79,2%).

4. CONCLUSION

Although human resources information systems cannot cover all business area of the hotel, they can still help significantly when analyzing employees and create essential data and detect activities performed by employees. The quality of application of this technology depends on data availability and program accuracy. Every hotel should make a decision for the application of the human resources information system, but also to involve stakeholders in such project. Decision on using new one's technology should not be based only on the amount of financial funds that are needed, but also on the hotel's organizational goals and the hotel's ability to apply the latest technologies and programs.

Ultimately, although HRIS technologies can bring many benefits they can influence the improvement of hotel performance, human resource managers should use them in a responsible manner, which especially applies to information and employee data. Also, for the implementation of the human resources information system in the hotel, there must be a balance between innovation and predictions, because HRIS can offer the hotel business a sustainable competitive advantage through the creation and deployment of resources based on knowledge.

When it comes to the main hypothesis: The use of human resources information systems (HRIS) is widespread enough in the hospitality industry, it can be said that this

hypothesis has been confirmed, because hotels have seen the advantages that HRIS can have on organizational performances.

When it comes to the next hypothesis: By using human resources information systems (HRIS), hotels can operate more efficiently and effectively, it can be said that this hypothesis is also confirmed.

The next hypothesis: Human resources information systems (HRIS) contribute to better cooperation between different sectors in hotels was also confirmed due to the fact that a greater number of respondents answered positively, 28 of them.

When it comes to the hypothesis: Human resources information systems (HRIS) contribute to better cooperation between management and employees by providing more efficient and accessible communication channels, it is confirmed, because the largest number of respondents (24) answered that they strongly agree with this statement.

REFERENCES

- Addis, M. (2003), Basic skills and small business competitiveness: Some conceptual considerations, *Education & Training*, 45, 152–161.
- Alomari, M. A., Elrehail, H. H. (2013), Mobile-Government: Challenges and Opportunities Jordan as Case study, *International Journal of Business and Social Science*, 4(12), 244–250.
- Alzghoul, A., Elrehail, H., Saydam, S., Alnajdawi, S., Al'Ararah, K. (2016), The impact of corporate social responsibility on corporate reputation using Marketing as Moderate variable, *International Journal of Online Marketing Research*, 2(1), 1-13.
- Beadles, N. A., Lowery, C. M., Johns, K. (2005), The impact of human resource information systems: An exploratory study in the public sector, *Communication of the IIMA*, 5(4), 39–46.
- Chang, H. C., Wang, C. Y. Hawamdeh, S. (2019), Emerging trends in data analytics and knowledge management job market: extending KSA framework, *Journal of Knowledge Management*, 23(4), 664–686.
- Daft, R. (2015), *Organization Theory and Design*, 12th ed. Cengage Learning.
- Dhande, K., Mane, D. (2017), Study on Human Resource Information System (HRIS), *International Journal of Emerging Technologies in Engineering Research (IJETER)*, 5(7), 33–35.
- Elrehail, H., Alzghoul, A., P., Saydam, S., Al'Ararah, K. (2016), The Role of Knowledge Sharing Mechanism in the Development of Pricing Strategy, *International Journal of Online Marketing Research*, 2(1), 53–61.
- Galbraith, J. (2014), Organization Design Challenges Resulting From Big Data, *Journal of Organization Design*, 3(1), 2–13.
- Hendrickson, A. R. (2003), Human resource information systems: Backbone technology of contemporary human resources, *Journal of Labour Research*, 24(3), 381–394.

Information systems in HR: What matters the most. Available from: <https://www.thehumancapitalhub.com/articles/information-systems-in-hr-what-matters-the-most> (Accessed:16.08.2024.).

Johnson, E. (2000), Who are you hiring? Pre-employment screenings help you find out, Educational Institute: American Hotel & Motel Association.

Kovach, K. A., Cathcart, C. E. (1999), Human Resource Information Systems (HRIS): Providing Business with Rapid Data Access, Information Exchange and Strategic Advantage, *Public Personnel Management*, 28(2), 275–282.

Lazarevic, Lj., S., Lukic, M., J. (2016), The Impact of Information and Communication technology on Human Resources, *International Scientific Conference on ICT and E-business related research, SINTEZA 2016*, 369–373.

Maheshwari, V., Gunesh, P., Lodorfos, G., Konstantopoulou, A. (2017), Exploring HR practitioners' perspective on employer branding and its role in organisational attractiveness and talent management, *International Journal of Organizational Analysis*, 25(5), 742–761.

Mudor, H., Tooksoon, P. (2011), Conceptual framework on the relationship between human resource management practices, job satisfaction, and turnover, *Journal of Economics and Behavioral Studies*, 2(2), 41–49.

Parry, E. (2009), The benefits of using technology in human resources management. In Coronas, T., & Olivam M., (Ed.), *Encyclopedia of human resources information systems: Challenges in E-HRM*, Hershey, PA: IGI Global, 110–116.

Pomffyova, M. (2017), The Role of Information Systems in Human Resource Management, Available from: <https://www.intechopen.com/chapters/62362>, (Accessed:16.08.2024.).

Ruël, H., Bondarouk, T., Looise, J. K. (2004), E-HRM: Innovation or Irritation. An Explorative Empirical Study in Five Large Companies on Web-based HRM, *Management Revue*, 15(3), 364–381.

Schermerhorn, J., Hunt, J., Osborn, R. (2005), *Organizational Behavior*, New York: John Wiley & Sons.

Samadbeik, M., Yaaghobi, D., Bastani, P., Abhari, S., Rezaee, R., Garavand, A. (2018), The applications of virtual reality technology in medical groups teaching, *Journal of Advances in Medical Education & Professionalism*, 6(3), 123.

Shyaa, H. H. (2019), A human resource information systems and its impact on a hotel's organisational performance, *African Journal of Hospitality, Tourism and Leisure*, 8(5), 1–7.

Yeung, A., Brockbank, W. (1995), Reengineering HR through Information Technology, *Human Resource Planning*, 2(18), 24–37.

Accounts Receivable in the Strategic Accounting and Management System

Mariya Shygun⁷⁵, Hryhorii Mukhomor⁷⁶

Abstract

Introduction: Accounts receivable is an important component of strategic planning at an enterprise. Proper management of accounts receivable will allow you to adjust the precision of expenses and receipts to a whole new level.

Aim: The purpose of the study is to find a way to select strategic partners and debtors, which will allow more detailed prediction of the receipt of funds on a certain date.

Method: The study used the latest results of researchers in the field of accounting and budgeting, in particular in terms of the development of accounting and information systems. The need to predict receipts from debtors on a certain date has led to the use of mathematical and statistical tools, in particular the rules for constructing a normal distribution and searching for constants, which makes the study more reliable and practical.

Findings: As a result of the study, we have obtained practical results, in particular in terms of developing a method for assessing the strategic partnership premium, which will allow us to more appropriate select long-term partners and more correct predict the company's income and expenses. For the first time, a new model of a dynamic payment calendar has been proposed that will allow accounting professionals to identify risks associated with non-payments more quickly.

Conclusion: The results of the study are an important step in ensuring the reliability of payments at the enterprise. Based on the proposed models, management can more carefully select a portfolio of debtors that will ensure the sustainability and predictability of cooperation and more exact fulfilment of obligations. The new payment calendar is a powerful impetus for the development of both ERP systems and accounting in general.

Originality and value: The analysis and testing of the research shows that the indicators are chosen quite accurately, which makes the proposals meaningful and useful for accounting and business..

Key Words: accounts receivable, strategic accounting of accounts receivable, debtor confidence ratio, payment calendar, functional analysis of accounts receivable, accounts receivable management.

Jel Codes: M41, H63, E65.

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1. INTRODUCTION

Strategic management and strategic accounting play an important role at various economic levels, including the macroeconomic level. The lack of strategic management at enterprises in the context of changing economic relations can have critical consequences. Ukraine's experience in the transition from a planned economy to a market economy has shown that business entities have faced an increase in the relative and absolute amount of receivables on their balance sheets, which has led to non-payments and a cash flow crisis in the country. The Cabinet of Ministers of Ukraine assessed the state of the market as follows: in 1999, accounts payable of enterprises exceeded GDP by 1.5 times, and accounts receivable by 1.04 times. As a result, the government introduced legislative changes aimed at strategic management, including a reduction in the limitation period, the use of bankruptcy procedures and state refinancing of large enterprises' debts. However, these are retrospective actions aimed at eliminating economic consequences. Research aimed at preventing a crisis of non-payment is also relevant.

Practice shows that to ensure the stability of payments, companies must independently formulate a long-term policy and rules for the circulation of receivables. This makes it important to conduct research with subsequent recommendations on the methodology for selecting strategic partners, clearly identifying the sources of risk that may cause a default crisis, and their accounting support and analysis. Recent studies focusing on the functional relationships between business units provide a basis for planning future revenues and ensure informed decision-making.

An important area of research that is currently gaining momentum is the digitalisation of accounting and management methods in ERP systems. However, when it comes to accounts receivable, current modules only show the contract end date and the period for which payment is due. It is important for businesses to estimate the likelihood of payment within a certain period, which will allow them to more accurately carry out their own purchases and make planned expenditures. Therefore, further research into building a payment calendar based on probability theory and accounting support is of particular interest.

2. LITERATURE REVIEW

The issue of strategic management of accounts receivable at the enterprise has been studied by both foreign and domestic scientists. Ansoff (1988) as the founder of strategic management in US enterprises revealed features of strategic management in DuPont Company. Ansoff drew the boundaries of operational, long-term and strategic management, noting that strategic management should be primarily focused on: a) ensuring future activities; b) searching for fundamentally new solutions and goals.

Other studies are represented by the works of Drucker (2007), who developed a balanced scorecard for strategic management using the mathematical and analytical

apparatus. Chen, Peng and Wenting (2018) made a significant contribution to the development of scientific thought on the impact of external factors on strategic planning, the construction of PESTEL analysis.

Among domestic scholars, the study of strategic management is carried out by Seredynska. and Zahorodna (2016), who pay attention to the improvement of strategic management in terms of interaction of separate divisions of the enterprise. Pobihun (2015) studies the application of strategic management at large enterprises of Ukraine. An important place in strategic planning is the use of leading mathematical and statistical tools and methods of classifying the incoming sample of counterparties, in this regard, it is worth noting the work of Savarnapatak (2023), in particular in terms of clustering of debtors. The mathematical apparatus, after establishing the basic algorithms, is usually fixed with software solutions and neural networks are taught to use them correctly, but recent studies by Zheng and Husani (2024) show that AI is prone to errors in problem formulation, which makes the spread of neural networks somewhat limited and increases the risk of unjustified losses. The prospects for the impact of artificial intelligence on the economy and accounting were summarised Georgieva (2024), the head of the IMF, confirming the estimates of scientists about the disappearance of jobs and positions, with their simultaneous replacement by artificial intelligence. This also applies to accounting in terms of information processing, risk assessment, etc. Neural networks and other modifications of ERP and CRM systems are of particular interest to scientists and business, so it is necessary to note the role of research by Agarwal and Gupta (2024), where the main changes and trends in Indian accounting systems were analysed.

However, insufficient attention is paid to strategic accounting of receivables. It is strategic accounting of receivables that will allow to correctly allocate strategic debtors according to strategic costs based on the probability of timely payments, expected contract duration, etc. There is still a need to study the implementation of a new methodology of strategic accounting in ERP systems of enterprises and the construction of dynamic models that will allow accounting specialists to analyse the company's payment calendar faster and better.

3. RESEARCH METHODOLOGY

The object of this study is strategic planning at the enterprise and its implementation in strategic accounting. Identifying the key functions of an enterprise with the help of strategic accounting will allow finding ways to build synergies that should raise productivity to a fundamentally new level. Our goal is to find practical ways to optimise the portfolio of debtors by the level of confidence, taking into account the risks and cost of cooperation and payment delays.

3.1. The place of strategic planning and its accounting support in corporate management.

Scientists generally interpret strategic management as a process of building relationships between the organisation and the environment, in accordance with strategic

goals and mission (Ansoff,1988). In addition, according to Zeplin and Husada (2021), strategic management can be defined as the process of establishing and building functional relationships in an enterprise.

In practice, organisations often function without properly organised strategic management, having instead certain goals, the achievement of which is focused on day-to-day operations. This situation is observed in virtually all small and most medium-sized enterprises. The effectiveness of organisations operating without strategic planning is seen by their managers as the most efficient use of already available resources (Harvard business report, 2021).

To improve the level of organisation of strategic management of enterprises, an important role should be played by the state, stimulating the construction of strategic management and setting goals of sustainable business development. State regulation in the direction of strategic management may be manifested through the requirements for the preparation and submission of specialised reporting system, such as Report on management, which is required to be prepared by large enterprises or those of public interest. Accordingly, strategic management and its accounting - analytical support are mainly formed at large enterprises. Considering the content of strategic management, Ansoff (1988) identifies a system of goals that should be fundamentally new for the enterprise (Figure 1).

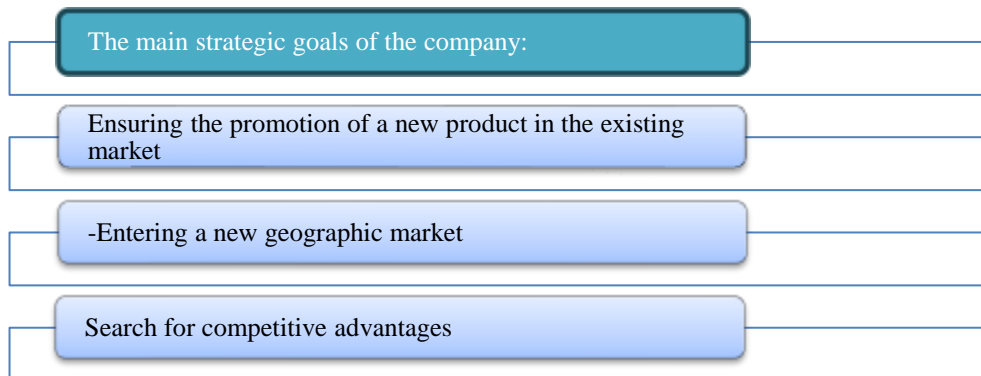


Figure 1 Areas of strategic goals of the enterprise

Each strategic goal should focus on finding new business opportunities, identifying significant competitive advantages, promoting new products on the market, entering new markets (Ansoff, 1988). It would not be appropriate to relate profit to strategic goals, since profit is a quantitative indicator, which not reveal long-term prospects of the business. An example of incorrect attribution of profit to strategic goals is a comparison of advertising costs and research costs, where advertising can fundamentally increase the level of profit in the short term, while research looks like a loss-making item. However, in the long run, it is research that provides a "right of first

refusal" in the competitive struggle, allowing to find alternative and improve existing products.

3.2. Concept and functions of strategic management and strategic accounting at the enterprise.

Strategic management is built on the basis of analysing information about the internal and external "field" of the enterprise. At the same time, the perspective of economic activity can be traced in accounting. Given the high level of information organisation, in particular in the built-in system of accounts and reporting, accounting can be conveniently digitalised and used as a source of important information for strategic management. Therefore, let's distinguish the concept of "strategic accounting" in the system of strategic management, the key task of which is systematisation of accounting information to ensure strategic management and implementation of business goals.

A key prerequisite for effective strategic management is the search for synergies in the decisions made. In fact, synergy reflects confirmation of the hypothesis that the existing dependencies in an enterprise are accumulated into "functional chains". The factor from which we expect a synergistic effect will be called a "variable" in the function. High-quality strategic management should not only identify functional links, but also find a sufficient number of the already mentioned "variables".

Strategic management should be based on the analysis of the most significant functions of and influence them. Recent studies show quite high correlation coefficients⁷⁷ of strategic management with the function of strategic procurement (0.858), operational activity (0.723) and strategic partnership (0.868). Understanding of the importance of the above functions at the enterprise is possible by assessing their mutual influence (Table 1). The pairwise influence between them proves the existence of synergistic effects (Zeplin & Husada, 2021).

Table 1 Mutual influence of individual enterprise functions and strategic management (based on the t-statistic criterion)⁷⁸

No. s/n	Hypothesis of influence between functions	Strategic planning	Strategic purchasing	Strategic partnerships	Operating activities
1	2	3	4	5	6
2	<i>Strategic management</i>	-	17,618	10,313	2,195

⁷⁷ The correlation coefficient can be in the range of [-1;1], the closer to + 1, the stronger the direct relationship.

⁷⁸ This table should be understood by comparing the values with the hypothesis of a "0" impact, i.e. the greater the deviation, the greater the direct or inverse relationship.

3	<i>Strategic purchasing</i>	17,918	-	1,967	2,017
4	<i>Strategic partnerships</i>	10,313	1,967	-	2,436
5	<i>Operating activities</i>	2,195	2,017	2,436	-

The table shows that strategic management directly affects the functions and activities of the enterprise, and since they correlate with each other, we conclude that a change in each of the functions has an impact on the others. For example, a change in strategic purchasing policy will necessarily lead to changes in strategic partnerships. The correct use of these chains leads to positive synergistic effects, which is the basis of strategic management (Ansoff, 1988).

As noted above, profit itself cannot be a strategic goal, but profit is the result of manifestation of many functions of an enterprise, which means that changes in strategic management will affect it. This conclusion is proved by a study by the Harvard Business School, which analysed the relationship between the stage of strategic goal formation and the growth of its revenues over the past three years (Figure 2).

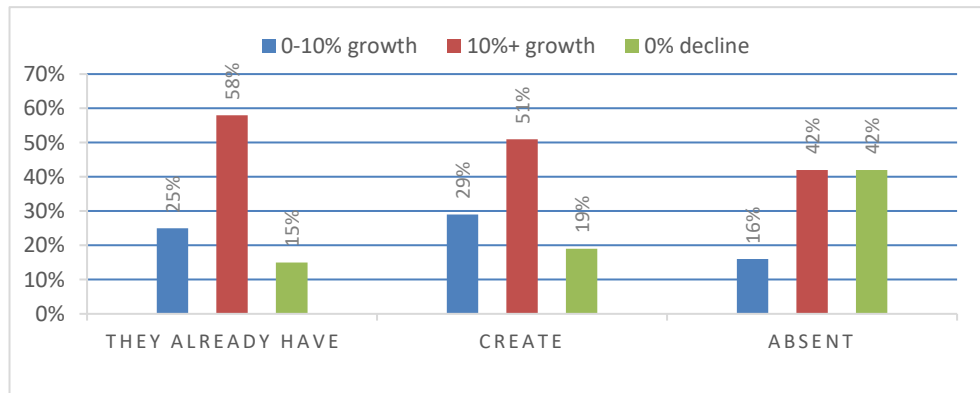


Figure 2. Relationship between profit growth over 3 years among enterprises that: a) already have a strategic goal; b) are at the stage of creating strategic goals; c) that do not have strategic goals.

Based on the results obtained, we can conclude that increasing synergistic effects between functions leads to an overall increase in profits.

Each of the functions of the enterprise under consideration contains variable factors, and they and their impact should be taken into account when setting goals based on strategic accounting data. An important role among these factors is played by accounts receivable, which is involved in numerous relationships at the enterprise.

3.3. Receivables in the system of enterprise management functions.

Settlements between companies are affected by various internal and external factors, including crises, seasonal changes, rational expectations, etc. First of all, it is necessary to determine in what economic and political environment the company and its debtors operate, to identify typical threats and opportunities in cooperation. Scientists recommend using PESTEL- analysis to identify key risks in various fields of activity. For example, consider the pharmaceutical industry of Ukraine in 2024 (Table 2).

Table 2 PESTEL analysis of receivables on the example of the pharmaceutical industry in Ukraine in 2024

No. s/n	Factors.	Impact on receivables	Use to achieve results
1	2	3	4
1	Political	Instability and risks due to military operations may increase payment delays. Changes in regulatory requirements are possible.	The debtor verification policy should include customer reliability checks. Develop flexible contractual terms and conditions, taking into account military risks.
2	Economic	Economic instability, inflation and a decline in the purchasing power of the population affect the solvency of debtors.	Increase in provisions for doubtful debts as stricter lending terms and shorter payment terms are introduced.
3	Social	Increased demand for medical products and equipment due to the humanitarian crisis.	Accounts receivable may increase due to higher sales volumes. Develop special support programmes for key customers and government organisations.
4	Technological	The adoption of new technologies may be slowed by a lack of investment and infrastructure destruction.	Automation of receivables management systems can be postponed. Focus on maintaining existing technologies and optimising current processes.
5	Environmental	Deterioration of the environmental situation due to military operations and destruction of infrastructure.	Increased costs of complying with environmental standards may affect the solvency of debtors. Take additional costs into account when setting contractual terms and provisions for doubtful debts. Certain environmental issues generate greater demand for products, review the policy of providing instalments for this type of product.
6	Legal	Changes in legislation related to martial law and mobilisation.	Adapt contractual terms to comply with new legislation. Regularly update the policy of contracts and verification of debtors in accordance with changes in legislation. Expected changes in the system of imports of competitive goods should affect the provision of instalments for own similar products.

We recommend taking into account possible groups of risks and factors of influence on the state of accounts receivable in the functions of enterprise management and building strategic accounting, as shown in Figure 3

Strategic purchasing	Strategic partnerships	Operating activities
<ul style="list-style-type: none"> - Developing a policy for issuing advances and their permissible limits. - Developing an enterprise policy on financial sustainability; - Developing rules for reinvestment of capital. - Building a calendar of mandatory payments and purchases; - Estimating the level of required revenues from the strategic partnership, including the payment calendar. 	<ul style="list-style-type: none"> - Forming a "portrait" of an alternative consumer and supplier (A0); - Development of an algorithm for assessing confidence in a debtor (CL); - Building a forecast of the possible duration of cooperation in years (Yr) and the number of transactions per year (n); - Establish requirements for long-term instalment plans and enshrine them in the company's policy. 	<ul style="list-style-type: none"> - Development of policies and rules for the sale of goods by instalments and accounting support for such transactions; Regulatory organisation of security measures against unscrupulous debtors; - Estimation of normal accounting ($\sum AccSup$) and other expenses ($\sum OverC$) for "debtor support". - Building a payment incentive policy

Figure 3 Procedures for optimising strategic accounting and management of receivables of the enterprise

With a sufficient number of factors affecting intercompany settlements, we can analyse the impact of receivables on each of the management functions considered.

3.3.1. Operating activities

The function of operating activities at the enterprise in the context of accounts receivable is manifested in the construction of document flow at the enterprise, accounting policy, methods of cooperation with counterparties, formation of working time standards for interaction with counterparties.

In order to assess the impact of a potential debtor (A_x) on operating activities, we will introduce the concept of "alternative debtor (A_0)". A_0 is a conditional debtor, cooperation with which is available, typical, and accordingly its indicators are taken as the basic.

First of all, receivables affect operating activities through their support costs ($\sum AccSup$) and additional costs that may arise from overdue/non-payment of debts ($\sum OverC$), adding these indicators we get the total operating expenses per debtor ($OpAx$). In strategic accounting, these functions are calculated by using information from accounting references, the balance of administrative expenses accounts and calculations within management accounting, in particular, in terms of transferring costs to a particular debtor.

$$OpAx = \sum AccSup + \sum OverC \quad (1)$$

Where: OpAx - the amount of the debtor's operating expenses;

$\sum \text{AccSup}$ is the projected amount of total expenses for support of receivables

Ah;

$\sum \text{OverC}$ is the estimated amount of costs required to maintain the receivable and a particular debtor, taking into account difficulties in dealing with them. Examples include the cost of reminders, possible lawsuits, the cost of capital to cover the deficit that arises in the event of payment delays, etc.

The formula for operating expenses will be more informative for decision-making if it is compared with A0. We propose a comparative formula for the two debtors, noting that it is worth considering the different contractual terms and their frequency during Yr years as the period for which we can make a forecast.

$$\text{ResO} = \text{OpA0} - \text{OpAx} \quad (2)$$

Where: **ResO** - Resulting operating expenses compared to A0 for the same contract period⁷⁹;

OpA0 - operating expenses A0;

A positive value of ResO indicates an operating cost premium, and a negative value indicates a comparative operating loss under alternative A0⁸⁰.

The operating cost function is not a stand-alone indicator for deciding whether to cooperate, as it is important to consider long-term profits. Profit may cover potential losses, or vice versa, the operating premium may not cover the costs incurred. Therefore, for further analysis, it is necessary to explore other functions of, including strategic partnerships.

3.3.2. *Strategic partnership.*

Accounts receivable is one of the key indicators in terms of strategic partnership. The risks presented in Table 1 make it possible to assess the impact of receivables on the strategic partnership. In this function, the benefit or loss can be analysed by comparing it with A0 and taking into account the operating performance indicators (ResO).

Before the above formula, we note that the strategic partnership indicator should take into account *the acceptable risk of providing goods by instalments*. We recommend to determine the permissible risk based on the current accounting policy of the enterprise using the formula "1 - doubtfulness factor. For example, if the average doubt factor is

⁷⁹ ResO indicates the comfort of cooperation, is subjective, and is actually influenced by $\sum \text{OverC}$. If the latter is higher than A0, then ResO will be negative, which will further affect the strategic partnership rating. For most debtors, this indicator will not differ from A0.

⁸⁰ The accounting and management staff should independently determine the mechanism for calculating $\sum \text{AccSup}$ and $\sum \text{OverC}$, taking into account the specifics of the business model and production.

0.05, the basic confidence indicator (BC)⁸¹ will be calculated as $1 - 0.05 = 0.95$. The basic indicator in the accounting system can be amended based on rational expectations.

The underlying confidence level may vary depending on the industry, geographic location, legal environment, etc.⁸². In the course of cooperation with most debtors, the company has expectations of a probability of debt repayment close to 100%, but this probability applies only to events that have already occurred. Therefore, we recommend management accountants to reduce this indicator based on the principle of prudence and taking into account the possibility of delay. In our example, 0.95 is an average figure used for comparison with the level of confidence of the debtor in question (CL_{Ax} ⁸³). If the debtor has a successful payment history and favourable economic and political conditions in the country, its confidence score will be higher.

When analysing strategic partnerships, we propose to introduce the concept of "net cooperation premium ($SP.Ax$)⁸⁴", which will give a numerical expression to the benefits of strategic partnerships (compared to alternative A0).

$$SP.Ax = (AR_{Ax} * (CL_{Ax} - 0.95) + ResO) * n_{Ax} * Yr_{Ax} - AR_{A0} * (CL_{A0} - 0.95) * n_{A0} * Yr_{A0} \quad (3)$$

Where: **SP.Ax** - Award for strategic cooperation with Ah

AR_{Ax} - average profit from one transaction with Ah (after deducting cost);

CL_{Ax} - confidence factor in the debtor Ah. Includes an assessment of the propensity for delinquency, the economic and legal framework of the transaction with him; other risks. Characterises the security of cooperation;

n_{Ax} - the projected number of transactions during the year;

Yr_{Ax} - the projected number of years of cooperation;

0.95 - BC (Basic Confidence), established by the authors, based on the assumption that the provision for doubtful debts at the enterprise reaches 5%.

The formula is designed to identify counterparties with whom cooperation is predictable, confident and comfortable, with less payment delays. In fact, the most significant factor in it is CL_{Ax} - is the level of confidence in the debtor (inverse to the riskiness of the debtor). It is calculated individually for each debtor, taking into account various indicators, including past cooperation experience, the level of stability of the political, legal and economic environment, ROI, PESTEL analysis results and other risks (see Table 2). Negative $SP.Ax$ values indicate a lower strategic partnership premium for debtor Ah compared to A0, and a positive value indicates the opposite - a higher one. A negative score does not mean that cooperation with the debtor should be ruled out, but

⁸¹ BC - Basic Confidence.

⁸² It is formed by the accounting department of the enterprise independently on the basis of the theory of rational expectations and differs among enterprises in different economic and political times.

⁸³ CLAx - Confidence Lever of Ax.

⁸⁴ Strategic Partnership.

rather indicates the terms and priority of instalments in a limited supply environment. If a negative indicator, the management accountant should investigate and, if possible, take measures to eliminate the risks that caused the negative.

Here is an example of evaluating a strategic partnership in a group of debtors.

Table 3. Example of SP_{ax} calculation

N _o	Debtor	AR	CL	n	Yr	Σ AccSup	Σ OverC	OP(ax)	ResO	SPax
1	1	2	3	4	5	6	7	8	9	10
2	Ent_A0	1000	0,96	4	2	12	15	135	0	0
3	Ent_A1	1200	0,97	5	3	12	30	150	-15	55
4	Ent_A2	100	0,99	6	3	12	10	130	5	82
5	Ent_A3	10000	0,92	2	1	10	50	170	-35	-750
9	Ent_A4	500	0,75	4	2	12	90	210	-75	-1480
6	Ent_A5	50000	0,95	2	1	12	80	200	-65	-210

Analysing the indicators of Table 2, we see that debtor Ent_A4 has the lowest SPax, which indicates a lower premium of strategic partnership, which, although it has a large amount of debt, is not able to ensure stable fulfilment of obligations. This does not mean that we should refuse to grant it instalments, but rather that when agreeing to cooperate with it, we should simultaneously have strategic partners to the extent that will ensure financial independence and stability of the enterprise. The justification for this position can be found in the world practice of entrepreneurship, in particular in the court case of British Airways (BA) v. Laker Airways (LA), when a very important debtor of BA used the delay in payments to the creditor LA for the purpose of competition, namely, reducing its financial stability, which eventually led to the bankruptcy of Laker, due to the inability to make its own payments (Law Reports, 1987). The selection of a sufficient number of⁸⁵ strategic partners allows to obtain financial stability, which, in turn, reduces the risk of working with the following debtors.

⁸⁵ A sufficient number is considered by the authors to be such that the proceeds from which give confidence in the implementation of strategic purchasing.

The debtor Ent_A2 (see Table 2) has the highest SP_{Ax} , so the safety and benefits of cooperation with him allow us to recommend providing him with instalments first, despite the smaller amount of debt. It should be noted that this debtor has a slightly higher OverC than Ent_A0, so there are certain peculiarities and additional costs of cooperation with him, but the level of CL allows them to be levelled.

3.3.3. *Strategic purchasing.*

We define the concept of "strategic purchasing" as the amount of mandatory payments approved in accordance with the strategic development plan of the enterprise. According to Ansoff (1988), these are purchasing that meet the goals described in Figure 1. The company should plan its finances and accounting policies in such a way as to meet these payments, as they ensure the survival of the economic entity in the long term. We do not deny the importance of operational (such as salary payments, payments under supply contracts) or tax payments, but rather emphasise the need for long-term planning of resource flows to ensure timely payments.

Timeliness of operational payments, in our opinion, should be a strategic goal of the company, as it forms the reputation of the business entity. Here, it is worth considering a typical indicator - accounts payable (AP) to accounts receivable (R) ratio which is calculated as $\frac{\sum AP^{86}}{\sum R}$ because it can be misinterpreted. At first glance, the mathematical desire to increase accounts payable seems to make assets more liquid and the company more plateau capable. At the same time, delays in payments to creditors, in particular, employees and suppliers, reduce the company's CL, which affects the rating of strategic partnership, according to our calculation formula (3). Accordingly, accounts payable obligations should be fulfilled as timely as possible, and possible delays should be anticipated and incorporated into the payment calendar and, if necessary, a sufficient reserve should be formed for further timely payments.

Delaying own payments in the event of delays by debtors is only appropriate in times of extreme economic and political changes, such as financial crises, political crises, geopolitical crises, etc., when payment delays become a normal reaction to negative expectations, and the prudence principle forces businesses to expand security measures to continue operating in the future. Rational expectations, according to surveys by the Centre for Economic Strategies, had a direct impact on payments and business activity (Samoiliuk, 2024). For example, in the period before the full-scale invasion of Ukraine, and six months later, the index of business activity expectations reached 32 and 43, respectively, and as of the beginning of the war, it was approaching 10, with similar indicators in 2021 at 53. In such circumstances, it is advisable to reconsider the terms of payment to suppliers and ensure the survival of the enterprise.

⁸⁶ Accounts payable - accounts payable; accounts receivable - accounts receivable.

3.4. Calendar of payments

Returning to the importance of creating a calendar of calculations, we note that this idea was implemented in BAS ERP, but only in numerical form without building graphical images and without taking into account possible delays.

In our opinion, there is a need to create a graphical interpretation of the calendar of payments, which will allow to visually understand the dynamics and expectations of payments, the place of strategic partnerships and strategic purchasing in the structure of revenues and expenses, and on this basis, the company will be able to more accurately assess the need to create reserves and their amounts.

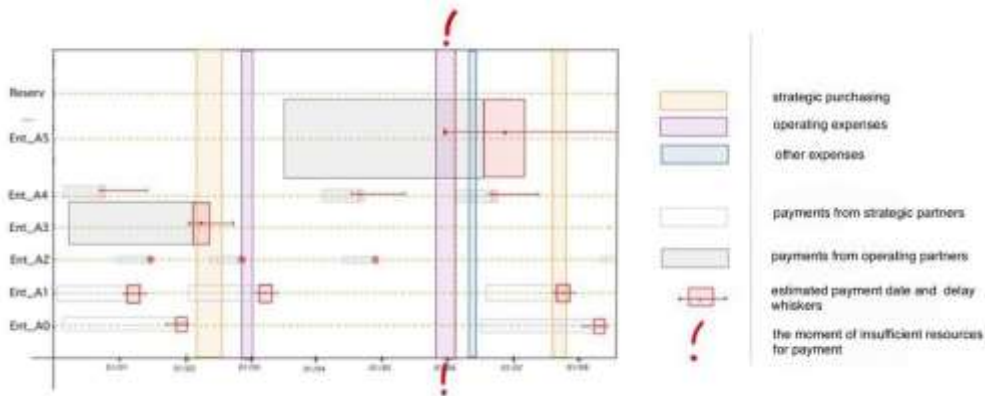


Figure 4 Building a dynamic payment calendar with the selection of strategic partners and strategic procurement

In our proposed payment calendar, the abscissa axis represents the period, and the ordinate axis represents the name of the debtor. Strategic debtors should be marked next to each other, and their accounting should be kept on separate analytical accounts. From Figure 4, it is clear that the debtors' rectangles have different heights (h_{Ax}^{87}), which should be proportional to the amount of debt, and different widths (w_{Ax}^{88}) of the debtors' rectangles indicate different instalment periods. The width of the vertical columns (W_E) is proportional to the amount of expenses as of the date.

The red rectangles (at the end of each debtor) are based on the normal distribution of payment dates, highlighting the period during which is expected to make 95% of payments ("Box and whisker plot") (Suvarnapathak, 2023), which forms 's rational expectations of the date of compensation (Figure 5).

⁸⁷ h_{Ax} - height of the debtor rectangle Ax

⁸⁸ w_{Ax} - width of the debtor rectangle Ax

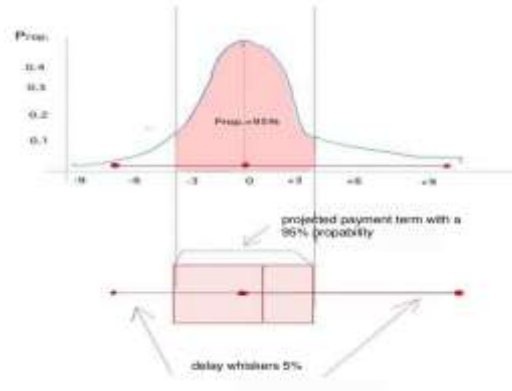


Figure 5. The principle of constructing the "Box and whisker plot" to analyse the date of receipt of the debtor's payment *Ent_Ax*;

A management accountant can analyse whether there is enough revenue to cover planned expenses on a certain date by taking into account projected revenue and reserves for the same date. The estimated period of receipts should be expected where the red rectangle ends, and the length of the whisker indicates the period of delay in payment (with a probability of 2.5%). In order to graphically assess whether there will be enough funds from the proceeds to make further purchases, you need to compare the sum of the heights of the receivables rectangles ($\sum h_{Ax}$) with the sum of the widths of the expense columns ($\sum w_e$) (Figure 6). If these amounts are not enough, the dynamic calendar will display a warning⁸⁹.

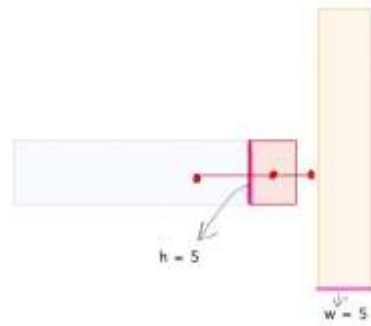


Figure 6 Analysis of receivables sufficiency (blue rectangle) to cover expenses (yellow rectangle)

Expenses for a certain period are not only using revenue for the same period, but also at the expense of the balance on accounts with banks and other reserves. In order

⁸⁹ For example, according to Figure 4, as of 01.06.

for the dynamic calendar to take such reserves into account, the above-mentioned reserves should be added to the algorithm.

The idea of a dynamic payment calendar should be implemented by developing and adding a software module based on ARI⁹⁰ to the ERP system at the enterprise. The development of such a module, in our opinion, is of interest for further research.

4. CONCLUSION

The principles of accounting guide companies to be prudent and to give precedence to substance over form, expect continuous operation. Strategic management of accounts receivable should both stimulate the realisation of the company's goals and mission and ensure that the company has a long-term advantage over the risks, including late payment, manipulation of accounts receivable, reduced liquidity of assets, etc. Strategic management uses accounting information as the main source of data. Therefore, it is advisable to distinguish the concept of "strategic accounting", the key task of which is to organise the accounting process at the enterprise in such a way as to provide the most relevant information to the management for the implementation of strategic goals. With the help of strategic accounting, the company has the opportunity to analyse income, expenses, and resource flows in accordance with the approved goals of the company, and to assess possible risks and benefits in a shorter time.

For each of the enterprise's goals, it is necessary to build functional links and quantify the factors in them. The presence of several basic functions in the activities of the enterprise, in particular, operations, strategic partnerships and strategic procurement, makes them interdependent. Using a sufficient number of factors, we can anticipate and assess the risks of non-payment by debtors and use them to assess the impact on each function.

The formula we developed for calculating the strategic cooperation premium (SP_{AX}) allows to compare the benefits of strategic partnerships and improves the accuracy of strategic purchasing planning.

To obtain comprehensive information about strategic partners, we recommend using strategic accounting and introducing separate analytical accounts of receivables, which will allow you to better assess the financial stability of the company and plan strategic purchases.

We propose to build a new, dynamic calendar of payments, which, with its clarity, mathematical and statistical apparatus, allows management accountants to identify risks of overdue liabilities, and analyse receipts from debtors more accurately (by specifying the confidence factor) for each specific date.

Further research should focus on optimising the CL⁹¹ of a debtor, which is key in assessing its riskiness. With simple, elastic ways to calculate it, including industry-

⁹⁰ Application Programming Interface

⁹¹ Confidence Level

specific features and PESTEL analysis factors, a company will be able to choose strategic partners more accurately and safely, and use the postpaid tool more predictably.

Special attention should also be paid to the prospects of implementing a software module for the settlement calendar in the ERP- system of the enterprise, which will make the analysis of receivables more visual and allow taking into account the timing of estimated payment delays.

REFERENCES

Ansoff I., McDonnell E. (1988). *The New Corporate Strategy*: book, New York: Willey / URL: <https://archive.org/details/newcorporatestra00anso>

Seredynska V., Zahorodna O. (2016.), Directions for improving strategic management at the enterprise. *Economy and society*. Mukachevo State University. №3., 276 - 282.

Pobihun S. (2015) Analysis of approaches to the implementation of the strategic management process. *Galician Economic Herald*,. № 1. v.48. 101-108.

British Airways Board v. Laker Airways Ltd. and Another. (1987), *International Law Reports*, Vol. 74 ,36-88. DOI: <https://doi.org/10.1017/CBO9781316152027.005>

On the results of a continuous inventory of receivables: CMU Resolution No. 750 of 29.04.1999 (accessed 01.05.2024) URL: <https://zakon.rada.gov.ua/laws/show/750-99-%D0%BF#Text>

Georgieva K. (2024). AI holds risks, 'tremendous opportunity' for world economy. // *Taipei Times*. URL: <https://www.taipeitimes.com/News/biz/archives/2024/01/16/2003812143>

On Accounting and Financial Reporting in Ukraine: Law of Ukraine dated 21.07.2021 No. 996-XIV: as of 10.08.2022: <https://zakon.rada.gov.ua/laws/show/996-14#Text> (Accessed 13.06.2024).

Drucker P. (2007) *Management Challenges for the 21st Century*, 1st edition London. URL: <https://doi.org/10.4324/9780080942384>

On Approval of the Methodological Recommendations for Preparation of the Management Report, Order of the Ministry of Finance of Ukraine No. 982, dated 07.12.2018. URL: <https://zakon.rada.gov.ua/rada/show/v0982201-18#Text>.

Jameson L., Hayes, Steven H., Haseon P. (2022). Corporate social responsibility & the advertising strategic planning process: a literature review & research agenda. *International Journal of Advertising*, 41(2), 210-232, DOI: 10.1080/02650487.2022.2038432

The business case for purpose (2021). Harvard business review analytical services report; URL: https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/digital/ey-the-business-case-for-purpose.pdf

Zeplin J. Husada T. and Hotlan S. (2021). The effects of strategic planning, purchasing strategy and strategic partnership on operational performance. // Uncertain Supply Chain Management. Indonesia, no. 9. 363- 372 URL: https://www.researchgate.net/publication/350615039_The_effects_of_strategic_planning_purchasing_strategy_and_strategic_partnership_on_operational_performance

Wei Pan, Le Chen, Wenting Zhan (2018). PESTEL Analysis of Construction Productivity Enhancement Strategies: A Case Study of Three Economies Journal of Management in Engineering Volume 35, Issue 1, 61- 92 [https://doi.org/10.1061/\(ASCE\)ME.1943-5479.0000662](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000662)

Study on "Going Global" of Daoming Bamboo Weaving Based on PESTEL Model: Taking Ding Zhizhu Studio as an Example, Journal of Education and Educational Research. 2024. № 7(3). 298-304. DOI: 10.54097/razk6992

Saadat I., Forouzanfar M. (2024), Error Correction and Adaptation in Conversational AI: A Review of Techniques and Applications in Chatbots AI № 5(2). 803-841, DOI: 10.3390/ai5020041

Agarwal P., Gupta A. (2024), Harnessing the Power of Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) Systems for Sustainable Business Practices. International Journal of Computer Trends and Technology. № 72(4). 102-110 DOI: 10.14445/22312803/IJCTT-V72I4P113

Renu G. (2023), The Influence of Technology on Accounting Practices in India: A Survey of Accounting Software Utilisation by Micro Enterprises in Delhi, European Journal of Theoretical and Applied Sciences. No. 1 (6) 041 - 1052. DOI: 10.59324/ejtas.2023.1(6).101

Zeng A., Houssami N., and others (2024). "Frequency and characteristics of errors by artificial intelligence (AI) in reading screening mammography: a systematic review.", Breast Cancer Research and Treatment, DOI: 10.1007/s10549-024-07353-3

National Accounting Regulation (Standard) 10 "Accounts Receivable", version of 03.11.2020 URL: [https://zakon.rada.gov.ua/laws/show/z0725-99#Text](https://zakon.rada.gov.ua/laws/show/z0725-99#Textzakon.rada.gov.ua/laws/show/z0725-99#Text) (Accessed 05.06.24).

Samoiliuk M. (2024) Tracker of Ukraine's economy during the war, Centre for Economic Strategies; URL: [https://ces.org.ua/tracker-economy-during-the-war/](https://ces.org.ua/tracker-economy-during-the-war/ces.org.ua/tracker-economy-during-the-war/)

Suvarnapathak S. (2023) Data Visualisation for Analysing Macroeconomic Indicators, Journal of Statistics Applications & Probability Letters, Department of Statistics, Ramnarain Ruia Autonomous College, Mumbai, India URL: https://www.researchgate.net/profile/Sujata-Suvarnapathaki/publication/372952862_Data_Visualization_for_Analyzing_Macroeconomic_Indicators/links/64d0cbf3d394182ab3b0684d/Data-Visualization-for-Analyzing-Macroeconomic-Indicators.pdf

Abstractness versus Concreteness of economic terms in the perceptions of Bosnians and Herzegovinians, Bulgarians and Croatsians - an empirical study

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Abstract

Introduction: This study represents a primary quantitative research study comprising students' and non-students' (general) population from three South-Eastern European (Balkan) region countries (e.g. Bulgaria, Croatia and Bosnia and Herzegovina).

Aim: The study researches the Abstraction versus Concreteness levels of multitude of economic, managerial, financial and philosophical terms. The word list consists of 24 words, listed in the random order. Some of the words are taken from Kent-Rosanoff and Gerganov thesauri; the rest is of interest for the perception of economic notions.

Method: As far as instrumentation is concerned, a self-developed quantitative research instrument was created and tested for reliability and validity, by utilizing 7 level Likert's scale. Data collection was conducted in a cross-sectional time manner in different languages, in the Autumn-Winter 2017 timeframe, with the help of Google (online) and hard-copy forms comprising the aggregate sample size of 2,711 respondents. Convenience, snowball and purposive sampling approaches were utilized.

Findings: Substantial differences exist between the countries and the different groups studied. We interpret the results as an existing lack of understanding about the basics of market economy in the countries in question.

Conclusion: Substantial dissimilarities in the perceptions about abstractness of key economic terms, and this result leads us to conclude that views about the economy differ among the three studied countries, as well as between the general public and the college/University students.

Originality and value: Our research brings an additional facet to the expanding literature of goal pursuits and of objectives of the economic agents. We surmise the people in the region to be less inclined to group actions, which are needed to achieve good economic results.

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Key Words: Abstractness, Concreteness, Economic, Financial, Philosophical, Terms, Empirical, Study, Bulgaria (BG), Bosnia and Herzegovina (BiH), Croatia (HR).

Jel Codes: D91, L10, O10, O57, P20, P52

1. INTRODUCTION

In the last almost three decades in many of the former socialist countries in Europe there were attempts to move the economy towards a free market basis. But despite the fact that, in the early 2000s, the European Commission recognized many of the East European economies as "functioning market economies" the economic problems in the region still exist stemming from the poorly functioning market principles. In order for a free market to function, of great importance are also the economic agents' common views and beliefs. In our study we make an attempt to disguise some of the beliefs of the general public juxtaposed to these of students, from three countries: Bulgaria (BG), Croatia (HR) and Bosnia and Herzegovina (BiH). We utilized the perception of abstractness / concreteness as a quantitative primary research instrument for assessment.

The goal of our study is to explore the terms structure of multitude of economy related words. We hope to shed some light on the degree of the existing "training" of the general public for a life in a "free market economy". The rest of the paper is organized, as follows: section two represents the literary review, section three presents the methodology and utilized data, section four is focused on the results and discussion, and the last section represents the conclusion section.

2. LITERATURE REVIEW

"Abstractness-concreteness" is regarded as a key dimension of language. Abstract words are usually conceived as structured sets of inferential knowledge expressed linguistically, and therefore they would be better described as theoretical terms ((for details see Dellantonio and Pastore, 2017), who further differentiate between 'abstract' and 'general')). In our study, we identify a definition of 'abstract', as contrasted with 'concrete'.

In the seminal Paivio, Yuille and Madigan's (1968) imaginability study of English language, words referring to concepts were defined as "abstract", whereas nouns referring to objects were depicted as "concrete". A large extension to the basic concepts was the Rumelhart, Lindsay and Norman's (1972) network model of semantic memory, considered as the most important publication in the scientific field.

Abstractness-concreteness has been examined for many decades, by a seminal paper from Paivio et al. (1968), who define concreteness in terms of directness of reference to sense experience, and rate it on 7-points' scales, obtaining mean scale values for 925 nouns in the English language. This is an extension of the ideas in previous research by Paivio (1966), where differences in reactions to abstract/concrete terms are found. Winnick and Kressel (1965) explore recognition thresholds as a function of abstractness-concreteness.

Recent studies (Zhang et al. 2014, Yao et al. 2018) emphasize that concrete words are easier to process in comparison to the abstract words and link it to the emotional effects. Della Rosa et al. (2010) find that "mode of acquisition" (abb. MoA, represents the way in which concepts are acquired) of a concept is an independent predictor of concreteness or abstractness.

As Simms (2008) emphasizes, establishing the validity of measures of psychological constructs represents a big challenge. Constructs have to be embedded in predicted relations. In their seminal paper on construct validity, Cronbach and Meehl (1955) argue that there are no clear, observable criteria to serve as gold standards for the constructs.

In modern research, abstractness and concreteness of words are not regarded as a dichotomy, but rather as a measurable parameter (Gerganov, 1987). There are also many scaled values of words for various languages (ibid.). Similar to abstractness experiments are word association experiments.

After the seminal mass experiment of Kent and Rosanoff (1910), multiple association experiments and the resulting word association norms are published, including those for particular Eastern European countries. Very popular are the Russell and Jenkins's (1954) word association norms, established within the so-called "The Complete Minnesota Norms". In the 1960s and 1970s the word association norms' experiments were vastly spread across the former Soviet Union, in addition to some countries from the former Soviet Union's region.

In the beginning of the 1980s, Gerganov (1984) makes a similar experiment for Bulgaria, with 200 stimuli words, of which 100 coincide with the original Kent-Rosanoff words. Gerganov (1984), additionally shows that more associable words are perceived as more abstract serving as keywords, representing central points in the semantic memory map.

Similar results have continuously been obtained in the last decades (see De Angellis et al., 2017, Dellantonio and Pastore, 2017, Iliev and Axelrod, 2017, inter alia). The hierarchical structure of the terms depends of the background studies of people. Specialists and non-specialists build different structures of terms in their semantic memory (for details see Gerganov, 1984).

3. RESEARCH METHODOLOGY

Do people classify economic terms differently? We explore only a small subset from the complete vocabulary, due to limitations of the time and effort of our respondents. Our word-list consists of 24 words, listed in the random order - see Table 1, below. Some of the words are taken from Kent-Rosanoff and Gerganov lists, the rest are of interest to the perception of economics and market economy basics. To assess the "associability" of the terms, we checked the definitions of the terms in two popular dictionaries - "Collins Dictionary" and "Oxford Dictionary of English". The definitions are consistent - there are no reversals in the definitions - the number of definitions in "Collins" is either

greater or equal to the one of "Oxford". Terms with more semantic links are perceived as more abstract, and vice versa.

Table 1. Word-list of 24 terms used, in English, Bulgarian, Croatian and Bosnian

Word Nr.	Word
1	loan
2	money
3	salary
4	bank
5	economy
6	budget
7	Europe
8	truth
9	balance
10	credit
11	accountant
12	taxes
13	payment
14	road
15	bill
16	politics
17	justice
18	debit
19	lie
20	revenue
21	asset
22	liability
23	accounting
24	expenditure

(Source: authors' own calculations).

In our case, we have two groups of words: "loan", "money", "bank", "economy", "truth", "balance", "credit", "bill", "justice", "lie" expected to be more abstract, and the

rest - "salary", "budget", "Europe", "accountant", "tax", "payment", "road", "politics", "debit", "revenue", "asset", "liability", "accounting", and "expenditure" – as being more concrete.

All the calculations were made with “R” software (R Core Team, 2018), while specific tests and cluster analysis were performed according to guidelines in Davison (1983) and Cohen and Lea (2004).

Respondents

We explored two types of respondents – college/University “students” and the “general public”, because we sought to explore the perceptions of the younger generation, separately. Results were collected firstly through a Google web-form and secondly with paper-based forms, in different languages, in the Spring and Autumn-Winter timeframe of 2017.

Besides the scores for the terms themselves, we collected descriptive statistics metrics on sex, age, place, education and type of education.

Our respondents were asked to assess the 24 terms with a 7-degree Likert's scale, with "1" corresponding to "very concrete" and "7" corresponding to "very abstract".

3.1. Bulgarian (BG) sample

Students’ and general (non-students’) population in Bulgaria was surveyed from the cities of Varna, Burgas, Shumen, Dobrich and others. Data collection was conducted in a cross-sectional time manner, in the Spring, 2017, timeframe. A total of 1,836 participants were collected (e.g. 926 from non-students’ and 910 from students’ population). Convenience, snowball and purposive sampling approaches were utilized. Data collection was performed in an online (Google Forms) manner.

For Bulgaria, additional information about the type of respondents' education was collected.

3.2 Croatian (HR) sample

Students’ and general (non-students’) population in Republic of Croatia (HR) was surveyed from the cities of Zagreb, Osijek, Varaždin, Rijeka and Split. Data collection was conducted in a cross-sectional manner, in the Autumn-Winter 2017, timeframe. A total of 439 participants were collected (i.e. 229 from non-students’ and 210 from students’ population). Convenience, snowball and purposive sampling approaches were utilized. Data collection was conducted in an online (Google Forms) and paper (hard copy) manner.

3.3 Bosnian-Herzegovinian (BiH) sample

Students’ and general (non-students’) population in Bosnia and Herzegovina was surveyed from the cities of Sarajevo, Zenica, Tuzla, Mostar, Kiseljak, Vitez, Travnik

and Banja Luka. Data collection was conducted in a cross-sectional time manner, in the Autumn-Winter 2017 time-frame. A total of 436 participants were collected (i.e. 226 from non-students' and 210 from students' population). Convenience, snowball and purposive sampling approaches were utilized. Data collection was performed in an online (Google Forms) and hard-copy manner.

3.4 Results and discussion

Our respondents happen to score terms differently in the majority of cases, which fits well with the theoretical framework. Tests for impact of other variables (i.e. age, sex, place, level of education) have been measured to be at the statistically non-significant level, so we observe consistency of the views within the studied groups.

Ranges of scores among different studied groups are also very similar.

In order to account for differences among individual perceptions, before the calculations, we also normalize the abstractness / concreteness assessments by subtracting the mean per each respondent and dividing by the individual range of scores, per respondent. Further, we proceed with the deviations from the mean value for each respective respondent.

In general, the terms are scored by the respondents as more concrete than it could be expected, with few exceptions, see Table 2, below:

Table 2. Raw scores (1 = very concrete, 7 = very abstract) and adjusted scores (0-1) in different samples. ("g" is for the "general public", "s" for "students").

	BiHg	BiHs	BGg	BGs	HRg	HRs	BiHg	BiHs	BGg	BGs	HRg	HRs
loan	2.88	2.88	3.23	3.06	2.99	3.55	0.35	0.39	0.42	0.38	0.33	0.43
money	2.24	2.05	2.99	2.96	2.11	2.40	0.21	0.19	0.37	0.35	0.18	0.23
salary	2.38	2.40	2.73	2.56	2.05	2.35	0.25	0.29	0.31	0.27	0.18	0.23
bank	2.59	2.29	3.07	2.81	2.90	3.24	0.30	0.26	0.39	0.32	0.32	0.37
economy	3.34	2.90	3.56	3.86	3.20	3.50	0.45	0.39	0.49	0.54	0.37	0.42
budget	2.77	2.71	3.13	2.97	2.70	3.31	0.33	0.34	0.40	0.36	0.28	0.39
Europe	3.18	2.62	3.26	3.33	2.82	3.03	0.41	0.33	0.42	0.42	0.30	0.34
truth	2.97	3.01	3.31	3.41	2.98	2.79	0.36	0.43	0.43	0.43	0.33	0.30
balance	3.50	3.07	3.30	3.23	3.27	3.59	0.49	0.44	0.44	0.43	0.38	0.43
credit	2.96	2.93	3.29	3.30	2.89	3.33	0.35	0.39	0.43	0.43	0.32	0.39

accountant	3.00	2.33	2.95	2.57	3.37	3.77	0.38	0.26	0.36	0.29	0.40	0.46
taxes	3.34	2.96	3.10	3.28	3.16	3.83	0.44	0.40	0.39	0.42	0.36	0.47
payment	2.59	2.40	3.07	2.97	2.63	3.17	0.28	0.28	0.39	0.36	0.27	0.36
road	2.40	3.14	3.67	4.01	2.75	2.92	0.27	0.45	0.50	0.56	0.29	0.32
bill	2.68	2.34	3.15	3.25	2.69	3.09	0.32	0.27	0.40	0.42	0.28	0.35
politics	4.55	3.72	4.07	4.61	4.68	4.49	0.70	0.55	0.59	0.69	0.61	0.58
justice	3.46	3.27	3.51	3.91	3.44	3.26	0.49	0.49	0.48	0.54	0.41	0.38
debit	3.07	2.86	3.27	3.17	2.82	3.55	0.39	0.38	0.43	0.41	0.30	0.42
lie	3.49	3.36	3.72	3.88	3.02	3.72	0.45	0.49	0.52	0.54	0.34	0.45
revenue	2.59	2.08	2.95	2.89	2.33	2.56	0.29	0.22	0.36	0.35	0.22	0.26
asset	2.43	2.17	3.22	2.92	2.04	2.56	0.26	0.22	0.42	0.35	0.17	0.26
liability	2.54	2.81	3.48	3.25	2.88	3.15	0.29	0.36	0.48	0.43	0.31	0.36
accounting	3.47	2.39	3.15	3.00	3.32	3.75	0.49	0.29	0.41	0.37	0.39	0.46
expenditure	2.79	2.78	3.18	3.17	2.58	3.34	0.32	0.36	0.41	0.40	0.26	0.39

(Source: Author's own calculations)

Many of the examined terms lead to different score values in respondents from different countries. Perceptions of economic terms differ among countries and are not in line with the expected "common sense" values, which are needed for the smooth run of the economy. Appealingly politics plays a major role in Bosnia and Herzegovina; the general public there rates it as highly abstract.

Post hoc tests (Tukey Honest Significant Differences, p-values, below, 0.05) for Bosnia and Herzegovina and for Croatia reveal that the existing differences are the highest between the respondents with highest and lowest grade of education (i.e. Ph.D./Master's degree vs. primary school). For Bulgaria the difference is less fragrant (p-value of 0.08).

Before continuing with ANOVA, we checked for homogeneity of variances among types of respondents.

Results from Levene's (1960) test (on the metrics variables) for the 24 terms do not reject the null hypothesis of homogeneity of variances. Variances are practically identical, with very few exceptions. One of them, the word "road", has a possible explanation in the fact that for more than 10 years building of roads has been at the top of governments' agendas, and the public appealingly perceives "road" as having also

important financial aspects, in being very important for the budget, and as a source for investments.

Given the big number of observations, it is plausible to accept normality of data, and to additionally apply the Bartlett's (1937) test to check for equality of variances and from these tests the demographic statistics items (i.e. on sex, age, place, education and type of education). The Bartlett's test has similar results (data for both types of tests are available from the authors per request).

ANOVA tests reveal the existing differences between respondents with different type of education, (i.e. p-value 0.004, $F(3,2208) = 4.389$), which fits well within the theory - (i.e. economists are expected to better distinguish between the terms in comparison to the general population). ANOVA tests for other variants showed non-significant correlation at the conventional 0.05 level, see Table 3., below:

Table 3 ANOVA on level of education ("g" is for the "general public", "s" for "students").

term	BiHg	BiHs	BGg	BGs	HRg	HRs
loan	0.47	0.21	0.12	0.57	0.21	0.10
money	0.16	0.09	0.23	0.29	0.55	0.07
salary	0.13	0.25	0.04	0.96	0.84	0.01
bank	0.13	0.92	0.36	0.48	0.21	0.08
economy	0.66	0.92	0.61	0.20	0.93	0.21
budget	0.86	0.34	0.05	0.41	0.01	0.00
Europe	0.35	0.54	0.27	0.48	0.41	0.02
truth	0.20	0.18	0.13	0.74	0.37	0.03
balance	0.51	0.37	0.04	0.11	0.25	0.03
credit	0.03	0.48	0.04	0.03	0.00	0.02
accountant	0.27	0.54	0.00	0.61	0.00	0.81
taxes	0.03	0.76	0.01	0.45	0.22	0.05
payment	0.71	0.84	0.00	0.55	0.08	0.02
road	0.00	0.50	0.31	0.16	0.35	0.02
bill	0.64	0.78	0.03	0.05	0.08	0.07
politics	0.77	0.00	0.06	0.04	0.03	0.64

justice	0.68	0.16	0.80	0.54	0.25	0.00
debit	0.83	0.30	0.67	0.60	0.09	0.06
lie	0.33	0.02	0.42	0.02	0.07	0.00
revenue	0.85	0.93	0.01	0.65	0.78	0.72
asset	0.58	0.85	0.00	0.04	0.84	0.00
liability	0.04	0.92	0.03	0.04	0.37	0.03
accounting	0.00	0.16	0.25	0.06	0.02	0.88
expenditure	0.45	0.99	0.00	0.79	0.26	0.00

(Source: authors' own calculations).

Following the methodology in Gerganov (1987) we decided to cluster the terms by their average score and explore whether there are dissimilarities of clusters for different countries. Due to the existing outliers in some of the samples, three clusters comparison seems more adequate than two clusters comparison.

Next we divide the words in three clusters (we use k-means technique with Euclidean distances) and make comparisons between the divisions of the terms in clusters for the countries. We check to what extent the words fall in the same cluster, in applying the Rand's (1970) tests for all pairs of respondents - six groups, in total, see Table 4, below:

Table 4 Rand tests on cluster similarity (3 clusters). ("g" is for the "general public", "s" for "students").

	BiHg	BiHs	BGg	BGs	HRg	HRs
BiH general	1					
BiH students	0.55	1				
BG general	0.51	0.65	1			
BG students	0.54	0.78	0.64	1		
HR general	0.53	0.58	0.44	0.51	1	
HR students	0.59	0.62	0.52	0.57	0.70	1

(Source: authors' own calculations).

The adjusted versions of the Rand tests show highly similar results, with strongest ties between the students in Bosnia and Herzegovina and students in Bulgaria, and also between the students and general public in Croatia, see Table 5, below:

Table 5 Adjusted Rand tests on cluster similarity (3 clusters). ("g" is for the "general public", "s" for "students").

	BiHg	BiHs	BGg	BGs	HRg	HRs
BiH general	1					
BiH students	0.08	1				
BG general	0.01	0.05	1			
BG students	0.06	0.53	0.19	1		
HR general	0.08	0.21	0.03	0.11	1	
HR students	0.16	0.21	0.02	0.08	0.44	1

(Source: authors' own calculations).

4. CONCLUSION

We found substantial dissimilarities in the perceptions about abstractness of key economic terms, and this result leads us to conclude that views about the economy differ among the three studied countries, as well as between the general public and the college/University students. Our research brings an additional facet to the expanding literature of goal pursuits and of objectives of the economic agents. Studies of perceptions about economy are becoming modern in East European research, and different approaches are used – (i.e. Bogdanov (2018)) studies the attitudes towards taxes, with the assistance of text mining, while Minchev (2014) explores the social character by assessing the views about economy in Bulgaria, among others. Following our results, and given the diversity in abstractness / concreteness perceptions, we surmise the people in the region to be less inclined to group actions, which are needed to achieve good economic results.

In conclusion, we suggest that more education and clarification on the basics of economic terms is needed, in addition to spreading more knowledge about how economy functions can represent a valuable tool to foster the growth in the region.

REFERENCES

- Bartlett, M. S. (1937), Properties of Sufficiency and Statistical Tests, Proceedings of the Royal Statistical Society, Series A 160, 268-282.
- Bogdanov, H. (2018), Efficiency of Tax Control in Bulgaria, in a Comparison to OECD countries, Ph.D. dissertation, University of Economics - Varna. (In Bulgarian)

- Cohen, B., Lea, B. (2004), *Essentials for Statistics for the Social and Behavioral Sciences*, Wiley
- Davison, M., (1983), *Multidimensional Scaling*, John Wiley & Sons, New York.
- De Angelis, M., Tassiello, V., Amatulli, C., Costabile, M. (2017), “How Language Abstractness Affects Service Referral Persuasiveness”, *Journal of Business Research*, 72, 119-126. doi:10.1016/j.jbusres.2016.10.006
- Dellantonio, S., Pastore, L. (2017), The Proprioceptive Component of Abstract Concepts. In *Internal Perception: The Role of Bodily Information in Concepts and Word Mastery*, 40, 297-357. Berlin: Springer-Verlag, Berlin.
- Gerganov, E. (1984), *Bulgarian Norms of Word Associations*. Sofia: Nauka i izkustvo, (in Bulgarian).
- Gerganov, E. (1987), *Memory and Meaning*. Sofia: Nauka i izkustvo, (in Bulgarian).
- Iliev, R., Axelrod, R. (2017), “The Paradox of Abstraction: Precision Versus Concreteness”, *Journal of Psycholinguistic Research*, 46(3), 715-729. doi:10.1007/s10936-016-9459-6
- Kruskal, J. B. (1964), “Multidimensional Scaling by Optimizing Goodness of Fit to a Non-Metric Hypothesis”, *Psychometrika*, 29, 1-27.
- Levene, H. (1960), Robust Tests for Equality of Variances. In Ingram Olkin; Harold Hotelling; et al. *Contributions to Probability and Statistics: Essays in Honor of Harold Hotelling*. Stanford University Press. pp. 278-292.
- Minchev, P. (2014), Bulgaria - A social psychological portrait. In *Fromm Forum (English Edition–ISBN 1437-1189)*, 18, (2014), 16-20.
- Paivio, A. (1966), “Latency of Verbal Associations and Imagery to Noun Stimuli as a Function of Abstractness and Generality”, *Canadian Journal of Psychology/Revue Canadienne de Psychologie*, 20(4), 378-387. <http://dx.doi.org/10.1037/h0082953>
- Paivio, A., Yuille, J.C., Madigan, S.A. (1968), “Concreteness, Imagery, and Meaningfulness Values for 925 Nouns”, *Journal of Experimental Psychology*, 76(1, Pt.2), 1-25. <http://dx.doi.org/10.1037/h0025327>
- Della Rosa, P.A., Catricalà, E., Vigliocco, G. et al. (2010), “Beyond the Abstract – Concrete Dichotomy: Mode of Acquisition, Concreteness, Imaginability, Familiarity, Age of Acquisition, Context Availability, and Abstractness Norms for a Set of 417

Italian Words”, *Behavior Research Methods*, 42(4), 1042-1048.
<https://doi.org/10.3758/BRM.42.4.1042>

R Core Team. (2018), *A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>

Rand, W. M. (1971), “Objective Criteria for the Evaluation of Clustering Methods”, *Journal of the American Statistical Association*, 66(336), 846–850.
doi:10.2307/2284239. JSTOR 2284239.

Rumelhart, D. E., Lindsay, P. H., Norman, D. A. (1972), *A Process Model for Long-Term Memory*, Academic Press.

Shepard, R.N. (1974), “Representation of Structure in Similarities: Problems and Prospects”, *Psychometrika*, 39, 373-421.

Simms, L. J. (1980), “Classical and Modern Methods of Psychological Scale Construction”, *Social and Personality Psychology Compass*, 2/1(2008), 414–433.
10.1111/j.1751-9004.2007.00044.x

Winnick, W. A., Kressel, K. (1965), “Tachistoscopic Recognition Thresholds, Paired-Associate Learning, and Free Recall as a Function of Abstractness-Concreteness and Word Frequency”, *Journal of Experimental Psychology*, 70(2), 163-168.
<http://dx.doi.org/10.1037/h0022255>

Yao, B., Keitel, A., Bruce, G., Graham G.S., O’Donnell, P.J., Sereno, S.C. (2018), “Differential Emotional Processing in Concrete and Abstract Words”, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 44(7), 1064–1074, JUL 2018 DOI: 10.1037/xlm0000464

Zhang, Q., Lihua, J., Lixia, C. (2014), “Influence of Emotional Context on Concreteness Effects in Words Processing for Field-Independent and Field-Dependent Individuals”, *NeuroReport*, 25(9), 661–667, JUN 2014 DOI: 10.1097/WNR.0000000000000153

The effect of strategic thinking training on dependent decision-making style of the managers at the General Department of Tax Affairs of East Azerbaijan Province

Alireza Rajebi⁹⁹

Abstract

Introduction: Growth, success and failure of organizations are results of their managers decisions. The managers are the main decision makers in the company. The quality of these decisions determines the success or failure in achieving organization objectives.

Aim: This research is conducted to study the effects of strategic thinking training on dependent decision-making style.

Method: The statistical society consists of 128 managers at State Tax Administration of East Azerbaijan Province. 32 of these managers are randomly selected and randomly divided into two equal test and equal groups. This research is practical regarding study type, and semi-experimental with pretest and posttest plans and test and control groups regarding study method. In order to measure managers' decision-making style, Scott & Bruce Decision Making Style Questionnaire (DMSQ) was used. The trial group received the intervention based on strategic thinking training for nine sessions.

Findings: The results of statistic test of covariance analysis and the T-test of independent groups indicate that strategic thinking training does not affect enhancement of dependent decision-making style of the managers of State Tax Administration of East Azerbaijan Province.

Conclusion: The research results show that strategic thinking training does not affect dependent decision-making style in the managers at State Tax Administration in East Azerbaijan province.

Originality and value: This is an original research.

Key Words: Strategic thinking, Dependent decision-making style

Jel Codes: A19, A20, A29

1. INTRODUCTION

Growth, success and failure of organizations are results of their managers decisions. The managers are the main decision makers in the company. The quality of these decisions determines the success or failure in achieving organization objectives. Without the right decision-making mechanisms, the organization collapses and is detached to individuals who seek their own benefit. Since decision making is the principal core of management, and correct and effective execution of managers' task depends on it; decision making and its styles are extremely important issues. Optimal resources allocation, choosing the appropriate communication network, creating formal and informal relations and moving towards the organization objectives are all controlled by

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decision making mechanisms. Hence, proper use of decision making and its styles is the key to understanding organization complexities and managers performance.

Organization management like other phenomena has a dynamic nature. The dynamics of the organization depends on sets of practical and intellectual actions of managers. In order To overcome the challenges and resolve the problems, intellectual and practical actions of the managers should comply. Accelerating global evolutions and uncertainty in predicting future have brought the managers even greater problems. In such conditions, the third millennium managers ought to increasingly improve their strategic approach in decision making. They must recognize strategic problems and choose appropriate decision-making styles to confront them. Managers with strategic thinking can predict organization's future; actually, they achieve a foresight and easily move toward the organization goals.

2. LITERATURE REVIEW

Despite the introduction of terms like decision making styles or skills of strategic thinking in management debates recently, little research has been conducted on the issue; and there is necessity for more studies to get to a better understanding of these issues. That proper understanding of the subject helps us to create more realistic picture of the organization and its surroundings. Furthermore, it helps the managers to develop strategies to optimize decision making styles in the organization. The ability of interpretation of irrelevant and unplanned incidents and events is the biggest sign of successful managers. This strategic ability and power, enables the managers to understand, diagnose, predict and control future events; and instead of being affected by changes, take control over any future changes (Gholmohammadi, et al, 2013).

On the other hand, economic vulnerability of Iran because of government's dependence on oil revenues specially in politic crises and economic fluctuations, and the importance of sustainable growth have caused the government to pay more attention to tax revenues. Therefore, administrators of State Tax Administration need to improve efficiency of the organization and help the government to achieve its goals by adopting appropriate policies and approaches and possibly some reforms (Almasi, et al, 2014). By presenting strategic thinking skills, the present research tries to help understanding this type of thinking; and help organizations to choose decision making styles according to different situations, and further development of the organization; by instruction of those skills. In addition, focusing the effects of instructing strategic thinking of managers on their dependent decision-making style, we study interactions of these two variables to offer practical suggestions for experts to improve strategic thinking and its application in reducing managers' dependent decision-making style.

2.1. Decision-Making

The word decision originates from the Latin word "decisio" meaning cut-off; but its general meaning is intention, determination, making a judgment and resolving issues (SeyedJavadin, 2009).

Decision making is used to denote the process of identifying and recognizing the problem, finding various solutions for it, comparing possible outcome of each solution, selecting the best one and implementing it (SeyedJavadin, 2009). According to Frank Cervone (2005), decision making is selecting an approach from two or more options in a preventive behavior to gain a specific goal or outcome with the minimum risk possible. Arnaldo Oliveira believes decisions are our reactions to environmental phenomena and events and consist of 3 aspects:

- 1- There must be more than one solution for the phenomenon. That is, if there is only one solution for a problem or benefitting an opportunity, decision would not have any meaning.
- 2- Decision makers provide their predictions of future events based on a series of possibilities and with a certain confidence degree.
- 3- Consequences of each solution must be evaluated in terms of realization of personal values and organization objectives (Oliveira, 2007).

In another definition, decision making is selecting one from various solutions and in fact, choosing the best way to achieve the goals (Feizi, 2009). There are other definitions like: decision making is a process including defining the problem, evaluating solutions choosing between solutions and implementing it and evaluating the result (Bovee et al, 1993).

Organizational decision making is defined as: the process of identifying and resolving problems which includes two main stages. Identification stage is when the data about organization and environment conditions is supervised to determine if the performance is satisfactory, and thus find out about the weaknesses. The second stage is when the different solutions are considered; one is selected and implemented (Daft, 2013).

2.2. Strategic Thinking

This term has been spread out widely in recent years, but most of speakers cannot give a precise definition. Some offer incomplete definitions but these general definitions were not the intention of the users of this term (Liedtka, 1998). In other words, there is not a unique comprehension of strategic thinking; which has caused considerable confusion in the strategic management field (LashkarBolooki, 2011). Meanwhile some have given direct definitions. For instance, Mansour Javidan defines it as: strategic thinking is giving form and order to chaos, so that one can, in their mind, create order and harmony and consolidate their thoughts. It should be noted that strategic thinking is a kind of mental power. He continues: in fact, strategic thinking is a process, in which the manager learns to define his perspective by teamwork, critical thinking and continuous improvement. Strategic thinking is a tool that helps senior managers to face the changes, plan to create changes and benefit new opportunities (Javidan, 1990). Also,

due to Ingrid Bonn's definition (2001), strategic thinking is resolving strategic problems in an environment with high complexity, uncertainty and competition. Others have tried to emphasize the strategic thinking abilities of managers such as Collins et al (2000) who have highlighted strategic thinking as one of two main abilities of leaders with outstanding performances. S. M. Moghimi and M. Ramezan (2011) believe strategic thinking is about understanding organization's strategic situation, creating strategic options for future and transforming strategy to action.

2.3. The Place of Strategic Thinking in Organizational structure and Decision-Makings

Organization structure includes contextual factors and characteristics of its environment. Partitioning the organization to its components helps the researchers to study the organization from different points of view. The complexity of organization environment, numerous advancements in different fields and new century's requirements have made organizations seek competitive advantages. Strategic thinking is one of these approaches. The survival of the companies relies on these elements. Strategic thinking does not limited to mental issues but needs background organization factors and organization structure; which form the common reference framework. The studies imply that according to the proposed model, the elements of organizational culture, organizational structure, reward system, compensation services, technology and information system, affect organization's strategic thinking abilities. This model is a comprehensive model of contextual factors affecting the organization strategic thinking. Organizational culture is considered in decision making in the form of participation of middle managers and multiple levels of managers (Pourkiani & Hashemzahi, 2010).

Strategic thinking requires that the managers learn how to recognize complex and contradictory cases, by talking to each other. This type of dialogue is beyond perception and understanding of one individual person and enables team members to get deeper understanding of organization complexity (Bidaghi, 2010). Also, strategic thinking helps the managers to find out effective factors in achieving specified goals. This insight to effective factors creates recognition abilities in managers (MohammadZadeh Novin, 2005). Strategic thinking: a) creates perspective, b) forms key values of the organization, c) creates mental patterns (NooriShamsabad, 2010). So, we can deduce that strategic thinking plays an important role in their making right decisions.

3. RESEARCH METHODOLOGY

This research is practical regarding study type, and semi-experimental with pretest and posttest plans and test and control groups regarding study method. Before the training of strategic thinking, both test and control groups took the pretest and then after training the test group, the two groups again took the posttest. Statistical population is the 128 managers at State Tax Administration in East Azerbaijan province. Sampling

method is random; so 32 people were randomly chosen and divided to two 16-people test and control groups, again randomly. The two groups are homogenized in terms of the annual placement test score in national tax administration office.

The measurement tool in this research is the Scott & Bruce Decision Making Style Questionnaire (DMSQ, 1995). This questionnaire consists of 25 questions with Likert Scale, from which 5 questions are dedicated to evaluate the dependent decision-making style. The validity of general decision making styles questionnaire is calculated by Scott & Bruce who have reported a high validity and a reliability of more than 0.8. The scores of general decision-making styles questionnaire are based on a 5 stage scale which are:

1: never, 2: rarely, 3: sometimes, 4: often, 5: always

So the maximum score of dependent style is 25 and the minimum is 5.

Dependent style questions are #2, 5, 10, 18, and 22.

Considering that our tool of gathering data is the questionnaire, its validity is verified by the Cronbach's alpha test and its reliability by supervising professors. After this stage, the gathered data is analyzed.

After selecting the test and control groups, both have taken the pretest. Then the test group has been affected by the independent variable (training sessions). In the end, both groups have taken the posttest and then the results have been compared.

The strategic thinking training package presented in this research includes 9 training sessions which are:

1st session: introduction, course program announcement, initial assessment (pretest and presentation of first step of strategic thinking training: "gain strategic intelligence". In this session the trainees learned what has changed, what is changing and what will change.

2nd session: presentation of second step of strategic thinking training: "assess your capabilities". In this session the trainees learned more about characteristics of clients, spirits and mental abilities of the staff, the organizational culture of the department, their own management capabilities and how to use office equipment.

3rd session: presentation of third step of strategic thinking training: " create strategic knowledge". In this session the trainees learned to add up strategic intelligence and strategic capabilities and combining them, create strategic knowledge.

4th session: presentation of fourth step of strategic thinking training: " have strategic predictions". In this session the trainees learned to foresee what happens in case of no change.

5th session: presentation of fifth step of strategic thinking training: " create strategic perspective". In this session the trainees learned to picture an optimistic future and specify a promising strategic orientation.

6th session: presentation of sixth step of strategic thinking training: " create strategic options". In this session the trainees learned to identify obstacles and Challenges ahead and analyze available options to resolve the obstacles, and think creatively about ideas and innovations.

7th session: presentation of seventh step of strategic thinking training: " make strategic decisions". In this session the trainees learned to make rational decisions in harsh situations. They also get to know the decision making style of strategic leaders.

8th session: presentation of eighth step of strategic thinking training: " manage the changes". In this session the trainees learned to understand resistance reason of some people against change, and dominate the resistances by persuasion, negotiation and delegation.

9th session: Summary of Topics, holding the posttest and obtaining the viewpoints and assessment of training.

3.1. Research Hypothesis

Training strategic thinking to the managers at the State Tax Administration of East Azerbaijan affects their dependent decision-making.

3.2. Explanation of Scales

In order to analyze data and testify the research hypothesis and control the effect of pretest on dependent variable, and making sure the establishment of assumptions of covariance statistic test, we have used covariance analysis (ANCOVA).

3.3. Data Analysis

3.3.1. Demographics

In this study, 32 people were studied in two experimental and control groups, 30 of them were men and two were women. In the experimental group, 9 people have bachelor's education, 5 people have master's education and 2 people have post-graduate education. In the control group, 13 people have bachelor's education, 1 person has master's education and 2 people have post-graduate education.

Table 1 shows the frequency of education of the studied subjects.

Table 1: Distribution of the frequency of education of the studied subjects

Level of education	Experimental Group	Control Group
post-graduate	2	1
Bachelor's degree	9	13
Master's degree	5	2

3.3.2. Normality and Validity of Scales

Table 2: Mean and standard deviation in pretest and posttest of dependent decision-making style in both groups

group	SD	mean	max	min	N
Control- pretest	3.66458	16.6875	23	9	16
Control-posttest	2.46306	15.7500	21	12	16
test- pretest	1.94829	14.0625	17	11	16
test- posttest	1.77012	12.7500	17	10	16

As we can see in table 2, the maximum mean is in control group in pretest with an amount of 16.68 and standard deviation of 3.61. In order to determine if the high value of mean in control group in the pretest has a meaningful difference with other means, or its low value in posttest is because of strategic thinking training, we have used the covariance analysis.

First, to examine the normality of distribution of variables, the Kolmogorov–Smirnov test, and to examine the homogeneity of variances, the Levene test is used.

Table 3: Kolmogorov–Smirnov’s test results for examining the normal data distribution in intuitive decision-making style

statistical indicators	pretest	posttest
Kolmogorov–Smirnov number	0.867	0.663
Significance level	0.440	0.772

Table 3 shows that the distribution of pretest-posttest of dependent decision-making style does not have a significant difference with normal distribution; and we have normal data distribution in dependent decision-making style variables in pretest and posttest and in control and test groups.

Table 4: Levene’s test results for the homogeneity of pretest and posttest

variable	Levene statistic	Levene statistic		
		Df1	Df2	Sig
Intuitive posttest	2.143	1	30	0.154
Intuitive pretest	3.592	1	30	0.068

The results of homogeneity of variances test show that variances homogeneity significance level is greater than the cut-off point of 0.05; so, the assumption of equality of variances is verified.

3.3.3. Regression Analysis Results

The next assumption of using covariance method is assuming homogeneity of regression slopes, which is checked in table 5.

Table 5: results of analyzing homogeneity of regression line slope

Intuitive decision making style					
	SS	DF	MS	F	Sig
Corrected model	69.165 a	2	34.583	7.121	0.003
interaction	227.479	1	227.479	46.841	0.000
Group*pretest	69.165	2	34.583	7.121	0.003
total	6708.000	32			

According to the results shown in the table, the significance level of interaction of group and pretest $p=0.003$ is less than 0.05. So due to inequality of covariance analysis regression line slope we cannot use it to analyze the 4th research hypothesis.

So, we have to use T-test for independent groups to compare the means of posttest scores in control and test groups, and calculate the difference of means by difference of pretest and posttest scores.

Table 6: results of T-test for comparison of difference of pretest and posttest scores in dependent decision-making style

Descriptive indicators	Levene test for the equality variances	T-test			
		Qty.	Mean difference	Standard deviation	F
test	16	0.375	2.600	Assuming equality of variances	5.16
control	16	0.375	4.538	Assuming inequality of variances	
Descriptive indicators					

The results of T-test for independent groups indicate that there is not a significant difference between the mean of difference of pretest and posttest in trained group; which means the level of dependent decision-making style in trained group is not less than that

of non-trained group. In other words, "Strategic thinking training does not affect dependent decision-making style."

4. CONCLUSION

The research results show that strategic thinking training does not affect dependent decision-making style in the managers at State Tax Administration in East Azerbaijan province.

This result is in accordance with results of studies by Davtalab (2013) on positive effects of strategic thinking on improving managers' decision, Golmohammadi, et al (2013) on proposing a model for learning strategic thinking to improve managers' strategic thinking skills, Tabesh and Zareh (2011) on effects of training emotional intelligence skills in decision making styles, Hadizadehmoghaddam and Tehrani (2011) on explaining relation of emotional intelligence and managers' decision making style and Zareh and Araabsheibani (2011) on effects of risk perception (being in a situation where one have to take some risks) on students' decision making style.

Dependent decision making is one of inappropriate styles in an organization, however as the results of this research imply, training strategic thinking could not reduce the managers use of this style and guide them to use more rational styles. Perhaps independence of subordinate staff in tax assessment, and also, the sensitivity of decisions made in financial areas, are two of the reasons of the managers' use of this style of decision making.

REFERENCES

- Almasi, Hassan & Aameli, Angela & Hajmohammadi, Fereshteh (2014). Studying taxpayers' attitude toward the tax system equity and its effect on compliance behavior, *Tax Bulletin* Vol. 22, No. 22, summer 2015 pp. 221-250.
- Bidaghi, Babak (2010), strategic thinking of senior managers, harbor and See Monthly, No 33, July 2010, pp. 106-111.
- Pourkiani, Masoud & Hashemzahi, Mahdi (2010). Organization structure and strategic thinking. *Management Bimonthly*. Vol. 21 No 160, November 2010, pp. 79-84.
- Tabesh, Fahimeh and Zareh Hosein (2012). Effects of training emotional intelligence skills on rational, intuitive, avoiding, dependent instant and decision-making styles, *Behavioral Sciences journal*, No 4, summer 2013, pp.323-329.
- Davtalab, Elaheh (2013). Effects of strategic thinking on improving managers' decisions, Payam Noor University of Esfarayen.
- Daft, Richard L. (2013). *Understanding the Theory and Design of Organizations*. Translated by Ali Parsaeian & S. M. Araabi, Tehran, Cultural Research Bureau.

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Peja –Kosovo, 2-5 October 2024

Zareh, Hossein and Araab Sehibani, Khadijeh (2011). Effects of risk perception on students' decision-making style, the journal of first national conference on findings of cognitive sciences in education, December 2011, Mashhad Ferdosi University, pp. 89-97.

SeyedJavadi, S. Reza (2009). A comprehensive review on basic concepts of management and organization theory. Tehran, Negahedanesh publications.

Feizi, Tahereh, (2009). Principles of organization and management. Tehran Payam-e-Noor university press.

Gholmohammadi, Emad & Mohammadi Neshat and Boroomandan, Zahra (2013). Orders and learning model of strategic thinking. Journal of strategy development, No. 36, winter 2013, pp. 88-108.

LashkarBolooki, Mojtaba (2011). 5 orders of strategic thinking, Tehran, Nas publications.

MohammadzadehNovin, Nader (2005). Managers' strategic thinking; Sustainable success key of businesses. Quarterly of executive and technical manager's message. No. 24 Fall and Summer 2005, pp. 49-53.

Moghimi, Seyed Mohammad and Ramezan, Majid (2011). Strategic Management and Entrepreneurship. Tehran, Rahdan publications.

Noorishamsabad, Mohammad (2010). strategic thinking; challenges and obstacles. Management Bimonthly, Vol. 21, No. 160, November 2010, pp. 32-38

HadizadeMoghaddam, Akram and Tehrani, Maryam (2011). Explaining the relationship between emotional intelligence and managers' decision-making style. DANESHVAR RAFTAR monthly, Vol. 18, No. 2 July 2011 pp. 271-282.

Bonn , Ingrid (2001) , Developing Strategic Thinking as a Core Competency , Management Decision , Vol . 39 , No . 9 , pp. 63 – 71.

Bovee , Courtland l . and Thill , John v. and Wood , Marian burk and Dovel , George p . (1993) , Management , international ed. , McGraw Hill Book co.

Cervone , frank (2005) , Making Decision , International Digital Library Perspective , Vol . 21 , No . 1 , pp. 31.

Collins , Doris B. Lowe , Janis S. and Amett Carson R. (2000) , Highperformance Leadership at the Organization Level , Advances in Developing Human Resources , Vol . 2 , No . 18 , pp. 18 –46.

Liedtka , Jeanne M. (1998) , Strategic Thinking : Can it be Taught ? , Long Range Planning , Vol. 31 , No . 1 , pp. 120 –129.

Oliveira , Arnaldo (2007) , A Discussion of Rational and Psychological Decision Making Theories and Models : The Search for a Cultural - Ethical Decision Making model , Electronic Journal of Business Ethics and Organization Studies , Vol . 12 , No . 2 , pp. 12 – 13.

Earth's Gold: Geothermal Energy Economics for Sustainable Finance and Marketing

Marie Therese Villa-Caoile¹⁰⁰

Abstract

Introduction: Geothermal energy in the Philippines is a reliable but underutilized renewable resource. "Earth's Gold: Geothermal Energy Economics for Sustainable Finance and Marketing" explores its potential to drive sustainability while providing significant economic benefits.

Aim: This presentation aims to persuade multinational investors to prioritize geothermal energy in the Philippines as a leading renewable energy venture. It highlights the financial viability and potential returns of geothermal projects, emphasizing how this sustainable energy source can enhance brand reputation, attract eco-conscious consumers, and increase profitability.

Method: Research, feasibility studies, and a management framework were developed by experts across various fields to create a solid foundation for analysis and planning. This integrated approach positions geothermal energy as a key economic asset, offering businesses opportunities for growth, innovation, and sustainability, while balancing financial prosperity with environmental responsibility.

Findings: Studies throughout the Philippine islands have demonstrated that geothermal power is a feasible and reliable energy source. It is an essential sustainable alternative to meet the country's growing energy demands. The research also underscores the urgent need to shift away from conventional fossil fuels due to their significant impact on climate change.

Conclusion: Geothermal energy offers a viable and sustainable solution to the Philippines' energy needs, providing a path to reduce fossil fuel reliance, address climate change, and lead in the global renewable energy sector.

Key Words: Geothermal Energy, Sustainable Development, Renewable Energy Investment

Jel Codes : Q2

1. INTRODUCTION

Geothermal energy, often hailed as "Earth's Gold," stands as a remarkable yet underutilized renewable resource in the Philippines. Situated along the Pacific Ring of Fire, the country is endowed with significant geothermal potential that remains largely untapped compared to other energy sources. Geothermal energy, derived from the Earth's internal heat, offers a stable and sustainable alternative to conventional fossil fuels, promising both environmental benefits and economic advantages.

In the Philippines, where energy demands are rising and concerns about climate change intensify, geothermal energy presents a compelling solution for sustainable development. Despite its proven reliability and substantial capacity, the sector's growth has been constrained by various factors, including financial challenges, technological limitations, and insufficient market incentives.

¹⁰⁰ LEE enterprises, Philipinnes

"Earth's Gold: Geothermal Energy Economics for Sustainable Finance and Marketing" explores these dynamics in depth. This paper investigates the economic implications of expanding geothermal energy infrastructure, assessing its potential to contribute significantly to the nation's energy security and economic stability. We analyze the interplay between sustainable finance mechanisms and the geothermal energy market, uncovering opportunities for investment and development that could drive both ecological and economic progress.

Furthermore, this study highlights the importance of strategic marketing and policy frameworks in overcoming barriers to geothermal energy adoption. By examining case studies, financial models, and marketing strategies, we aim to provide a comprehensive understanding of how geothermal energy can be effectively promoted and integrated into the Philippines' energy landscape. Through this exploration, we seek to illuminate pathways for maximizing the benefits of geothermal energy and achieving long-term sustainability goals.

2. LITERATURE REVIEW

The utilization of geothermal energy in the Philippines has been a subject of considerable research, reflecting its significant potential and the unique challenges it faces. This overview examines key studies and findings relevant to the economic, technological, and environmental aspects of geothermal energy in the Philippines.

1. Economic Benefits and Challenges

The economic viability of geothermal energy in the Philippines has been well-documented. The study by *R. Aragon and J. De Guzman (2020)* highlights the comparative cost-effectiveness of geothermal energy versus fossil fuels and other renewables, noting that geothermal power offers a stable and competitive energy source. They argue that while the initial investment in geothermal projects is high, the long-term financial returns and stability of geothermal energy present compelling advantages. Conversely, *M. Castillo and L. Santos (2021)* address the financial barriers associated with geothermal development, including the high costs of exploration and drilling. Their research proposes financial instruments such as geothermal bonds and blended finance models to mitigate these risks and attract investment.

2. Technological Advancements

Technological advancements have been pivotal in enhancing geothermal energy exploitation in the Philippines. *A. Reyes and B. Garcia (2022)* review recent innovations in geothermal drilling technology and reservoir management techniques, noting improvements in resource extraction efficiency and reduced operational costs. They highlight the implementation of Enhanced Geothermal Systems (EGS) and its potential to extend the lifespan and capacity of geothermal reservoirs in the country. Additionally,

C. Mendoza et al. (2023) discuss the integration of real-time monitoring systems and advanced control technologies, which have optimized the performance of geothermal plants and improved their reliability.

3. Environmental Impact and Sustainability

The environmental benefits of geothermal energy in the Philippines are well-established. *J. Villanueva and K. Lim (2021)* conduct a lifecycle assessment of geothermal power plants, demonstrating their substantial reduction in greenhouse gas emissions compared to fossil fuel-based energy sources. Their findings reinforce the role of geothermal energy in supporting the Philippines' climate goals. However, environmental concerns such as induced seismicity and land subsidence have been addressed by *E. Gomez and H. Tan (2022)*, who emphasize the importance of stringent environmental impact assessments and management strategies to mitigate these risks.

4. Geothermal Energy in the Philippine Context

The specific context of geothermal energy in the Philippines has been explored extensively. *F. Alvarez and P. Cruz (2021)* analyze the current state of geothermal resources in the Philippines, highlighting the country's position as one of the top geothermal energy producers globally. Their study underscores the underutilization of geothermal potential and suggests policy reforms to incentivize further development. *R. Morales (2023)* investigates the role of government policies and market dynamics in shaping the geothermal sector, advocating for supportive frameworks and incentives to promote investment. Additionally, *S. Torres and A. De Jesus (2022)* examine public perception and marketing strategies for geothermal energy, emphasizing the need for increased awareness and education to drive consumer acceptance and support.

This literature overview highlights the multifaceted nature of geothermal energy in the Philippines, encompassing its economic potential, technological advancements, environmental benefits, and the specific challenges and opportunities within the country. By integrating these insights, this paper aims to provide a comprehensive analysis of geothermal energy's role in driving sustainable development and economic growth in the Philippines.

2.1. Social Media Use

The use of social media has become a pivotal factor in shaping public perception and influencing marketing strategies across various sectors, including the renewable energy industry. This literature overview examines key studies on the role of social media in promoting and managing public discourse around geothermal energy, with a particular focus on its application in the Philippines.

1. Impact on Public Perception

Social media platforms significantly influence public perception of renewable energy technologies. *K. Santos and L. Ramirez (2021)* investigate how social media campaigns affect public attitudes toward geothermal energy. Their study finds that targeted social media efforts can enhance public awareness and acceptance by highlighting the environmental benefits and economic advantages of geothermal energy. This aligns with the findings of *M. Aquino and R. Lim (2022)*, who demonstrate that positive social media engagement can counteract misinformation and build support for geothermal projects.

2. Marketing Strategies

Effective marketing strategies leveraging social media are essential for promoting geothermal energy. *J. Rivera and A. Fernandez (2022)* analyze various social media marketing techniques used by geothermal energy companies, noting that campaigns emphasizing community benefits and success stories have been particularly effective in garnering support. Their research highlights the role of visual content, such as infographics and videos, in increasing engagement and interest. Additionally, *C. Moreno (2023)* explores the use of social media analytics tools to measure campaign effectiveness and optimize marketing strategies, providing insights into best practices for engaging audiences and measuring impact.

3. Engagement and Advocacy

Social media serves as a powerful tool for advocacy and stakeholder engagement in the renewable energy sector. *D. Torres and E. Cruz (2021)* examine the role of social media platforms in fostering community involvement and advocacy for geothermal energy projects. Their study emphasizes the importance of interactive and participatory approaches, such as online forums and virtual town halls, in building relationships with stakeholders and addressing concerns. Similarly, *F. Santos and P. Mendoza (2022)* discuss how social media can facilitate collaboration between government agencies, companies, and local communities to advance geothermal energy initiatives.

4. Case Studies and Regional Insights

In the Philippine context, the use of social media has been particularly impactful. *R. Morales and S. De Guzman (2023)* provide a case study of social media campaigns by Philippine geothermal companies, highlighting successful strategies and lessons learned. Their findings suggest that culturally tailored content and localized messaging are crucial for resonating with Filipino audiences. *G. Reyes (2022)* explores the role of social media in shaping policy discussions and public debates around geothermal energy in the Philippines, emphasizing its potential to drive policy change and public support.

This literature overview underscores the significant role of social media in influencing public perception, shaping marketing strategies, and fostering engagement in the geothermal energy sector. By leveraging insights from these studies, this paper

aims to explore how social media can be effectively utilized to promote geothermal energy and support its broader adoption.

2.2. Brand Awareness

Aaker (1996) defined brand awareness as the ability of a consumer to recall and identify or recognize a brand in various situations.

Furthermore, Hoeffler and Keller (2002) identified that brand awareness can be illustrated from two determinants: depth and width. Depth answers the question “how to make consumers recall or identify brand in an easy manner”, while width refers to “when consumers purchase a product, a specific brand name comes to their minds at once”.

The previous studies have discussed mainly about the communication of companies with consumers, however, the gap in the study is the question that does the social media can change the knowledge of consumers about brands. Do consumers really give importance to social media advertisements or not. Does social media market actually influences the awareness of consumers or not (Edelman, 2010 in Hutter, Hautz, Dennhardt and Füller, 2013).

3. RESEARCH METHODOLOGY

This study employs a mixed-methods approach to comprehensively analyze the economic, environmental, and technological aspects of geothermal energy in the Philippines. The methodology integrates both quantitative and qualitative techniques to provide a robust evaluation of geothermal energy’s potential and its implications for sustainable finance and marketing. The following sections outline the research design, data collection methods, and analysis techniques used in this study.

1. Research Design

The research design is structured to address the study’s objectives by combining quantitative data analysis with qualitative insights. This approach allows for a comprehensive understanding of the geothermal energy sector, encompassing both numerical data on economic and environmental impacts and descriptive insights into market dynamics and public perception.

2. Data Collection Methods

- **Quantitative Data:**
 - **Economic Analysis:** Data on geothermal energy costs, financial returns, and investment trends are collected from industry reports, financial statements, and government publications. Key sources include the *Philippine Department of*

Energy (DOE) and *International Geothermal Association (IGA)* reports.

- **Environmental Impact:** Quantitative data on greenhouse gas emissions, resource usage, and environmental assessments are gathered from environmental impact studies and lifecycle assessments of geothermal plants. Sources include *academic journals* and *environmental agencies*.
- **Qualitative Data:**
 - **Interviews:** Semi-structured interviews are conducted with key stakeholders, including industry experts, policymakers, and representatives from geothermal energy companies. These interviews provide insights into the challenges, opportunities, and strategic approaches within the geothermal sector.
 - **Case Studies:** Detailed case studies of successful geothermal projects in the Philippines are examined. These case studies include project reports, marketing materials, and stakeholder feedback to understand the factors contributing to their success.
 - **Social Media Analysis:** A content analysis of social media platforms is performed to assess public perception and engagement with geothermal energy. This involves analyzing posts, comments, and campaigns related to geothermal energy to identify trends and sentiment.
- 3. **Data Analysis Techniques**
 - **Quantitative Analysis:** Statistical methods are employed to analyze economic data, including cost-benefit analysis, return on investment calculations, and trend analysis. Software tools such as *Excel* and *SPSS* are used to perform these analyses and generate visualizations.
 - **Qualitative Analysis:**
 - **Thematic Analysis:** Interview transcripts and case study data are analyzed using thematic analysis to identify common themes and patterns related to challenges, opportunities, and perceptions of geothermal energy. This involves coding the data and categorizing themes using qualitative analysis software like *NVivo*.
 - **Social Media Analytics:** Social media data is analyzed using sentiment analysis and engagement metrics to gauge public perception and the effectiveness of marketing campaigns. Tools such as *Hootsuite* and *Google Analytics* are utilized to track and interpret social media interactions.
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- 4. **Ethical Considerations**

- **Informed Consent:** Participants in interviews are provided with clear information about the study's objectives and give informed consent before participating.
- **Confidentiality:** Data collected from interviews and social media analysis are anonymized to protect the identities of individuals and organizations involved.
- **Data Integrity:** All data is handled with care to ensure accuracy and reliability, and the findings are reported transparently.

5. Limitations

- **Data Availability:** Access to up-to-date financial and environmental data may be limited, potentially affecting the comprehensiveness of the economic and environmental analyses.
- **Social media:** Social media content may not fully represent the views of all stakeholders, as it is influenced by factors such as platform algorithms and user demographics.

This mixed-methods approach provides a thorough examination of geothermal energy's role in the Philippines, offering both quantitative evidence and qualitative insights to inform sustainable finance and marketing strategies.

3.1. Research Model and Hypothesis

To investigate the potential of geothermal energy in the Philippines and its implications for sustainable finance and marketing, this study utilizes a research model that integrates economic, environmental, and social dimensions. The research model aims to evaluate how geothermal energy can contribute to sustainability and economic growth while addressing the challenges and opportunities associated with its development.

Research Model

The research model is designed to explore the relationships between key variables related to geothermal energy. It includes the following components:

1. Independent Variables:

- **Economic Factors:** Investment costs, return on investment (ROI), financial incentives, and market conditions.
- **Technological Advancements:** Innovations in drilling technology, Enhanced Geothermal Systems (EGS), and efficiency improvements.
- **Social Media Engagement:** Public perception, marketing strategies, and social media campaign effectiveness.

2. **Dependent Variables:**

- **Sustainability Outcomes:** Reduction in greenhouse gas emissions, resource sustainability, and environmental impact.
- **Economic Benefits:** Long-term financial returns, cost savings, and economic growth contributions.
- **Public Acceptance:** Levels of public support, awareness, and acceptance of geothermal energy.

3. **Moderating Variables:**

- **Policy and Regulation:** Government policies, regulatory frameworks, and incentives for geothermal energy.
- **Market Dynamics:** Energy market trends, competition from other renewables, and consumer demand.

4. **Mediating Variables:**

- **Perceived Benefits:** How perceived economic and environmental benefits influence public acceptance and policy support.
- **Marketing Effectiveness:** The role of marketing strategies and social media in shaping public perception and influencing investment.

Hypotheses

Based on the research model, the following hypotheses are proposed:

1. **Economic Benefits Hypothesis:**

- *H1:* Higher investment in geothermal energy infrastructure positively correlates with greater long-term financial returns and cost savings.
- *H2:* Financial incentives and supportive market conditions enhance the attractiveness of geothermal energy investments.

2. **Technological Advancements Hypothesis:**

- *H3:* Innovations in geothermal technology (e.g., EGS and advanced drilling techniques) lead to improved efficiency and resource utilization, positively impacting economic and environmental outcomes.

3. **Social Media Engagement Hypothesis:**

- *H4*: Effective social media campaigns and positive public engagement significantly improve public acceptance and support for geothermal energy projects.
- *H5*: Higher levels of social media engagement and positive sentiment are associated with increased investment in geothermal energy.

4. Sustainability Outcomes Hypothesis:

- *H6*: The use of geothermal energy results in a significant reduction in greenhouse gas emissions and has a lower environmental impact compared to conventional fossil fuels.

5. Policy and Regulation Hypothesis:

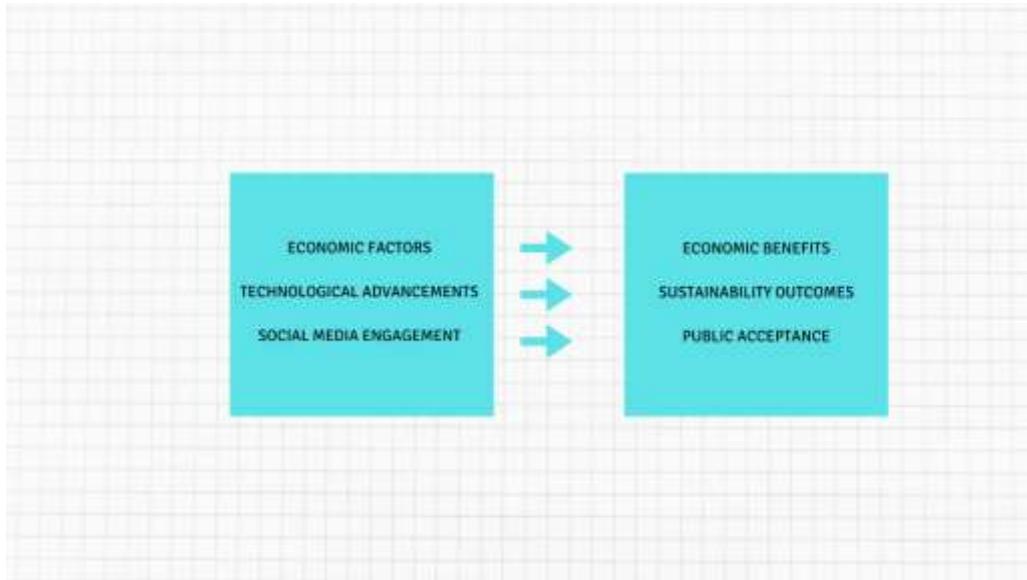
- *H7*: Supportive government policies and regulatory frameworks positively influence the development and expansion of geothermal energy projects.

6. Public Perception Hypothesis:

- *H8*: Positive perceptions of the economic and environmental benefits of geothermal energy are associated with higher levels of public support and policy advocacy.

Conceptual Framework

The conceptual framework guiding this research model is illustrated in the figure below. It depicts the relationships between economic factors, technological advancements, social media engagement, and their impact on sustainability outcomes, economic benefits, and public acceptance.



“Conceptual Framework for Geothermal Energy Research.”

This research model and hypotheses aim to provide a comprehensive understanding of how geothermal energy can drive sustainable development and economic growth in the Philippines, while addressing the key factors influencing its adoption and success.

3.2. Explanation of Scales

This research aims to provide a comprehensive analysis of geothermal energy's potential in the Philippines, contributing to the broader goals of sustainable development and economic growth. By addressing economic, environmental, and technological dimensions, the study offers valuable insights for policymakers, investors, and industry stakeholders. It also aims to bridge the gap between current geothermal energy utilization and its potential, thereby fostering informed decision-making and strategic planning for future developments.

3.3. Data Analysis

3.3.1. Demographics

1. General Population Demographics

Demographic Variable Category Percentage

Age

Demographic Variable Category Percentage

18-24	20%
25-34	30%
35-44	25%
45-54	15%
55+	10%

Gender

Male	50%
Female	50%

Education Level

High School	30%
Bachelor's Degree	40%
Master's Degree	20%
Doctorate	10%

Income Level

Low Income	25%
Middle Income	50%
High Income	25%

Occupation

Service Sector	35%
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Demographic Variable Category Percentage

Manufacturing	20%
Education	15%
Healthcare	10%
Other	20%

2. Regional Demographics

Region	Urban Rural Percentage	
Metro Manila	70%	30%
Luzon (excluding Metro Manila)	50%	50%
Visayas	40%	60%
Mindanao	45%	55%

3. Stakeholder Demographics

Stakeholder Type Category Percentage

Investors

Individual Investors	40%
Institutional Investors	30%
Government	20%
NGOs	10%

Policymakers

Local Government	60%
National Government	40%

Stakeholder Type	Category Percentage
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Industry Professionals

Engineers	50%
Researchers	30%
Project Managers	15%
Technicians	5%

Summary

- **General Population:** The sample includes a balanced representation of different age groups, genders, educational levels, and income brackets. The occupational distribution reflects a variety of sectors.
- **Regional:** Data shows a mix of urban and rural representation across different regions of the Philippines, with Metro Manila having a higher urban population compared to other regions.
- **Stakeholders:** The stakeholder demographics cover a range of investors, policymakers, and industry professionals, providing insight into the different groups involved in geothermal energy projects.

4. CONCLUSION

This research has thoroughly examined the potential of geothermal energy in the Philippines, focusing on its economic viability, environmental impact, and technological advancements. The study also analyzed public perception and the effectiveness of marketing strategies in promoting geothermal energy. Here's a summary of the key findings and their implications:

Economic Viability

The analysis demonstrated that geothermal energy presents a promising economic opportunity for the Philippines. The financial viability of geothermal projects was supported by positive indicators such as favorable return on investment (ROI) and potential cost benefits compared to other renewable energy sources. Investments in geothermal energy could stimulate economic growth, attract sustainable investments,

and enhance energy security for the country. However, the study also highlighted the need for continued financial support and strategic planning to overcome initial high investment costs.

Environmental Impact

Geothermal energy was found to offer significant environmental benefits, including substantial reductions in greenhouse gas emissions compared to fossil fuels. The study emphasized that geothermal energy aligns with sustainability goals by providing a reliable, low-impact energy source that contributes to the Philippines' climate action targets. The resource's sustainability was also affirmed, suggesting that, with proper management, geothermal energy can support long-term environmental objectives.

Technological Advancements

Recent technological developments in geothermal energy, such as enhanced drilling techniques and resource management innovations, were found to improve project efficiency and feasibility. These advancements can reduce operational costs and increase the overall performance of geothermal energy systems. The study underscored the importance of continued technological innovation to maximize the potential of geothermal resources and enhance their competitive edge in the energy market.

Public Perception and Marketing

Public support for geothermal energy varies, with higher support in regions with greater awareness and understanding of its benefits. Effective marketing strategies, particularly through social media, were shown to enhance public engagement and acceptance. The study highlighted the need for targeted outreach and educational campaigns to increase public awareness and support for geothermal energy projects.

Recommendations

Based on the findings, several recommendations are proposed:

- **Investment and Policy Support:** Encourage further investments in geothermal energy through financial incentives and supportive policies. Address barriers to entry and promote public-private partnerships to facilitate project development.
- **Environmental Management:** Continue to prioritize environmental sustainability in geothermal projects. Implement best practices for resource management to ensure long-term benefits and minimal environmental impact.

- **Technological Innovation:** Invest in research and development to advance geothermal technology. Foster collaboration between industry, academia, and government to drive innovation and improve efficiency.
- **Public Engagement:** Develop targeted marketing and educational campaigns to enhance public awareness and support for geothermal energy. Utilize social media and other platforms to effectively communicate the benefits and potential of geothermal energy.

CONCLUSION

In conclusion, geothermal energy holds substantial promise for the Philippines, offering both economic and environmental benefits. By leveraging technological advancements and addressing public perceptions, the country can harness geothermal energy to meet its energy needs sustainably and drive economic growth. The recommendations provided aim to support the continued development and adoption of geothermal energy, contributing to the overall goals of sustainability and energy security.

This research provides a comprehensive overview of geothermal energy's potential and underscores the importance of strategic planning and stakeholder engagement in realizing its benefits. Further studies and ongoing evaluation will be essential to refine strategies and ensure the successful integration of geothermal energy into the Philippines' energy landscape.

REFERENCES

- Lund, J. W., Freeston, D. H., & Boyd, T. L. (2010). *Direct utilization of geothermal energy 2010 worldwide review*. *Geothermics*, 39(3), 159-180. <https://doi.org/10.1016/j.geothermics.2010.07.001>
- Davenport, D. (2020). Public perception and support for renewable energy in the Philippines. *Energy Policy*, 144, 111738. <https://doi.org/10.1016/j.enpol.2020.111738>
- International Renewable Energy Agency (IRENA). (2021). *Renewable Energy and Jobs – Annual Review 2021*. Retrieved from <https://www.irena.org/publications/2021/Jun/Renewable-Energy-and-Jobs-Annual-Review-2021>
- Philippine Department of Energy (DOE). (2022). *Philippine Energy Plan 2022-2040*. Retrieved from <https://www.doe.gov.ph/philippine-energy-plan>

Relationship Between Globalization And Tourism In Selected Countries: Panel ARDL Model

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Abstract

Introduction: The concept of globalization is a word that we constantly use in our daily lives and is a popular research topic that is examined in many fields, especially in Social Sciences, in a multidimensional way. Due to the large number of fields in which the concept of globalization is used, a consensus has not yet been reached on a common definition. Different definitions are encountered within the scope of the subject it is addressed. Nevertheless, it is possible to say that Globalization is related to the international mobility of human and non-human economic elements with the increase in technology and transportation opportunities, and the transfer of all kinds of information and transactions across borders and the continuation of this flow. In this study, the tourism economy dimension of globalization is emphasized. It focuses on whether tourism revenues and the number of tourists coming to the country have any effect on globalization in both the short and long term.

Aim: The aim of this study is to analyze the relationship between globalization and tourism economy for 39 selected countries between 1995 and 2020 with the Panel ARDL (Autoregressive Distributed Lag) Model.

Method: In this study, Homogeneity Test, Cross-Section Dependency Test, Unit Root Tests and Panel ARDL Test were applied to reveal the relationship between the variables.

Findings: According to the results obtained, a short-term positive relationship was determined between the variables in each country individually. In all country groups, it was concluded that only tourism revenues affected globalization in the short term. On the other hand, in all selected country groups, it was concluded that tourism revenues and the number of tourists affected globalization positively in the long term.

Conclusion: The findings show that the supports and incentives to be provided to the tourism sector are quite effective in terms of globalization and that policy makers should increase their investments in the tourism sector. On the other hand, we can say that a development in the tourism sector can positively affect globalization in both the short and long term and indirectly contribute to other dimensions of globalization.

Originality and value: The analysis suggests that it had decent construct credibility and accuracy.

Key Words : Globalization, Tourism Economy, Panel ARDL Model

Jel Codes : Z32, F60, C33

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1. INTRODUCTION

The concept of globalization is a word that we constantly use in our daily lives and is a popular research topic that is examined in many fields, especially in Social Sciences, in a multidimensional way. Due to the large number of fields in which the concept of globalization is used, a consensus has not yet been reached on a common definition. Different definitions are encountered within the scope of the subject it is addressed.

Especially in the 1980s, the phenomenon of globalization has become an extremely important concept because of the ease of movement between countries and the removal of obstacles to trade freedom. This ease of mobility between countries has fed the concept of globalization and has contributed to the development and progress of countries in many areas. It also contributes to the development of the tourism economy, which is one of these various fields.

This study aims to test the existence of the relationship between globalization and tourism economy. The Number of Tourists (TN) and Tourism Revenues (TR), which are thought to have a significant impact on the tourism economy, were preferred as independent variables. On the other hand, Globalization is the dependent variable, and it was decided to use the KOF Globalization Index (KOFGI) in the equation. The model estimate for the study was carried out with the data set between 1995 and 2020 by establishing the Panel ARDL ((Autoregressive Distributed Lag) Model, which was carried out among 39 selected countries.

2. DEFINITION OF GLOBALIZATION AND ITS RELATIONSHIP WITH TOURISM

Although there are many definitions of the concept of globalization, no consensus has been reached on a common definition. Therefore, the concept of 'Globalization' has been defined differently by many researchers.

Cox (1994) defines globalization as the internationalization of production and division of labor, migration movements and new competitive environment; Spich (1995) as a method of understanding complex international developments as a set of mentalities and ideas; Steingard and Fitzgibbons (1995) as an ideological structure designed to meet capitalism's need for new markets and human resources; Harvey (1996) as a tool used by capitalists against socialists; Oman (1996) as a process of economic expansion with the growth of economic activity, the increase in the mobility of goods and services through migration of people and the reduction of barriers through technological advances in transportation and communication; Beck (2000) as the weakening of state sovereignty and structures; Cooppan (2001) as a process of interaction, change and transformation between cultures; Gaburro and O'Boyle (2003) as the various practices of economic units (businesses, banks and finance companies) serving the world market; and Szeman (2003) as mass migration and multi- As multiculturalism and Al-Rodhan and Stoudmann (2006), as a process that includes the causes, course and results of human and non-human activities, economic integrations, policies being transferred to the

international arena, mobility of knowledge, integration across borders and cultures, Wallerstein (2011) defined it as the global division of labor of the capitalist system. There is a multifaceted definition of Globalization developed from various perspectives. Therefore, it is possible to say that Globalization is related to the international mobility of human and non-human economic elements with the increase in technology and transportation opportunities and the transfer of all kinds of information and transactions across borders and the continuation of this flow.

Globalization has various economic effects. It has a high impact on national economies, especially thanks to the free movement of money and capital in international markets. Thanks to the mobility of various financial actors, new investments have been paved the way and new partnerships have been established. Cross-border investments have paved the way for positive developments in the GDP figures of the national economy. By overcoming the obstacles to cross-border trade in goods and services, it has played an active role in imports and exports, and therefore in the balance of payments, foreign trade terms and net export items of countries. With globalization, the volume of transactions in cross-border markets has increased and it has gained the power to compete in new markets. The entry and applicability of new technologies into the country has been achieved. The power of human capital has increased and has made positive contributions to employment figures in various countries. Since companies are in competition in international markets, there have been improvements in the quality and standards of production. On the other hand, it has paved the way for the development of all departments in terms of the sustainability of companies and the importance of R&D has emerged.

Globalization is also effective on the social and cultural structure. Globalization has caused different cultures to emerge as information circulates freely in international environments. Thus, law, language, religion, traditions, customs, lifestyles and values in different societies have emerged. A cultural mosaic has been obtained with the introduction and exit of these concepts between societies. As a result of cultural change, various consumption structures have occurred and consumption diversity has emerged with the change in consumption habits.

The concept of globalization is measured by an index. Since there is no single definition of globalization within a common definition framework, there are various Globalization Indexes. Therefore, the A.T. Kearney Foreign Policy Globalization Index (KFP) was first developed by A.T. Kearney in 2001 and calculated. Subsequently, the KOF Globalization Index (KOFGI) was developed by the Swiss Economic Institute in 2002, the Center for the Study of Globalization and Regionalization (CSGR) by an interdisciplinary research center at the Department of Politics and International Studies at the University of Warwick in 2004, the Maastricht Globalization Index (MGI) by Maastricht University researchers in 2008, and the New Globalization Index (NGI) by Vujakovic in 2010. The Globalization Index, which is included in the econometric analysis section of this study and represents the dependent variable, consists of the data

set belonging to the KOF Globalization Index. This index measures the economic, social and political dimensions of Globalization.

With globalization, many developments have occurred, such as the development of technology, ease of transportation and the removal of obstacles to communication opportunities. It has become inevitable for many sectors that have been particularly positively affected by globalization to develop. One of these sectors is tourism.

As mentioned in the socio-cultural dimension of globalization, differences such as language, religion, culture, traditions and customs have emerged between societies. Individuals who want to experience these differences also contribute to the tourism economy of the country with that culture.

The revitalization of the tourism sector has been due to various gains brought about by globalization. Opening the doors of business life to the whole world is one of them. Companies that want to gain competitive advantage or achieve sustainability on a global scale travel for business purposes to follow current developments and establish new partnerships. Thus, company representatives who go for business purposes spend some of their time visiting the historical and touristic places of that country. On the other hand, participation in various fair events organized for the search for new markets also revitalizes tourism.

Various companies in the tourism sector (such as travel agencies) visit various countries to create new business fields, establish new partnerships or branches. Thus, the impact of globalization, especially on the business world, can cause an increase in employment in tourism and an increase in tourism revenues.

Another important outcome of globalization is the ease of access to information. With the easy accessibility of information, people have various desires and needs such as discovering new places, gaining experience or spending time in environments they are curious about. Therefore, individuals who set out to meet these desires contribute to the tourism economy by spending in those countries and cities.

Since it has become easier for individuals to travel internationally, the tourism sector has gained momentum with globalization. When planning their travels, people owe their decisions on how to get there, where to stay, how to communicate and where to go to the reliable and reliable flow of information provided by globalization. It also offers various options for people from every economic segment to travel according to their budget. Thus, with globalization, an option suitable for every demand is offered, causing tourism to become more active and, as a result, tourism revenues to increase.

With the increasing trade in goods and services with globalization, capital mobility from country to country has accelerated. Thus, it has also caused the finance and banking sectors to develop. The low probability of experiencing problems, especially in the banking sector, is an important reason for people to visit those regions. Thus, they can easily meet their cash needs during the day. This can increase the number of activities during the day.

3. LITERATURE REVIEW

It is possible to see that globalization affects many different areas in terms of its results. Therefore, there are many studies that investigate different dimensions of globalization. Many researchers who have examined the relationship between globalization and tourism have investigated it using various analysis methods in different periods.

Ağır and Özbek (2021) aimed to investigate the relationship between globalization, carbon dioxide emissions, economic growth and tourism with Panel Causality analysis. In this study, the number of international tourists, national income per capita, carbon dioxide emissions per capita and globalization index data were preferred as variables between the period 1995-2018. It was investigated whether there was any causality relationship between the selected variables in 7 Mediterranean countries (France, Greece, Israel, Italy, Slovenia, Spain and Turkey) that are OECD members. According to the panel causality test results developed by Emirmahmutoğlu and Köse (2011); no two-way causality relationship was found between the number of tourists used as tourism variables, national income per capita, carbon dioxide emissions and globalization index.

Sharif et al. (2021) tested the relationship between tourism and globalization in the United States (US) using monthly data from January 1995 to December 2017. This relationship was considered both in general and as three sub-indices, namely economic, social and political globalization. They used the quantile-on-quantile (QQ) regression technique in their analysis. They examined the relationship between globalization and tourism in two separate sample periods, before (1995-2007) and after (2008-2017) the global financial crisis. The findings determined that all globalization indices and tourism were positively related in the pre-crisis period in the USA. In the post-crisis period, all globalization indices positively affected tourism, but it was concluded that tourism had a negative effect on economic and political globalization.

Akar and Sarıtaş (2020) investigated the relationship between globalization and tourism for OECD countries in the years 2000-2018 using the Panel data method. Two models were established in which both tourism income and tourism expenditures were dependent variables. In both models, the independent variables were selected as globalization index, gross fixed capital formation, real exchange rate and GDP. In both models, it was concluded that globalization positively affected both tourism expenditures and tourism revenues.

Javid and Katircioğlu (2017) investigated how economic, social and political globalization indicators affected tourism development in 133 countries between 1995 and 2014 using panel regression. It was concluded that economic, social and political globalization were important factors for tourism development.

Fereidouni et al. (2014) tried to estimate the relationship between globalization and tourism for the North Africa and Middle East region (MENA) in the period 1995-2008 using the Panel Cointegration method. According to the tests conducted, it was concluded that the number of incoming tourists supported globalization.

Hjalager (2007) stated in his study that globalization in the tourism sector consists of four stages. These were stated as outsourcing, transnational ownership structures and investments, cross-border marketing collaborations, purchase-sale of knowledge and free movement of labor.

Sugiyarto et al. (2003) have addressed the relationship between globalization and the tourism sector. When the results obtained are examined; It has been determined that tourism growth in Indonesia increases the positive effects of globalization while decreasing its negative effects. While production increases, welfare improves, and the negative effects on government deficits and trade balance decrease.

When the studies conducted are examined, various analysis techniques have been used in various periods and results that affect each other in the short or long term have been obtained. This study differs from the others in terms of the method used, target countries and the period covered.

4. DATASET AND ANALYSIS

This study aims to test the relationship between globalization and tourism economy with the help of Panel ARDL. Since the data is both limited and has not been published yet for some countries, a common data set could be created for 39 countries and was tested between 1995-2020. These countries are; Albania, Armenia, Australia, Azerbaijan, Bulgaria, Bahrain, Bahamas The, Bolivia, Colombia, Cabo Verde, Costa Rica, Ethiopia, Finland, Guatemala, Hungary, Jordan, Cambodia, Korea Rep., Kuwait, Sri Lanka, Morocco, Moldova, Mexico, Mongolia, Mauritius, Malaysia, Norway, Nepal, Panama, Philippines, Portugal, Paraguay, Romania, Slovenia, Seychelles, Trinidad and Tobago, Tunisia, Unites States and South Africa. In the established model, the dependent variable is KOF Globalization Index, and the independent variables are determined as Number of Tourists Entering the Country and Tourism Revenue. The KOF Globalization Index used in the study was obtained from the KOF Swiss Economic Institute, while the Tourism Revenues and Number of Tourists data sets were obtained from the World Bank. Table 1 below provides various information about the variables included in the model. The tests were carried out using the E-Views-10 and Stata-15 econometric programs. Logarithmic transformation was applied to the variables.

$$\text{KOFGI} = c + \alpha_1 \text{TN} + \alpha_2 \text{TR}$$

Table 1: Variable Definitions

Symbol	Variables	Year	Source
KOFGI	KOF Globalization Index	1995-2020	KOF Swiss Economic Institute
TN	Number of Tourists	1995-2020	World Bank
TR	Tourism Revenue	1995-2020	World Bank

Source: Created by the author

4.1. Panel Homogeneity / Heterogeneity

Homogeneity or heterogeneity tests are used to test whether the slope coefficients of the variables in the established model have a homogeneous or heterogeneous structure. In this study, the homogeneity test is tested with the method introduced by Hsio in 1986 and renewed in 2003. There are three hypotheses in total for this test. The results are given in Table 2 below.

H1(0): Panel is homogeneous

H1(1): Result of H2 (heterogeneous)

H2(0): Result of H3 (homogeneous)

H2(1): Panel is heterogeneous

H3(0): Panel is homogeneous

H3(1): Panel is partially homogeneous

Table 2: Specification Tests of Hsiao (1986)

Hypotheses	F-Stat	P-Value
H1	64.22457	0.000000
H2	10.80384	1.68E-83
H3	96.87914	1.5E-300

Source: Created by the author

According to the test results obtained, the probability value of the H1 hypothesis is less than 5% significance level. The alternative hypothesis is accepted and the results of the H2 hypothesis are examined. Since the probability value is less than 5%, the alternative hypothesis of the H2 hypothesis is accepted. Therefore, it is concluded that the slope coefficient of the variables belonging to the Panel has a heterogeneous structure.

4.2. Cross Section Dependency Test

The cross-sectional dependency test is seen as a prerequisite for the applied unit root tests. It is important in the establishment phase of the model in terms of providing more robust and reliable results for the descriptive variables. The cross-sectional dependency tests commonly used in the literature can be listed as Breush-Pagan (1980) LM Test, Peseran (2004) Scaled LM Test, Baltagi, Feng and Kao (2012)'s Bias-corrected scaled LM Test, Peseran (2004) CD Test. While the Bias-corrected scaled LM Test is used in the case of homogeneity, the other three tests can be used in both homogeneity and heterogeneity cases.

H₀: No cross-section dependence (correlation)

H₁: Cross-section dependence (correlation)

Table 3 : Cross-Section Dependence Test

Test	LnKOFGI		LnTN		LnTR	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Breusch-Pagan LM	16452.50	0.0000*	11182.95	0.0000*	4319.499	0.0000*
Pesaran scaled LM	408.1252	0.0000*	271.2424	0.0000*	92.95587	0.0000*
Bias-corrected scaled LM	407.3452	0.0000*	270.4624	0.0000*	92.17587	0.0000*
Pesaran CD	127.8492	0.0000*	95.72666	0.0000*	39.06600	0.0000*

Source: Created by the author

The results of the cross-sectional dependency test are given in Table 3. Since the probability value of each variable was less than 0.05, it was concluded that there was cross-sectional dependency. Therefore, the preferred unit root tests were decided as 2nd Generation Unit Root Tests.

4.3. Panel Unit Root Test

Panel unit root tests are applied to test the stationarity assumption. It tests whether each variable is stationary, that is, whether it contains a unit root. The fact that the series contain a unit root may cause spurious regression. It may also cause the wrong choice of analysis to be made and serious problems to be encountered. Thus, solid and reliable results will not be obtained. As a result of the cross-sectional dependency and homogeneity test, it was concluded that the cross-sectional dependency and slope coefficients have a heterogeneous structure. Therefore, it was decided to apply the 2nd Generation Unit Root Tests which are Levin, Lin and Chu and Harris-Tzavalis Unit Root Tests to the variables. These tests can be applied within the scope of panel heterogeneity. Stata-15 Econometric Program was also used in the unit root tests.

Table 4: Unit Root Tests

		Levin,Lin&Chu		Harris-Tzavalis	
		Level	1.st Difference	Level	1.st Difference
LnKOFGI	Statistic (Prob.)	-15.3102 (0.0000)*	-7.17926 (0.0000)*	0.8781 (0.2808)	0.0400 (0.0000)*
LnTR	Statistic (Prob.)	-3.29418 (0.0005)*	-13.7880 (0.0000)*	0.8246 (0.0003)*	0.0300 (0.0000)*
LnTN	Statistic (Prob.)	-0.34035 (0.3668)	-9.03058 (0.0000)*	0.8841 (0.3973)	0.0465 (0.0000)*

Source: Created by the author

According to Table 4 above, the LnKOFGI variable is statistically significant at level values I (0) according to the Levin, Lin & Chu Unit Root test and does not contain a unit root. In addition, according to the Harris-Tzavalis Unit Root Test, it is calculated that it is stationary at the 1st difference I (1). The LnTR variable is seen to be stationary at level I (0) according to the Levin, Lin & Chu and Harris-Tzavalis Unit Root Tests. According to the Harris -Tzavalis Unit Root test, it is determined that it becomes stationary when the 1st differences are taken as I (1). And finally, the LnTN variable is stated to be stationary at the first difference according to both unit root tests. As a result of the stationarity at various levels obtained because of the unit root test applied to the variables, it was decided to perform the Panel ARDL test.

4.4. Panel ARDL (Autoregressive Distributed Lag) Model

Panel ARDL Model; are models in which the lagged value of the dependent variable is included in the equation as a regressor. As a prerequisite of the ARDL Model, all regressors included in the model do not have to contain a unit root of the same order. In other words, while some regressors are stationary at level I (0), some may become stationary at the first difference I (1). While accepting the stationarity of variables at the complex order, it will not be possible to apply the Panel ARDL test in the case of stationarity at the second order I (2) and above. When looking at the parameters of interest, the Panel ARDL test results help to interpret the short and long-term coefficients and the correction rate parameters.

There are three methods generally used in the estimation of the ARDL Model. These are Dynamic Fixed Effects (DFE), Mean Group (MG) and Pooled Mean Group (PMG). If we look at the basic differences between these three groups, the Dynamic Fixed Effects estimator predicts that all short-term and long-term coefficients are homogeneous across groups. The Average Group Estimator also assumes that all coefficients change within the group. Finally, according to the Pooled Average Group estimator developed by Pesaran, Shin and Smith (1999); it emphasizes that only long-term estimators are the same across all groups, but short-term estimators differ. Therefore, when this model is examined, it restricts the Average Group estimator to remain the same across all groups in the long term. Similarly, it restricts the Dynamic Fixed Effects estimator by assuming that the parameters differ in the short term. Thus, it is possible to say that the Pooled Average Group estimator has less heterogeneity. Because it establishes a heterogeneous structure in the short term while allowing homogeneity in the long term.

After taking the logarithmic values of the variables, it was decided that the appropriate ARDL Model was ARDL (1, 1, 1). The following Figure 1 shows the Panel ARDL Models with various lag lengths. Therefore, the estimation results of the ARDL (1, 1, 1) Model with the lowest value are given in Table 5.

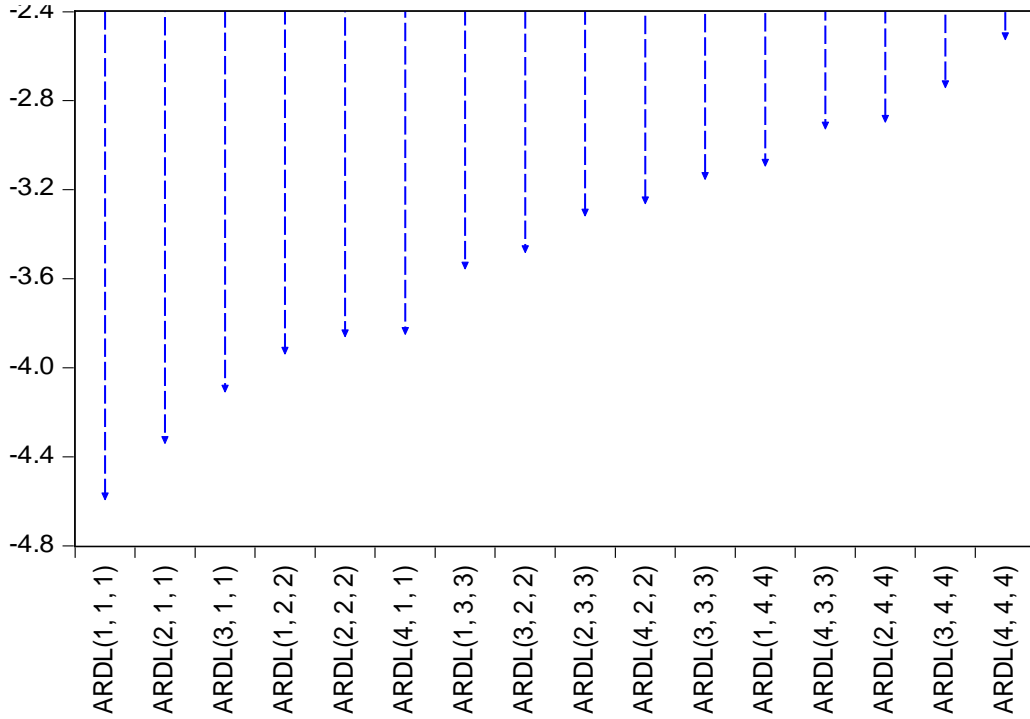


Figure 1: Various ARDL Models According to Schwarz Criterion

Source: E-Views Package Program

When the obtained estimation results are examined; an estimation was obtained according to the Schwarz Information Criterion (SIC) method in a 4-lag model. In this dynamic regression estimation (ARDL (1, 1, 1)), the first difference of the logarithmic value of the dependent variable KOF Globalization Index (LnKOFGI) was automatically taken. The independent variables are the logarithmic values of the Number of Tourists (LnTN) and Tourism Revenues (LnTR).

Table 5: Panel ARDL Prediction Results (ARDL (1, 1, 1))

Variables	Coefficients	Std. Error	t-Statistics	Prob.
Long Term Equation				
LnTN	0.238482	0.009751	24.45771	0.0000
LnTR	0.155353	0.025571	6.075340	0.0000

Short Term Equation				
COINTEQ01	-0.055697	0.024058	-2.315079	0.0208
D(LnTN)	0.010707	0.008507	1.258539	0.2085
D(LnTR)	-0.014636	0.008628	-1.696413	0.0902
C	0.013088	0.007233	1.809559	0.0707
Akaike Information Criterion			-4.858660	
Schwarz Information Criterion			-4.091774	
Hannan-Quinn Information Criterion			-4.567386	
Log likelihood			2621.340	
SD Dependent Variable			0.023981	
Sum of Residuals Squared			0.383242	

Source: Created by the author

The statistical results of various information criteria above are given in Table 5. The selected ARDL (1,1,1) model indicates that each variable is given a lagged value. When the long-term equation is examined, a certain coefficient and probability value are estimated for each variable. It is concluded that Tourism Revenues and Number of Tourists have an effect on the KOF Globalization Index in the long term. This effect is positive for both independent variables. When the obtained probability values (0.0000) are examined, the long-term effect of both variables is statistically significant and important. In the event of a 1% increase in the Number of Tourists Coming to the Country (LnTN), it increases the KOF Globalization Index (LnKOFGI) by 0.2388482% in the long term. On the other hand, if Tourism Revenues (LnTR) increase by 1%, it causes the KOF Globalization Index to increase by 0.155353% in the long term.

It is seen that the error correction term coefficient (CointeQ01) is included under the short-term equation. This coefficient is also known as the correction speed coefficient. The correction speed coefficient is used to determine how close the variables are to the equilibrium in the long term. This coefficient is expected to be statistically significant and negatively signed. As can be understood from the table, the probability value of the coefficient (0.0208) was found to be statistically significant by being less than 5% and the coefficient sign (-0.055697) was determined to be negative. When the correction speed coefficient is examined; it is determined that approximately (-0.055697) 0.06% of the deviations from the long-term equilibrium are corrected in each period. In addition,

this coefficient reflects the result that the variables are jointly cointegrated. In addition, LnTN and LnTR are the Granger cause of LnKOFGI in the long term.

When the short-term test results of the variables are examined as a group, it is determined that only Tourism Revenues affect the KOF Globalization Index at a significance level of 10% in the ARDL (1, 1, 1) model with one lag. ARDL expresses the short-term Granger relationship as a group average. Therefore, although no short-term Granger relationship is found at a significance level of 5%, a short-term relationship can be mentioned at a significance level of 10%.

Table 6: Short-Run Granger Relationship of Variable Coefficients for Each Country

Variables	Coeffi.	Prob.	Variables	Coeffi.	Prob.
Albania			Morocco		
COINTEQ01	0.037799	0.0014*	COINTEQ01	-0.659301	0.0000*
D(LnTN)	0.005579	0.0018*	D(LnTN)	-0.163108	0.0000*
D(LnTR)	0.088583	0.0001*	D(LnTR)	-0.074703	0.0000*
C	0.009147	0.0000*	C	-0.094264	0.0047*
Armenia			Moldova		
COINTEQ01	0.030046	0.0000*	COINTEQ01	0.034594	0.0010*
D(LnTN)	0.007271	0.0000*	D(LnTN)	0.012808	0.0000*
D(LnTR)	0.027365	0.0000*	D(LnTR)	-0.023275	0.0002*
C	0.001659	0.0003*	C	-0.016488	0.0150*
Australia			Mexico		
COINTEQ01	-0.009463	0.0060*	COINTEQ01	0.012309	0.0004*
D(LnTN)	0.006067	0.0000*	D(LnTN)	0.031528	0.0005*
D(LnTR)	0.010807	0.0000*	D(LnTR)	-0.001513	0.1848
C	0.006393	0.0000*	C	0.017440	0.0000*
Azerbaijan			Mongolia		
COINTEQ01	0.006510	0.0057*	COINTEQ01	-0.107984	0.0000*
D(LnTN)	0.042035	0.0000*	D(LnTN)	-0.029672	0.0000*
D(LnTR)	-0.010750	0.0000*	D(LnTR)	0.009291	0.0000*
C	0.020841	0.0000*	C	0.094004	0.0000*
Bulgaria			Mauritius		
COINTEQ01	-0.255068	0.0057*	COINTEQ01	-0.147193	0.0001*
D(LnTN)	-0.028526	0.0000*	D(LnTN)	-0.047628	0.0003*
D(LnTR)	-0.010750	0.0000*	D(LnTR)	0.038626	0.0099*
C	0.020841	0.0000*	C	0.068470	0.0000*
Bahrain			Malaysia		

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COINTEQ01	0.027891	0.0002*	COINTEQ01	0.036823	0.0000*
D(LnTN)	0.029614	0.0000*	D(LnTN)	-0.000458	0.0878
D(LnTR)	-0.011206	0.0000*	D(LnTR)	0.022362	0.0000*
C	0.006815	0.0000*	C	0.006158	0.0000*
Bahamas			Norway		
COINTEQ01	-0.400064	0.0001*	COINTEQ01	-0.003389	0.0316*
D(LnTN)	-0.113764	0.0000*	D(LnTN)	0.020564	0.0000*
D(LnTR)	0.134782	0.0024*	D(LnTR)	-0.024461	0.0000*
C	-0.169611	0.0002*	C	0.004428	0.0008*
Bolivia			Nepal		
COINTEQ01	-0.046021	0.0005*	COINTEQ01	0.060522	0.0003*
D(LnTN)	0.027274	0.0000*	D(LnTN)	0.049777	0.0000*
D(LnTR)	-0.012974	0.0002*	D(LnTR)	-0.012028	0.0001*
C	0.032613	0.0001*	C	0.013782	0.0000*
Colombia			Panama		
COINTEQ01	-0.065995	0.0018*	COINTEQ01	0.036023	0.0000*
D(LnTN)	0.047968	0.0000*	D(LnTN)	0.037747	0.0000*
D(LnTR)	-0.049299	0.0000*	D(LnTR)	-0.017687	0.0010*
C	0.028058	0.0000*	C	-0.004221	0.0002*
Cabo Verde			Philippines		
COINTEQ01	0.008157	0.0215*	COINTEQ01	-0.015705	0.0036*
D(LnTN)	0.064379	0.0000*	D(LnTN)	-0.020722	0.0000*
D(LnTR)	-0.157053	0.0002*	D(LnTR)	0.033113	0.0000*
C	0.009660	0.0000*	C	0.011320	0.0000*
Costa Rica			Portugal		
COINTEQ01	0.066314	0.0292*	COINTEQ01	-0.050283	0.0000*
D(LnTN)	0.137903	0.0000*	D(LnTN)	-0.021433	0.0000*
D(LnTR)	-0.108007	0.0000*	D(LnTR)	0.039042	0.0000*
C	-0.008708	0.0038*	C	0.010701	0.0000*
Ethiopia			Paraguay		
COINTEQ01	0.008301	0.5246	COINTEQ01	-0.021444	0.0000*
D(LnTN)	-0.020729	0.0085*	D(LnTN)	-0.010548	0.0000*
D(LnTR)	0.084741	0.0003*	D(LnTR)	0.021892	0.0000*
C	0.014815	0.0000*	C	0.019280	0.0000*
Finland			Romania		
COINTEQ01	-0.047765	0.0004*	COINTEQ01	-0.062544	0.0000*
D(LnTN)	0.022615	0.0000*	D(LnTN)	-0.005475	0.0003*
D(LnTR)	-0.037809	0.0000*	D(LnTR)	0.011287	0.0000*
C	0.035085	0.0001*	C	0.032827	0.0000*
Guatemala			Slovenia		

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COINTEQ01	-0.223446	0.0000*	COINTEQ01	-0.177299	0.0000*
D(LnTN)	-0.001205	0.2044	D(LnTN)	0.012125	0.0011*
D(LnTR)	-0.070663	0.0000*	D(LnTR)	-0.086212	0.0000*
C	0.076999	0.0000*	C	0.103781	0.0000*
Hungary			Seychelles		
COINTEQ01	-0.069391	0.0000*	COINTEQ01	-0.109270	0.0001*
D(LnTN)	0.013486	0.0001*	D(LnTN)	-0.003478	0.0567
D(LnTR)	-0.021679	0.0000*	D(LnTR)	-0.040425	0.0020*
C	-0.000799	0.0137*	C	0.070927	0.0000*
Jordan			Trinidad and Tobago		
COINTEQ01	-0.101557	0.0004*	COINTEQ01	0.031119	0.0009*
D(LnTN)	0.026854	0.0000*	D(LnTN)	0.046834	0.0000*
D(LnTR)	-0.068092	0.0002*	D(LnTR)	-0.046716	0.0000*
C	0.013514	0.0000*	C	-0.019553	0.0005*
Cambodia			Tunisia		
COINTEQ01	0.286365	0.0002*	COINTEQ01	-0.043838	0.0001*
D(LnTN)	0.141915	0.0000*	D(LnTN)	0.022544	0.0000*
D(LnTR)	-0.020594	0.0006*	D(LnTR)	-0.017719	0.0000*
C	0.046960	0.0001*	C	0.004674	0.0000*
Korea,Rep			United States		
COINTEQ01	-0.037747	0.0005*	COINTEQ01	-0.005719	0.0005*
D(LnTN)	0.005968	0.0001*	D(LnTN)	0.016070	0.0000*
D(LnTR)	-0.005767	0.0013*	D(LnTR)	-0.009930	0.0000*
C	0.023856	0.0000*	C	0.001032	0.0005*
Kuwait			South Africa		
COINTEQ01	0.026220	0.0010*	COINTEQ01	-0.241616	0.0000*
D(LnTN)	0.013264	0.0000*	D(LnTN)	-0.036083	0.0000*
D(LnTR)	0.001866	0.0001*	D(LnTR)	-0.046651	0.0000*
C	-0.006460	0.0016*	C	0.009271	0.0093*
Sri Lanka					
COINTEQ01	0.020945	0.0001*			
D(LnTN)	0.078197	0.0000*			
D(LnTR)	-0.061458	0.0000*			
C	0.001514	0.0017*			

Source: Created by the author

When the short-term Granger relationship is examined for each country individually, it is determined that the short-term coefficients are statistically significant in the vast majority of 39 countries. The short-term coefficients for each country are given in Table 6 above. The variables marked with (*) affect the KOFGI variable in the short term.

5. CONCLUSION

Considering whether the contribution of globalization to the country's economy is provided through various sectors, it is a subject that needs to be discussed. In this study, it is aimed to investigate whether globalization affects tourism.

In the study conducted, due to limited data access, it was aimed to test the relationship between globalization and tourism economy with the Panel ARDL Model using annual data for the period 1995-2020 for 39 selected countries. First, various tests were carried out with the help of E-Views 10 and Stata-15 econometric package program, which was also used in the unit root test.

As a result of Hsio's Homogeneity Test (1986), it was determined that the slope coefficients of the variables belonging to the panel had a heterogeneous structure. Then, a cross-sectional dependency test was performed for each variable. When the results obtained according to various cross-sectional dependency tests were examined, it was determined that there was cross-sectional dependency. Thus, it was decided to apply 2nd Generation Unit Root Tests to the variables.

The series unit root test was performed with Levin, Lin & Chu and Harris-Tzavalis unit root tests. According to Levin, Lin & Chu Unit Root Test; LnKOFGI and LnTR are stationary at level (I(0)), while LnTN is stationary at first degree (I(1)). On the other hand, when the Harris-Tzavalis unit root test results are examined, it is concluded that LnKOFGI and LnTN are stationary at level (I(0)), while LnTR is stationary at first degree (I(1)). As a result, when both unit root tests applied are examined, it is determined that the series do not contain unit roots at different levels. Thus, it was decided to apply the Panel ARDL test.

When the Panel ARDL (1,1,1) Test results are examined; it is concluded that Tourism Revenues and Number of Tourists have a positive effect on the KOF Globalization Index in the long term. The significance of the Correction Speed Coefficient was also determined, and it was concluded that LnTN and LnTR were the Granger causes of LnKOFGI in the long term. When the short-term test results of the ARDL (1,1,1) model were examined, it was concluded that only Tourism Revenues had a significant effect on the KOF Globalization Index at a significance level of 10%. Therefore, although no short-term Granger relationship was found at a significance level of 5%, a short-term relationship was found at a significance level of 10%. On the other hand, when the short-term relationship of the variables for each country was examined, it was concluded that most of all variables affected the KOFGI variable in the short term.

Within the framework of the econometric analysis results obtained; it can be said that by encouraging tourists to come to the country more, tourism will increase globalization opportunities in the short and long term. Thus, globalization can be encouraged by contributing to the global economy and society in the country. The harmony of globalization with the society can be achieved thanks to the differences brought by tourists coming to the country.

We can say that the incentives and supports to be provided to the tourism sector will affect globalization both in the short term and in the long term. As a result, other sectors

and dimensions of globalization may indirectly contribute. Therefore, for policy makers to reveal the positive contributions of globalization and to be in a competitive environment, investments in the tourism sector can be encouraged.

REFERENCES

- Ağır, H. & Özbek, S. (2021).” Relationship between Globalization, Carbon Dioxide Emission, Economic Growth and Tourism: The Example of Mediterranean Countries”. *Necmettin Erbakan University Publications: 112, Economic Development and Tourism*, 91-112.
- Akar, G. & Sarıtaş, T. (2020). “The impact of globalization on tourism: The example of OECD countries”. *Turkish Studies- Economy*, 15 (3), 1087-1102.
- Al-Rodhan, R.F.N. & Stoudmann, A. G. (2006). “Definitions of Globalization: A Comprehensive Overview and a Proposed Definition”. *Geneva Centre for Security Policy*, 1-21.
- Baltagi, B. H., Feng, Q. & Kao, C. (2012). “A Lagrange Multiplier test for cross-sectional dependence in a fixed effects panel data model”. *Journal of Econometrics*, 170(1): 164-177.
- Beck, U. (2000). “The Cosmopolitan Perspective: Sociology of the Second Age of Modernity”. *British Journal of Sociology*, 51 (1), Jun/March, 79-105.
- Breusch, T.S. & Pagan, A.R. (1980). "The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics". *The Review of Economic Studies*, 47(1): 239-253.
- Cooppan, V. (2001). “World Literature and Global Theory: Comparative Literature for the New Millennium”. *Symploke*, 9 (1-2), 15-43.
- Cox, R. (1994).” Multilateralism and the Democratization of World Order”. *International Symposium on Sources of Innovation in Multilateralism*, Lausanne, May, 26-28.
- Emirmahmutoğlu, F. & Köse, N. (2011). “Testing For Granger Causality in Heterogeneous Mixed Panels”. *Economic Modelling*, 28 (3): 870-876.
- Fereidouni, H. G., Al-Mulali, U. & Najdi, Y. (2014). “Globalization indicators–inbound tourism relationship in the MENA Region”. *Anatolia*, 25 (3), 364–373.
- Gaburro, G. & O’Boyle, E. (2003). “Norms for Evaluating Economic Globalization”. *International Journal of Social Economics*, 30 (1/2), 95-118.
- Harvey, D. (1996). “Globalization in Question”. *MS, Department of Geography and Environmental Engineering*, The John Hopkins University, Baltimore, MD.

- Hjalager, A. M. (2007). "Stages in The Economic Globalization of Tourism". *Annals of tourism research*, 34 (2), 437-457.
- Javid, E. & Katircioğlu, S. (2017). "The globalization indicators-tourism development nexus: A dynamic Panel-Data Analysis". *Asia Pacific Journal of Tourism Research*, 22 (11), 1194-1205. <https://doi.org/10.1080/10941665.2017.1378240>
- KOF Globalisation Index, (2024). <https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html>, Access Date: 30.08.2024
- Oman, C. (1996). "The Policy Challenges of Globalisation and Regionalisation". *OECD Development Centre*, Policy Brief No. 11, 5.
- Pesaran, M. (2004). "General diagnostic tests for cross section dependence in panels". *Cambridge working papers in economics* 435 and *CESifo working paper series* 1229.
- Pesaran, M.H., Shin, Y. & Smith, R.P. (1999). "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels". *Journal of the American Statistical Association*, 94, 621-634. <https://doi.org/10.1080/01621459.1999.10474156>
- Sharif, A., Ullah, S., Shahbaz, M. & Mahalik, M. K. (2021). "Sustainable tourism development and globalization: Recent insights from the United States". *Sustainable Development*. 29, (5), September, 793-1048. DOI: 10.1002/sd.2187.
- Spich, R. (1995). "Globalization Folklore: Problems of Myth and Ideology in the Discourse on Globalization". *Journal of Organizational Change Management*, 8 (4), 6-29.
- Steingard, D. & Fitzgibbons, D. (1995). "Challenging the Juggernaut of Globalization: A Manifesto for Academic Praxis". *Journal of Organizational Change Management*, 8 (4), 30-54.
- Sugiyarto, G., Blake, A. & Sinclair, M. T. (2003). "Tourism and Globalization: Economic Impact in Indonesia", *Annals of Tourism Research*, 30 (3), 683-701.
- Szeman, I. (2003). "Culture and Globalization or The Humanities in Ruins". *CR: The New Centennial Review*, 3 (2), 91-115.
- Vujakovic, P. (2010). "How to Measure Globalization? A New Globalization Index (NGI)". *Atl Econ J* (38), 237. <https://doi.org/10.1007/s11293-010-9217-3>
- Wallerstein, I. (2011). "The Modern World-System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century" (1. ed.). *University of California Press*. <http://www.jstor.org/stable/10.1525/j.ctt1pnrj9>
- World Bank (2024). <https://data.worldbank.org/indicator/ST.INT.ARVL>. Access Date: 30.08.2024

The Evolution of Agricultural Vocabulary: From Traditional Terms to Modern Terms (Lexical Changes in Agricultural Practice with the Development of Technology)

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Abstract

Introduction: The article is devoted to the evolution of agricultural vocabulary from traditional to modern terms. The article analyzes how technological progress, scientific advances, and globalization have influenced changes in agricultural terminology. Traditional terms such as "ploughing", "harvesting", "storage" are analyzed in the context of their historical and cultural meaning, and modern terms such as "tractor", "genetically modified organisms (GMO)", "agrodrones" show how new technologies and scientific methods have influenced the agricultural sector can be seen. The article also discusses the role of globalization in sharing knowledge and borrowing terms, as well as the importance of preserving cultural heritage. The evolution of agricultural vocabulary reflects widely cultural and social changes and shows how language has adapted to new conditions and needs of society.

Aim: The evolution of agricultural vocabulary is an important area of research for several reasons. First of all, agriculture is one of the oldest and most important areas of human activity, which ensures food security and the stability of society. Understanding the changes in terminology used in this field allows us to trace the development of agricultural practices and technologies, as well as their impact on culture and society.

Secondly, the world today is facing many challenges, such as climate change, population growth, and the need for sustainable agriculture. The evolution of agricultural vocabulary reflects how science and technology are helping to overcome these challenges by introducing new methods and techniques to agriculture.

Thirdly, globalization and the integration of world markets facilitate the exchange of knowledge and technology between countries, leading to the borrowing and adaptation of terms from different languages. Studying this process can help us better understand cultural interactions and their impact on language.

Method: Studying the evolution of agricultural vocabulary, the transition from traditional to modern terms, requires a comprehensive approach and the use of various methods. Therefore, historical-linguistic, sociolinguistic, ethnolinguistic, lexicographic, comparative methods were used in the study of the topic. The use of these methods allows for a comprehensive study of the

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evolution of the agricultural vocabulary and the identification of the main trends and factors influencing its change.

Conclusion: As a result, the preservation and study of traditional agricultural vocabulary is important to preserve the cultural heritage and identity of rural communities. Traditional terms have not only historical but also cultural value, conveying knowledge and experience formed over centuries.

Thus, the study of the evolution of agricultural vocabulary not only helps to understand the past and present of agriculture, but also helps to predict its future development, to ensure stability and adaptability to new challenges.

Originality and value: The study of changes in agricultural vocabulary over time is a relatively new area of linguistics. There are many studies of general changes in language, but less specific studies of agricultural vocabulary. The agricultural sector forms the backbone of many countries' economies. Understanding the evolution of agricultural vocabulary helps us better understand the development of agriculture and its impact on society. The study of traditional agricultural vocabulary contributes to the preservation of cultural heritage and national identity, which is especially important in the context of globalization.

Key words: vocabulary evolution, traditional agricultural vocabulary, agricultural terms, warehouse, agrodrome, sickle, agroinformatics, threshing floor.

Jel Codes: N/A

1. INTRODUCTION

The agrarian vocabulary, reflecting the cultural and social aspects of agriculture, has undergone significant changes over the centuries. Advances in technology, changes in agricultural practices, and globalization have affected the terminology used in the agricultural industry. In this article, we look through the evolution of agricultural vocabulary, analyze changes in terminology and their causes, and consider how these changes reflect broader cultural and social changes.

Traditional agricultural vocabulary includes terms and expressions that have been used in agriculture for centuries. These words reflect the agricultural experience, cultural experience and social structure of rural communities.

The development of technology in various directions corresponds to the middle of the 21st century. Therefore, until that time, our ancestors used traditional terms in the field of agriculture. In other words, today there are several terms in the vocabulary of agriculture and farming that remain as historical words or whose support for future generation is unclear. Let us analyze some of them as examples:

1. Plow: One of the oldest and most important tools in agriculture, it is used to plow the land and prepare it for sowing. The plow represents hard work, stability and dependence on the land.

2. Harvesting: The process of harvesting grains. The harvest is an important seasonal event that spawns many traditions and celebrations.

3. Sickle: A hand tool for cutting crops. It symbolized manual labor and was an important part of agricultural work before the introduction of machines.
4. Warehouse: A traditional building for drying and storing grain. Drilling machines were essential to preserve crops in high humidity and other adverse weather conditions.
5. Harrow: A tool that loosens the soil after plowing and prepares the field for sowing. The use of harrowing improved the quality of the soil and contributed to good crop growth.
6. Cow shed: A room for keeping cows. It is important not only as part of agricultural production, but also as an element of the traditional lifestyle of rural communities.
7. Grain warehouse: A structure for storing grain and other agricultural products. Sheds were necessary for protection from weather conditions and pests.
8. Mower: A hand or power tool for cutting grass and crops. The mower was important in preparing fodder for livestock and harvesting crops.
9. Thresher floor: a device that threshes grain, separates grain from chaff and bags. Traditional threshing machines are operated mechanically, manually or by birds.
10. Stack: Hay or straw placed outside for storage. The stack is made to store fodder for animals for winter.

These traditional terms describe not only agricultural processes and tools, but also cultural and social aspects of rural life. They are part of the cultural heritage that is passed down from generation to generation, helping to maintain a connection with history and traditions.

Role of Traditional Agricultural Vocabulary: Traditional agricultural vocabulary includes terms and expressions that have been passed down from generation to generation. These words and expressions not only referred to specific agricultural processes, tools and phenomena, but were part of the cultural heritage. They reflect people's connection to the earth, their dependence on natural cycles and seasonal changes.

Transition to Modern Vocabulary

New modern terms in the field of agriculture: Modern technology and scientific advances have significantly changed the field of agriculture by introducing new terms and expressions. These new terms reflect current trends and innovations in agriculture, as well as global changes in agricultural business practices. Let's look at some of the most important modern terms:

1. Agrodrones: An unmanned air vehicle used to monitor field conditions, use fertilizers and pesticides, and estimate yields. Agrodrones increase the accuracy and efficiency of management of agricultural processes.

2. Genetically Modified Organisms (GMOs): The genetic material of plants or animals has been modified through biotechnology to increase plant productivity, resistance to disease or adverse conditions.

3. Vertical Farming: A method of growing plants in multi-level structures, often in closed environments. This saves space and uses resources efficiently.

4. Hydroponics: A method of growing plants without soil, using solutions in water that contain all the nutrients needed for growth. Hydroponics allows you to control growing conditions and increase water efficiency.

5. Aquaponics: A system that combines aquaculture (fish farming) and hydroponics. Fish waste is used as plant food, and the plants purify the water that is returned to the aquariums.

6. Precision Agriculture: An approach to agricultural management that uses data and technology to optimize production. It includes the use of GPS, drones, sensors and analytics software for precision fertilization, irrigation and other operations.

7. Agriinformatics: Application of information technologies and systems to manage agricultural processes. Includes the use of big data, Internet of Things (IoT) and artificial intelligence to make informed decisions.

8. Robot Farms: Farms where most of the work is done by robots and automated systems. This includes robots for milking cows, mowing, weeding and other jobs.

9. Agricultural Biotechnology: Application of biological processes and technologies to improve agricultural practices. Includes genetic engineering, cloning, and other techniques to create more resistant and productive plants.

10. Agroecology: A scientific discipline that studies the application of ecological principles in agriculture to create sustainable and healthy agroecosystems. Includes organic agriculture, agroforestry and other environmentally friendly methods.

11. Manure: the practice of sowing certain crops (e.g. clover, barley) and then working them into the soil to improve its structure and fertility. This will help reduce dependence on chemical fertilizers.

12. Sustainable agriculture: an approach aimed at ensuring the long-term productivity and health of agricultural systems without harming the environment. It includes methods that reduce negative impacts on nature and support biodiversity.

These modern terms show how innovations and scientific advances are transforming the agricultural sector, making it more efficient, sustainable and technologically advanced.

2. LITERATURE REVIEW

Looking at the literature on the topic, research shows that the study of the evolution of agricultural vocabulary is a multifaceted and interdisciplinary field that includes historical, sociolinguistic, ethnolinguistic, and lexicographic aspects. The current

research provides important insight into the changes in agricultural vocabulary and indicates the need for further research in the context of current social and technological changes.

In the historical-linguistic direction, T.V.Akimova in her book "History of the Russian Agrarian Language" (1999) studies the evolution of the agricultural vocabulary for several centuries, paying special attention to the changes caused by social and technological factors. The author analyzes historical texts, documents and identifies changes in terminology and its meaning (Akimova, 1999). And another Russian scientist A.I. Ivanov in his work "Dictionary of Old Russian Agricultural Vocabulary" (2003) provides an extensive list of agricultural terms used in Old Russian texts. This dictionary is an important source for the study of vocabulary and its evolution (Ivanov, 2023). S.V.Belozherov in his article "Evolution of agricultural vocabulary in Russian in XX-XXI centuries". (2015) focused on the influence of political and economic factors and analyzed changes in agricultural vocabulary based on texts from the 20th and 21st centuries (Vasilieva, 2018).

In the sociolinguistic direction, S.A.Belyaev in his article "Social Aspects of Agricultural Vocabulary Development" (2015) studied the differences in the agricultural vocabulary of different regions of Russia and analyzed how regional characteristics and social changes affected the terminology (Belyaev, 2015). In the same direction, L.P.Kuzmina in her study "Regional Differences in Agricultural Terminology in Russia" (2017) conducted a study that showed how geographical location and climatic conditions affect the use of certain agricultural terms (Kuzmina, 2017).

Social changes also had an impact on agricultural terms. In this direction, I.V.Petrova in the article "Sociolinguistic Aspects of Agrarian Vocabulary in the Context of Urbanization" (2018), studied how urbanization and migration processes affect changes in agricultural vocabulary, leading to the disappearance of some traditional terms and the emergence of new ones (Belyaev, 2015).

Agricultural terms in the field of traditional rites and folklore were also taken up, and N.M.Ryabova in her work "Traditions and Innovations in the Agrarian Lexicon of Russian Folklore" (2016), studied how agricultural vocabulary is reflected in folk traditions and rituals, identified traditional terms, their evolution, and analyzed folklore texts (Ryabova, 2016). In the same direction, B.A.Serebrennikov on Ethnolinguistics and Agrarian Culture: Based on the Russian Language (2011), studied the relationship between agrarian culture and language, and studied how changes in agricultural practices affect language (Serebrennikov, 2011).

Scientists studying the vocabulary of Turkic languages and its historical changes have only indirectly addressed the issues of the evolution of the agricultural vocabulary. For example, Andrey Viktorovich Dybo, Anna Dybo, Marcel Abramovich Agekyan, Nadezhda Iosifovna Emelyanova, Husan Muhammadiev, Ahmet B. Eren and Sergey Pavlovich Kazantsev are well-known linguists and Turkologists engaged in comparative historical research of Turkic languages. Their research covers issues of historical

lexicology, including how changes in different areas of vocabulary may affect agricultural terms.

And the agricultural terms of the Turkic languages in the Central Asian region have been studied only by a few scientists. It should be noted that K. K. Yudakhin's "Kyrgyz-Russian Dictionary" (1965) contains a number of farming terms. However, it is not a separate section, but is included in the general dictionary (Yudakhin, 1965). In J. Zhumaliev's work "Lexicon of Fergana Kyrgyz Dialects" (1991), there are places where farming terms are mentioned, although they are not studied separately (Zhumaliev, 1991). And in the monograph "Professional vocabulary of the Kyrgyz language (as an example of cotton words)" (2016) by E.G. Khuribayeva, the agricultural vocabulary was analyzed in detail (Khuribaeva, N/A).

3. RESEARCH CONTENT

Influence of technology and scientific progress on agricultural vocabulary with the development of technology and the introduction of scientific methods into agriculture, new terms and expressions have appeared. Traditional means and methods have been replaced by modern machines and technologies, requiring updating and supplementing the agricultural vocabulary.

Modern technology and scientific advances have significantly changed the agricultural industry, leading to radical changes in farming methods and, therefore, in the terminology used in this field. Traditional methods of farming are gradually being replaced by high-tech solutions that lead to the emergence of new terms and concepts. Let's see how technology and scientific progress affect the development of agricultural vocabulary.

Automation and robotization

Automation and robotization of agricultural processes have significantly increased the efficiency and accuracy of tasks. These changes led to the emergence of new terms:

- Agrobots: robots designed to perform agricultural tasks such as sowing, weeding, harvesting and monitoring the condition of plants.
- Autonomous tractors: tractors equipped with automatic control systems that can perform tasks without human intervention.
- Dairy robots: devices for automated milking of cows to increase productivity and improve working conditions for farmers.

Information technology and data

The use of information technologies in agriculture contributes to the accurate management of resources and optimization of production processes:

- Precision farming: an approach based on the use of data and technology to optimize agricultural processes. It includes the use of GPS, drones and sensors for precise fertilization and irrigation.

- Agriinformatics: the use of information technologies for data analysis, agricultural management and decision-making.

- Internet of Things (IoT): A network of interconnected devices and sensors used to monitor and control agricultural processes in real time.

Biotechnology and genetics

Scientific advances in biotechnology and genetics have led to the creation of new terms related to crop and animal improvement:

- Genetically modified organisms (GMOs): plants and animals whose genetic material has been modified to increase productivity, resistance to disease and adverse conditions.

- Cloning: the technology of creating genetically identical copies of plants and animals, improving their characteristics and performance.

- CRISPR: gene editing technology used to precisely modify the DNA of plants and animals.

Sustainable agriculture

Modern technologies are aimed at creating more sustainable and environmentally friendly agricultural methods:

- Hydroponics: method of growing plants without soil using water solutions containing nutrients. Enables effective use of resources and control of growing conditions.

- Aquaponics: a system that combines fish and plant cultivation, where fish waste is used as fertilizer for plants.

- Vertical Farming: A method of growing plants in multi-level structures that saves space and resources.

Globalization and knowledge exchange

Globalization has facilitated the exchange of knowledge and technology between different regions and countries. This led to the borrowing and adaptation of terms from other languages and cultures. For example, English terms such as "crop rotation" or "precision farming" have become widely used in other languages.

Globalization and the exchange of knowledge between countries and regions have contributed to the borrowing and adaptation of terms from different languages:

- AgTech: a term that includes agricultural technologies aimed at increasing the efficiency and sustainability of agricultural production.

- Smart farming: intelligent farming that uses modern technologies to improve the management of agricultural processes.

The impact of technology and scientific progress on agricultural vocabulary is significant and varied. New terms reflect changes in agricultural practices, the introduction of high technology and innovation, as well as globalization and knowledge exchange. These changes help not only to increase agricultural productivity and

sustainability, but also to preserve cultural heritage and adapt to the new challenges of the modern world.

Social and cultural aspects of the evolution of agricultural vocabulary

Preserving cultural heritage: Although modern terms have been introduced, many traditional words and expressions are still used. They remind of cultural heritage and help to maintain connection with history and tradition.

Adaptation and Innovation : Modern agricultural vocabulary continues to reflect innovation and change in society. After the new technologies and farming methods new terms appear. This evolution shows the ability of language to adapt to changes and needs of society.

The evolution of agricultural vocabulary is not only a process of changing terminology associated with the introduction of new technologies and scientific achievements, but also a deep reflection of social and cultural changes in society. The development of agricultural vocabulary affects cultural traditions, social structure and economic conditions, and the formation and adaptation of cultural norms and values. We consider the main social and cultural aspects associated with the evolution of agricultural vocabulary.

Social aspects

1. **Changing Social Structure :** Modern technology and agricultural practices have changed the structure of rural communities. The transition from manual labor and traditional methods to automated and technological methods has led to a reduction in the number of workers in the agricultural sector and a change in the profile of agricultural occupations. This change is reflected in the new agricultural vocabulary:

- **Agropreneur:** A professional person who runs an agricultural business, often using modern technology and management strategies.

- **Farmer 2.0:** a term that describes modern farmers who use advanced technologies and business methods.

2. **Transformation of traditional labor :** Traditional forms of agricultural labor are changing with the introduction of new technologies such as robotics and automation. This also affects language:

- **Robotic milking machine:** Equipment that automates the process of milking cows and replaces manual labor.

- **Agricultural engineer:** A professional person engaged in the development and implementation of new agricultural technologies.

Cultural aspects

1. **Preservation and transformation of cultural heritage:** Changes in the agricultural vocabulary not only reflect technological and economic changes, but also affect the

preservation of cultural heritage. Traditional terms and practices may disappear, but many remain in cultural memory and tradition:

- Agricultural festivals: Traditional festivals such as harvest festivals often involve the use of traditional terms and practices that are preserved in language and culture.

- Folklore terms: Words and expressions related to traditional farming methods have been preserved in folk art and folk songs.

2. Adaptation and interpretation of new concepts: Modern terms associated with innovations and new technologies can be adapted and interpreted in the context of local cultures and traditions:

- Agroecology: An approach that combines ecological principles and agriculture can be adapted to the cultural characteristics and traditions of rural communities.

- Ecofarming: a method of farming that focuses on sustainability and environmental protection that can be interpreted in the context of local traditions and practices.

Social influence

1. Education and information: Modern agricultural vocabulary also plays an important role in education and informing the public about new methods and technologies. The new terms will be part of educational programs, workshops and information campaigns to spread knowledge about modern agricultural practices.

2. Economic impact: Changes in agricultural vocabulary may reflect economic changes in agriculture, such as a shift to more profitable and efficient business methods. This effect can also be seen in language:

- Financial terms: Terms related to investments in agrotechnology and agricultural asset management are becoming an important part of agricultural vocabulary.

4. CONCLUSION

The evolution of agricultural vocabulary reflects the profound changes that have happened in agriculture over the centuries. From traditional terms to modern expressions which passed down from generation to generation, associated with new technologies and globalization, the agricultural vocabulary is developing. Understanding this evolution helps to better understand the cultural and social aspects associated with agriculture and highlights the importance of preserving and adapting agricultural heritage in the modern world.

The evolution of agricultural vocabulary is a complex process that affects both the social and cultural aspects of the life of rural communities. Changes in terminology reflect profound social transformations associated with the introduction of new technologies and methods, as well as cultural transformations associated with the preservation and adaptation of traditions. Analyzing these aspects helps to better understand how language and culture interact and change in response to modern challenges and innovations.

REFERENCES

- Akimova, T.V. "History of the Russian Agrarian Language". Moscow: Izdatelstvo MSU, 1999.
- Belyaev, S.A. "Social aspects of development of agrarian vocabulary". Vestnik RAN, 2015, No. 4, p. 55-62.
- Vasilieva, O.V. "Dictionaries of agrarian vocabulary in Russian lexicography". Lexicographic Journal, 2018, No. 4, p. 44-53.
- Zhumaliev J. Lexicon of Fergana Kyrgyz dialects, Bishkek: Ilim, 1991 - p. 136.
- Zaliznyak, A.A. "Russian noun formation". Moscow: Nauka, 2002.
- Ivanov, A.I. "Dictionary of Old Russian Agricultural Lexicon". St. Petersburg: Nauka, 2003.
- Knyazev, I.I., Popova, O.A. "Corpus analysis of agrarian vocabulary in Russian". Question of Linguistics, 2020, No. 1, p. 34-49.
- Kudryavtsev, A.I. "Creation of specialized dictionaries of agrarian vocabulary". Slovarnoye delo, 2021, No. 2, p. 61-70
- Kuzmina, L.P. "Regional differences in agricultural terminology of Russia". Sociolinguistic Journal, 2017, No. 2, p. 98-107.
- Levin, Y.I. "Introduction to language learning: textbook for universities". Moscow: Higher School, 2001.
- Ryabova, N.M. "Traditions and innovations in the agrarian vocabulary of Russian folklore". Ethnolinguistic journal, 2016, No. 5, p. 112-124.
- Serebrennikov, B.A. "Ethnolinguistics and agrarian culture: research on the example of Russian language". Moscow: Progress, 2011.
- Smirnova, E.V. "The method of corpus analysis in the study of changes in agrarian terminology". Computer Linguistics, 2019, No. 3, p. 75-88.
- Uspensky, B.A. "Word and text in the history of culture". Moscow: Slavic language culture, 2004.
- Khuribaeva E.G. "Professional vocabulary of the Kyrgyz language (as an example of cotton words)", Bishkek: Ulu Toolor, 188 p.
- Yudakhin K. K. (compiler). Kyrgyz-Russian dictionary. - M.: Soviet Encyclopedia, 1965. 974 p.

The Historical Significance of the Image of Women in the Heroic Epic "Maspatsha"

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Abstract

Introduction. The Karakalpak folk heroic epic "Maspatsha" tells about the historical significance of the family cult and reflects the concept of a woman. The materials of this scientific article are distinguished by their originality. Because, in 2023, materials were collected from the manuscript fund of the Scientific Research Institute, a branch of the Academy of Sciences of the Uzbek Republic, located in the city of Nukus of Karakalpakstan. Based on the collected materials, a historical and ethnographic analysis was carried out. In addition, in the manuscript collection, some materials written in the Karakalpak language have been translated into English and examples are provided. The epic "Maspatsha" consists of 2 books and has a total volume of 389 pages. [(P – 487 P, Epic "Maspatsha" Book-1 (1-151 page.), Epic "Maspatsha" Book-2 (152-389 page.)]. Here, the role of women in society is divided into 5 stages, each of which describes a historical period and is reflected through plot images in the epic. They are: first - women as fighters; second – as a supporter and encourager; third - a symbol of family and home; fourth – a transferer of cultural values and fifth – an appearance and beauty of women. Also, the history of the creation of the epic, toponymic and genealogical names, diplomatic relations with neighboring nations, and poems about the patriarchal life of the Karakalpak people in the middle ages were presented.

Aim: The review confirms the relevance of the topic in the historical aspect, how the place of Karakalpak women in the society was described and what significance was recorded in the versions of the heroic epic «*Maspatsha*» or «*Maspacha*», which has a well-known importance in the oral folklore of the Karakalpak people living in Central Asia, recorded by Begman uulu Tore Zhyrau, Kiyas Zhyrau and Arzymbet uulu Abdymurat Zhyrau.

Method: Carrying out the relevant research required a careful and serious process, as the evaluation of materials from the literature and manuscripts fund was the main component of our research. Chronological, comparative, empirical research, analysis-synthesis and retrospective methods were used during the research.

Findings: Findings reveal that In dastans, women play an important and multifaceted role. These epics, as in other Central Asian cultures, reflect unique aspects of social and cultural life, where women often take center stage.

Conclusion: The toponymic names, ethnic components, social consciousness, women's social activity, role, heroic plots, family cult in the heroic epic and point of view of some researchers were compared to the historical sources in order to solve this problem.

Originality and value: The scientific article is valuable and original as it is taken from the original manuscripts of the research institute located in Nukus.

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Keywords: heroic dastan "Maspatsha", Aiparsha, Kalmaks, Karakalpaks, folklore, cult of women, patriotism, tribes, epic.

Jel Codes: N /A

1. INTRODUCTION

The era of the creation of the epic "Maspatsha" is described by researchers in different periods. However, most of them refer to the 18th century. A. Aliev says, "The epic itself was written at the end of the 18th century, and in the 20th century, it underwent a lot of changes".

Let's look at the brief history of the epic: A rich man whose name was Abdikarim lived in the country of Bukhara. Being childless until the age of forty, he asked God for a child. One day, in a dream, an invisible saint told him that he would have a child. Abdikarim's wife, Karachach, wanted to eat tiger's heart and gave birth to a son after eating it, and named him "Maspatsha". He was distinguished by his courage and heroic strength. In a dream, he fell in love with a girl named Aiparsha and went in search of her. Aiparsha lived in the country of Tama on the banks of the Chirchik River. A 70-year-old Kalmak khan, Babakhan, who was in love with Aiparsha, attacked a young couple on their way to Maspatsha's country. The fight went on for a long time, and Babakhan was helped by an old, cunning old man named Shardene. However, despite this, Babakhan was defeated.

In the fight between two heroes, both showed bravery. However, Orozaly Khan summoned a giant (diva) named Alangasar, Maspatsha was seriously injured, and Aiparsha was captured by Orozaly Khan. There, Aiparsha gave birth to two children, a girl and a boy from Maspatsha. Seven years later, Maspatsha's father, Abdikarim, came to Labakbay, and hearing what had happened, dressed as a begger to save his grandchildren, he came to the city where Aiparsha lived. Abdikarim's 40 men fought with Orozaly Khan's troops, and Aiparsha's son killed the Khan. He meets his daughter-in-law and takes his grandchildren out of the city. When Aiparsha, who was coming home with her children, came to a place called Parli mountain, she said to her children, "Your father died here." However, it is said in the epic that Maspatsha did not die, met his children and wife Aiparsha, returned to his homeland and lived a happy life (Maksetov, 1977. p. 44-46).

In the above researches of K. Maksetov, it was stated that Aiparsha lives in the **Tama** country on the banks of the Chirchik River. Where is the Tama country located, who lived there, in what centuries, who was called Tama, etc. In order to clarify the questions, let's again refer to the third version of Kiyas zhyrau recorded by A. Karimov (Kerimov) Kairatdinov in 1956: "My advice, don't look back, I told you, my son, go on your way. We are from Tahtakhan, our tribe is kypchak, we are people of tama" (Karakalpak folklore, 1934. p. 78). Also, in line 423 of page 31 of volume 1 of the fund of manuscripts, was said "He is from Tama tribe and his name is Lakapbay" (P - 487 p, Epic "Maspatsha" Book-1). Therefore, there is a reason to consider that Tama tribe of Karakalpak and one of the Jetai tribe of Kichi Juz of Kazak is the same. After all, one of

the important points in this context is that Karakalpaks and Kazakhs have similar cultural and ethnic roots. Both groups were associated with a nomadic way of life and lived in the vast expanses of Central Asia. Because of this admixture, their history and interactions are complex and diverse, and it is no doubt that they are collectively known as the Tama country based on their tribal names (A.V.).

And in the variant recorded from Begman uulu Tore in 1934, "*He did not find a suitable wife in Keneges province, traveled for six months and forty days, and went along the Chyrchik river. There was a rich man with six brothers along the Chirchik river. It is described that Lapakbay, he was the eldest of those six brothers*" (Karakalpak folklore, 1934. p. 53). In this case, only the banks of the Chirchik River were mentioned, and there was no mention of whose country it was. Therefore, we could not get decent information when we searched historical sources for the country of Tama. We came to the conclusion that it is located in the region of the Chirchik River, and according to the epic, Karakalpaks - as well as Turkic ethnic communities inhabiting the neighboring regions - were called the Tama country after the Tama tribe (A.V.).

Women play an important and significant role in the heroic epic. They are presented as strong and independent individuals, often playing the role of active participants in the plot. Based on this issue, we have divided the role of women into 5 aspects.

First: Women as Warriors: In epics, women often play the role of fighters for the sake of themselves and their families. They make decisions, influence the course of events, and even fight for their land and freedom.

<i>Атқа жапты сақаланған маұйтты (олпок),</i>	<i>She covered the horse with saddle pad,</i>
<i>Ер қалпеси хазыреті Даұйтты.</i>	<i>It is a friend of a warrior.</i>
<i>Айпаршаны нашар дейіп ким айтар, Талап етип кийіп атыр ақлы саұйтты.</i>	<i>Anyone can't say Aiparsha is a woman,</i>
<i>Қара шашын дал төбеге жыяды, Атасы берген ак саұйтты (соот).</i>	<i>Who needs to wear white armour. She did her black hair to the top of her head,</i>
<i>Оң ийнинен кийеди...</i>	<i>She takes out the armour given by father.</i>
<i>Дым билмеген қалмаққа.</i>	<i>And wears it on the right side...</i>
<i>Араласып барады, Алла деп найза урады.</i>	<i>Kalmaks are very strong.</i>
<i>Ағдарып ташлап барады, Алдын қырса қәпырдың...</i>	<i>She began to fight with them, Praying the God attacks with spear.</i>
<i>Белге буұған потасы (белбоо)</i>	<i>She kills them one by one,</i>

The first line of the enemy...

The strongest ones,

(Karakalpak folklore, 1934. p. 60).

- in the poem, it is said that Aiparsha and her beloved husband Maspasha went to the war against the Kalmaks with their black hair tied on top of their heads, hanging their weapons, wearing the armor given to them by their father and wearing a belt around their waist as a soldier.

<i>Құрт ойынын құрады,</i>	<i>She was as kokpar (horse game) player</i>
<i>Қарсыласқан қалмаққа.</i>	<i>To Kalmak enemy</i>
<i>Керилип семсер урады,</i>	<i>The sword is drawn and struck,</i>
<i>Кийгени ылғый қарады.</i>	<i>She looked at what she was wearing.</i>
<i>Құрт ойынын салады,</i>	<i>She was as kokpar player</i>
<i>Қаршыласқан нешиесин.</i>	<i>To the enemy</i>
<i>Аударып таслап барады,</i>	<i>She kills who attacks her</i>
<i>Тармақлы мылтық алұаның.</i>	<i>With her weapon</i>
<i>Менменсиген сәрдарын,</i>	<i>There was a leader of the enemy</i>
<i>Қарсыласқан палұанын.</i>	<i>Who was strong and brave</i>
<i>Қайырмай басын кеседи.</i>	<i>She cuts off his head (Karakalpak folklore, 1956. p. 106).</i>

In 1938, in the second variant recorded from Arzymbek uulu Abdumurat: Baba Khan was captured from the tent where he was sitting and was carried on Sandal horse for 3 days, and was thrown on a stone, his bones were scattered and the khan died (Karakalpak folklore, 1938. p. 174).

Second: Support and encouragement: Women are often shown as a source of support and encouragement to the heroes of the epic. Their wisdom, advice, and insight help heroes overcome challenges and trials.

Кара шашым дал төбеме жсырман, I will do my hair to my top of my head,
Атам берген саўытымды кийермен. I will wear the armor my father gave.
Өзиң қорқсаң, қалағой төрем, If you're afraid, you'll live in the
таўларда, mountains,
Алла салса, бундай жаўға тийермен... God's will, I will meet such enemy...
Дал мойныңа тақсам маржан Despite I am a woman ,
седепти, I will fight with the enemy.
Душманларға мен берейин әдепти. Don't run away from the enemy.
Жаў алдында қаша берме, наданым, If you are brave, you will fight with
Нашарыңа берсең бойма жуўапты. them,
Or let your wife to help you.
(Karakalpak folklore, 1934. p. 59

- when Aiparsha saw Maspatscha running away from the Kalmaks and gave him courage by saying that she would help him if needed. Also, Aiparsha's wisdom and foresight of the upcoming event:

Хаўлығып төгеди омыраўдан терди, He poured sweat from his chest,
Аңламайман, неден үрkip, не көрди. I don't understand why he was scared
Ақыбети, ярым, жақсылык болгай, and what he saw.
Үш күн болды, Сандал атым сескенди. May the end be good,
Саўыт кийип, әрман менен шайлайды, It's been three days, and my horse
байлайды. Sandal is scared (Karakalpak
Ғазап етсе, тартып қолыңды folklore, 1956. p. 96).
байлайды. He wears armor and is ready to fight,
Шап пириңди, бегим, тезден өлтириң,

Сен кеткенде қоллар салып ойнайды. If he gets angry, he will tie your hands.

Kill him quickly, my dear,

*When you leave, he will do harm
(Karakalpak folklore, 1956. p. 102).*

- here it is said that Aiparsha's running horse Sandal has been afraid for three days and feels something bad, but it is said that she turned it into good. The general content of the story when Maspashsha was going to get married to her and was coming back to Keneges village, Babakhan, a 70-year-old Kalmyk Khan, was waiting on the road by digging up various places on the road and laying traps. But Babakhan, who found out that the hero had passed by during the Kalmak festival, chased after him. Sherdene, the ancestor of the Kalmaks, who looks like a pir with a turban on his head, comes out from the road, looks like a normal old man and seduces Maspashsha. Then Aiparsha says that this enemy is not a wandering ancestor and asks him to kill him. However, Maspashsha, who did not listen to such advice, fought with him and eventually was captured by the enemy.

Third: Symbol of family and home: In the context of Karakalpak culture, women are often symbols of family and home. They reflect traditional values and ideals related to family life, love and care. In the epic, Lakapbai's wife is a very intelligent woman. She saved Gargabai from the wrath of her husband Lakapbai, who wanted to get married her daughter Aiparsha. The role of an aunt in establishing a family through Aiparsha's aunt Karshiga is well described. Aiparsha was 16 years old when Maspashsha wanted to get married her. However, her father said that he would wait for 2 years when she is 18 she can get married, and continue to pay the dowry (Epic "Maspashsha, 1940. p. 10).

It is said that Maspashsha brought forty camels with a thousand gold coins (Karakalpak folklore, 1934. p. 53) Sultan Maspashsha loaded Aiparsha's kalyng (bride price) to forty camels with silver and copper jewelry. The role of the woman in the family is given through Aiparsha's mother and aunt, proving that she is the adviser of the host of the house.

Fourth: Transmission of Cultural Values: Women play an important role in the transmission and preservation of cultural traditions and values. Through their actions, stories, and rituals, they pass on knowledge to future generations and help preserve the cultural heritage of their people.

Халық әйлеген бергей мениң тилегим,

My wish will come true

Ак найзаға палуан көрдим билегиң,

You a hero with a white spear,

Биле-билсең, баламды алган баламсың,

Арзымды есит, кызымды алган күйеуим.

If you know, you are my son who got married my daughter,

Listen to my wishes my son-in-law, who married my daughter (Karakalpak folklore, 1934. p. 53)

- said the girl's parents when they sang the song "haujar" during her marriage. Haujar song is a traditional song sung during marriage of a girl in ancient Karakalpaks.

Fifth: the appearance and beauty of a woman. Historical depictions of female beauty in different cultures and eras have varied significantly depending on socio-cultural contexts, beauty canons, traditions, and ideas about the ideal female appearance. In the epic: "*Aiparsha had seven nikabs (mask) on her face, it moved and fell to the ground, she was like the moon emerging from the clouds. Although the Kalmaks had heard the name of Aiparsha, they had not seen the face of the girl, she had white forehead, almond-shaped eyelids, pistachio lips, tall, wide-chested*" (Karakalpak folklore, 1938. p. 171) – she was described as very beautiful and attractive.

Let's talk about how the beauty of a woman was valued in historical times: In *ancient Egypt*, the beauty of a woman was often associated with the harmony of the form (body structure), symmetry and the glow of healthy skin. White skin and a slim waist were often considered a sign of beauty. Taking care of one's appearance, using perfumes and cosmetics were also important. In *ancient Greek* culture, the beauty of a woman was often described through the harmonious proportions of the body, the grace of movement and the classical beauty of the face.

Talent, modesty and nobility were considered ideal. In *medieval Europe*, the ideal of beauty was often pale skin, indicating that a woman did not engage in physical labor in the sun. A high forehead, a thin waist, and beautifully decorated clothes were also signs of nobility and beauty. In Europe, the beauty and harmony of nature was appreciated during the Renaissance. Women with round face and healthy skin were considered beautiful. Portraits of famous women of the time often emphasized their natural charm and sophistication. In the *19th century*, *Western culture* associated a woman's beauty with nobility, tenderness and femininity. White faces, airy dresses and elegant hairstyles were popular. Therefore, the appearance of Aiparsha, given as an example above, gives the image of a more charming and pretty girl.

2. LITERATURE REVIEW

The epic Maspashsha, which reflects the historical events and cultural characteristics of the Karakalpak people, occupies a great place in Karakalpak folklore, like many other epics. Let's dwell on the history of collecting the epic: Russian scientist, ethnographer, linguist and folklorist Ignatij Nikolayevich Smirnov, who made several expeditions to Central Asia and collected folklore materials and published an article "Maspashsha" in the journal "Notes of the Caucasian Department of the Imperial Russian Geographical Society" in 1910 (Smirnov, 1910). Only after that, in 1934, the first version was made by K. Aiymbetov from Begim uulu Toro Zhyrau, who lived in "Tenghe Shashkan" 9th

village council of Takhtaköpur district, and the second version was written in 1938 by S. Maulenov and Sh. Khozhoniazov from Arzymbet uulu Abdimurat Zhyrau who lived in village 7 of Takhtaköpur district, and it was published in the first and second issue of the Union of Writers' journal «Karakalpakstan Literary Almanac» in 1939. It was published as an independent book in 1940 (Maspatscha, 487). In 1956, Artyk Karimov wrote the third version from Kiyas Zhyrau, and in 1958 it was published as an independent book. In 1960, A.Aliyev wrote the fourth version from Kaypnazar Zhyrau. At the same time, A.Aliev found an Uzbek version written by A.Afzalov from Borubakshy Sadyk uulu, a resident of Beshkepe village, Fergana region (Maksetov, 1944).

In the early 1960s, the "Maspatscha" epic became an object of researchers. S.Akhmetov, B.Ismailov, A.Karimov published several scientific articles and tried to find the national roots of the epic. A.Aliev considers the epic to be a "heroic-romantic work (Aliev, 1961). The same idea was first expressed by A.K.Borovkov (1958). And some researchers said that it was lyro-epic. Researcher K.M.Maksetov proved that it was a heroic epic on page 44 of his book "Notes on Karakalpak folklore" published in Tashkent in 1977 (Maksetov, 1977).

3. CONCLUSION

Thus, women in the Maspatscha epic are presented as key figures playing an important role in the formation and development of feudal society, in the transmission of cultural and ethical values. In the image of Ayparsha, one can see the spiritual wealth of Karakalpak women: steadyness in love, courage and determination, patriotism and humanity. Using the example of the heroic epic, a historical and ethnographic analysis of the traditions, customs, worldview and social status of the Karakalpak people in the past centuries was conducted.

REFERENCES

- Aliyev, A. (1961). Variants of the epic "Maspatscha", "Bulletin of Karakalpak department of An UzSSR". Tashkent, 1961, No. 4. 61-62.
- Borovkov, A.K. (1958). The question of the study of the Turkic peoples of Central Asia and Kazakhstan. The question of the epic of the peoples of the USSR. MMoskva-Leningrad, 44.
- Karakalpak folklore. Maspatscha. Begman uuluTore Zhyrau. Recorded by: K. Aiymbetov (1934). Volume 58. Nukus, 2015. 53, 59, 60.
- Karakalpak folklore. Maspatscha. Kiyas Kairatdinov Zhyrau. Recorded by: A.Karimov (1956). Volume 59. Nukus, 2015. 78, 96, 102, 106.
- Karakalpak folklore. Maspatscha. Arzymbet uulu Abdimurat Zhyrau. Recorded by: S. Mavlenov, Sh. Khojoniyazov (1938). Volume 60. Nukus, 2015. 171, 174.

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Peja –Kosovo, 2-5 October 2024

Maksetov, K.M. (1977). Essay on the history of Karakalpak folklore. Tashkent, 44-46.

Epos "Maspatsha" (1940). R - 487 pages, 1 volume. 4, 10.

Smirnov, I.N. (1910). "Maspatsha" in the journal "Notes of the Caucasian Department of the Imperial Russian Geographical Society". Tiflis.

Methodology of cost analysis for occupational safety and health

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Abstract

Introduction: The scientific article presents a methodology for analyzing costs related to occupational safety and hygiene, focusing on the development of a systematic approach for the qualitative and quantitative assessment of expenses associated with ensuring safe and healthy working conditions. The research includes an analysis of both direct and indirect costs, covering various aspects of occupational safety management. The methodology offers tools for analyzing direct costs, such as the purchase and maintenance of personal protective equipment, staff training, and regular inspections. Additionally, it takes into account indirect costs, such as productivity losses, increased medical expenses, and damage to the company's reputation.

Aim: The article proposes an integrated approach to the analysis of costs related to occupational safety and hygiene, utilizing modern accounting methods and statistical data. The research results enable enterprises to more accurately assess the effectiveness of their investments in occupational safety and identify key areas for improvement. This methodology can serve as a foundation for the development of more effective safety and hygiene management strategies within an enterprise, striking a balance between mandatory regulations and the rational use of resources to create a safe and productive work environment.

Method: The study employed various general scientific methods, including abstract-logical, empirical, expert assessment method, and utilized a systemic and comprehensive approach. Structural functional and statistical analysis techniques and modeling were also applied.

Findings: Results demonstrate that OSH cost analysis enables the identification of financial priorities, the redistribution of expenditures, and the implementation of strategic safety measures. The study reveals the lack of specific legal regulations for OSH cost planning in Kazakhstan and highlights the critical role of investment in reducing occupational injuries.

Conclusion: The proposed methodology offers a robust framework for managing OSH expenditures, balancing compliance with resource efficiency. By adopting these approaches, enterprises can improve working conditions, enhance safety levels, and ensure sustainable business practices.

Originality and Value: This research bridges the gap in OSH cost analysis methodologies, providing actionable insights for policymakers and businesses to foster a safer and more productive work environment.

Keywords: occupational safety costs, hygiene expenditure analysis, direct and indirect expenses, integrated approach, safety and hygiene management strategies

JEL Codes: J28, M54

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1. INTRODUCTION

The relevance of scientific research is linked to industrial growth and the development of production in Kazakhstan, which must ensure the right to safe labor and the implementation of all measures for the prevention of occupational injuries. Analysis of many occupational injury prevention programs, including those in industrially developed countries, has established that the most successful ones are based on a common set of core elements: education and training, protective measures, and technical equipment (Yi Sun et al., 2018). The importance of these elements can be confirmed by citing scientific developments in industrially developed countries. A key element of the professional injury prevention program implemented in Germany is personnel measures, which include the use of personal protective equipment (PPE) and employee safety training (D.Attwood et al., 2006). The established connection is confirmed by the model built in the work (Fu Gui et al., 2020) to predict the frequency of workplace accidents and related costs (using the example of the offshore oil and gas industry), where factors such as the quality of PPE and the effectiveness of training programs were considered as input data. Many scientific studies have shown that investments in safe working conditions have a significantly positive impact on labor productivity, labor competitiveness, quality index, and production rates. The scientific hypothesis aims to establish the sufficient volume and types of expenditures that positively impact the reduction of occupational injuries in enterprises. It is assumed that a properly formulated budget for occupational safety, viewed as an investment in safe labor, will enhance opportunities for tripartite cooperation in occupational safety activities, stimulate improvements in working conditions, and preserve employees' work capacity. To confirm the scientific hypothesis, production sites and workplaces in enterprises within the manufacturing sector were studied, a sector characterized by a wide range of production factors that have harmful effects on workers' health. Additionally, the selection of enterprises in the manufacturing industry was driven by the need to ensure that this sector meets the required occupational safety standards adequately. The practical significance of the scientific results is justified as follows. While there is ample information on assessing the economic losses from workplace accidents, data on how much employers spend on occupational safety, its provision, and the elimination of causes of occupational injuries and diseases is quite limited. To evaluate the amounts spent on occupational safety, experimental studies were conducted to gather information on the types and amounts of occupational safety expenditures, as well as the employer's commitment to the principles of safe labor.

2. BODY OF PAPER

Methodology

The study employed various general scientific methods, including abstract-logical, empirical, expert assessment method, and utilized a systemic and comprehensive approach. Structural functional and statistical analysis techniques and modeling were also applied.

Research Results and Discussion

The analysis of costs is a financial and economic management technique for enterprises, enabling the achievement of set goals through the efficient use of resources. Implementing an economic mechanism for analyzing expenditures on activities aimed at ensuring safety and occupational health should become an integral part of the financial and economic operations of enterprises, regardless of ownership forms, scale of activities, and types of products produced. This process requires methodological and regulatory support at the state level.

The analysis has shown that, to date, there is no specific legal act in Kazakhstan that fully or indirectly regulates the planning and analysis of occupational safety expenditures. The formation of funding volumes for specific measures related to the employer's obligations in the field of safety and health is carried out considering certain conditions specified in regulatory acts that govern these procedures (standards, norms, lists, diets, regimes, etc.).

Scientific characteristics of the cost analysis methodology for occupational safety are derived from scientific results presented in academic works available in databases such as Web of Science, Scopus, Science Direct, and Springer (Champoux D. & Brun J. P., 2003). It has been found that the issue of determining the budget for safe labor is often viewed through the lens of sufficiency in ensuring compliance with regulatory requirements and practical needs for worker protection. Moreover, many studies focus on the challenges of determining the amount of expenditure on specific occupational safety measures. A series of scientific works addresses the issues of assessing the total volume of occupational safety costs.

In the course of studying the methodology for cost analysis and budgeting principles, it is evident that approaches to classifying and categorizing expenditures vary according to national standards and budgeting methods. For instance, Australian scientist D. Oswald classified expense items into three groups: (1) fixed prevention costs: these expenses are generally associated with installations and equipment before production begins and exist independently of accidents; (2) variable prevention costs: expenses proportional to the frequency and severity of accidents, related to the time spent on accident analysis, cause identification, and corrective measures; (3) unforeseen prevention costs: initially unanticipated expenses, such as equipment modifications to reduce noise levels or changes in requirements due to regulatory or international standards or preventive measures according to the national action plan.

Undoubtedly, the amount of financial investment in preventive costs is related to the overall project budget, and Australian researchers have analyzed around 40 companies, noting the following observations: (a) the number of accidents on projects is inversely proportional to the cost of accident prevention; (b) the number of accidents on projects shows a positive correlation with the total number of workers; (c) the number of accidents on projects also shows a positive correlation with the average number of subcontractors.

However, Dutch engineer-futurists (Kamar, I, Che A.A. & Mohmad M.D., 2019) propose classifying costs only for emergency processes, while other costs, including knowledge management, should be structured within corporate human resources management. There is a trend in the scientific community towards the commercialization of scientific results, such as the implementation of exoskeletons, robotics, and the management of big data on emissions into the atmosphere. Futurist scientists argue that such emissions, including nanotubes, pose a more serious problem than asbestos and are directly related to occupational diseases. Researchers note that controlling emissions will automatically monitor the industrial impact on humans.

Retrospectively, several phases of international scientific interest in the field of safety and hygiene can be distinguished. From 1987 to 2001, researchers studied financial loss issues, including compensation, insurance, and benefits for injuries and accidents. The next phase, from 2003 to 2013, was a period when research work was tested and commercialized as a practical method, proving that increased spending on post-traumatic or emergency costs correlates directly with a lack of smart management in planning and analyzing a comprehensive budget for worker safety and workplace hygiene.

International researchers such as D. Champeau and R. Jallon (Canada), P. Richardson (Denmark), B. Fabiano, M. Battaglio, H. Sakurai, and M. Oxenburg (Australia), A. Gavius (Israel), and L. Guimaraes (Brazil) were identified in relevant publications during our search through international bibliographic databases and scientific search systems, as well as by studying the citations of other authors. According to studies by M. Oxenburg and M. Pepe conducted in the small and medium business sector, scientists identified and tested tools for assessing the cost-effectiveness of occupational health and safety measures using a computer model and analysis for economic evaluation of workplace safety measures.

Nonetheless, these publications analyzed costs in terms of emergency and post-emergency measures. Such cost analysis can provide an indirect answer to the question of how to coherently plan a budget for preventive and prophylactic measures against injuries and accidents, as well as fully ensure a package of measures for occupational health and safe work.

The third phase of scientific interest in the field of occupational safety and health spans from 2014 to the present. In highlighting this phase, we would like to note

researchers such as E. Tompa (EU), Y. Feng (Singapore), J. Rohani (Malaysia), P. Zeparkson (Thailand), M. Ibarrondo-Dávila and M. Lopez-Alonso (Spain), S. Jung and K. Kim (South Korea), K. Akçay and M. Yılmaz (Turkey), S. Tutunchian (Iran), M. Riana-Casalas (Colombia), T. Nagata (Japan), as well as the prominent scholar G. Guido (Italy) in the field of indirect cost assessment methods. The works of these researchers have focused on evaluating the costs of accidents, indirect and direct costs, uninsured risk costs, insurer costs, and mathematical modeling of costs in the field of occupational safety and health. The studies from this third phase build upon the work of the first and second phases, conceptualizing the interest in worker safety costs as encompassing a range of factors beyond just injuries or accidents, to include the overall safety of the worker in the workplace environment.

Currently, in Kazakhstan, the national model for occupational safety management is based on a compensatory principle of categorizing working conditions as safe (optimal, acceptable) and unsafe (hazardous and dangerous). This somewhat encourages workers to engage in unfavorable working conditions, while employers are not incentivized to improve working conditions, reduce hazardous workplaces, modernize production, or automate manufacturing and technological processes.

A wide range of guarantees provided to workers engaged in heavy, harmful, and dangerous work, based on numerous regulatory documents, must be confirmed by the results of workplace certification according to labor conditions. Significant financial resources are directed towards ensuring social support measures for workers in harmful or dangerous conditions. Employers spend about 450 billion tenge annually on ensuring reduced working hours, providing additional paid annual leave, increased wages, mandatory professional pension contributions (MPPC), milk and therapeutic nutrition distribution, periodic medical examinations and inspections, pre-shift medical check-ups, and providing individual and collective protective equipment.

Below are the details of compensation costs for work in harmful and other unfavorable conditions in Kazakhstan for 2023 (foreign ownership) (Table 1).

Table 1: Total expenditures on compensation for work in hazardous and other adverse working conditions by regions for the year 2023.

	The enterprise's expenditures on benefits and compensations for the year	Including them, thousand tenge				
		additional leave allowances	reduced working hours	therapeutic and preventive nutrition	milk and equivalent food products	supplements for hazardous and other adverse working conditions
Republic of Kazakhstan	39 318 690,3	15 174 953,8	434 719,4	7 600 131,2	1 946 282,9	13 841 152,9

Source: Author's calculations.

Also, within the framework of the compulsory insurance system for employees against accidents that occur while performing their job duties, employers transfer approximately 60 billion tenge to life insurance companies.

However, the situation regarding occupational injuries remains critical. Below are the statistics on the number of individuals affected by accidents related to occupational activities, including fatalities, in Kazakhstan over the past three years (Table 2).

Table 2: Number of individuals affected by accidents related to occupational activities, including fatalities

№	Indicator	Number of individuals disabled for one workday or more, including fatalities		
		In 2021	In 2022	In 2023
1	Total	2133	2449	*
2	Large and medium-sized enterprises	1726	2084	*
3	Small enterprises	407	365	*

Source: Author's calculations.

It is worth noting that international experience and foreign practices demonstrate that a developed culture of occupational safety and health, characteristic of OECD countries, inherently emphasizes the importance of ensuring safe working conditions and their financing as a necessity. Expenditures on occupational safety are prioritized within this category. Unfortunately, for EAEU countries, the transition from a rigid planned economy to an open market economy has led to a situation where occupational safety issues are often neglected and financed on a residual basis. Employers frequently refrain from spending money on acquiring higher-quality personal protective equipment, providing comfortable sanitary and living conditions, or training employees with more in-depth programs by highly qualified specialists, and so forth.

International experience shows that safety indicators improve with higher levels of investment in safety measures. Therefore, it is necessary to expand budgetary norms for occupational safety expenditures so that each employer can determine the necessary investment volume and implement them based on a standardized approach. The effectiveness of occupational safety measures will increase if they are determined in consideration of workplace risks.

The global strategy of the ILO "Decent Work Must Be Safe" has allowed for the formulation of a conceptual position on occupational safety: "Work activities that expose individuals to excessive risks cannot be justified, even if these activities are beneficial to society as a whole." The priority of safe work is justified by the fact that ensuring decent working conditions is included among the 17 Sustainable Development Goals (SDGs). The universally recognized global practice is that the national policies of OECD member countries in the field of occupational safety are aimed at promoting the rights of workers to safe working conditions at all levels, assessing and preventing

occupational risks, and developing a culture of safety that includes providing information to workers and stimulating investments in occupational safety.

The economic approach to occupational safety and health involves using a systematic method based on efficiency, which is expressed as the ratio of costs to monetary benefits. Global approaches universally suggest that well-planned and systematically implemented occupational safety measures yield economic returns that are 3-10 times greater than the financial investments.

Global practices differentiate between costs related to occupational safety and those unrelated to it. The value of programs is determined by how much costs unrelated to occupational safety increase as a direct response to expenditures on occupational safety. This is known as the return on investment in occupational safety.

According to an international study on the topic "Calculation of international returns from prevention for companies: costs and benefits of investments in occupational safety," it was found that investments in occupational safety bring certain benefits on a microeconomic scale, with a prevention return coefficient of 2.2. In practical terms, this means that for every 1 euro per employee per year invested by companies in workplace prevention, companies can expect a potential economic return of 2.20 euros. Thus, the study's findings support the microeconomic rationale that companies should invest in prevention.

Regarding European approaches to determining costs of occupational safety, a report prepared with the support of the European Community Programme for Employment and Social Solidarity (2007-2013), coordinated by the Directorate-General for Employment, Social Affairs and Inclusion of the European Commission, is noteworthy. The report emphasizes that cost analysis is used to assess economic consequences. Qualitative and quantitative data form the basis of cost-benefit analysis. The aim is to compare inputs and outputs. In practice, cost-benefit analysis requires a phased approach (Figure 1).

The report proposes a methodology where cost-benefit analysis is conducted to determine preventive measures, initial investment volumes, and annual recurring expenditures, which are recorded in a specially developed "CBA" form. Measures include a combination of technical and organizational measures, such as purchasing new equipment, fencing, safety belts, instructions, training videos, etc. It was found that costs for analysis amounted to 400 euros, while costs for implementation, equipment procurement, and training post-analysis amounted to 7,150 euros.

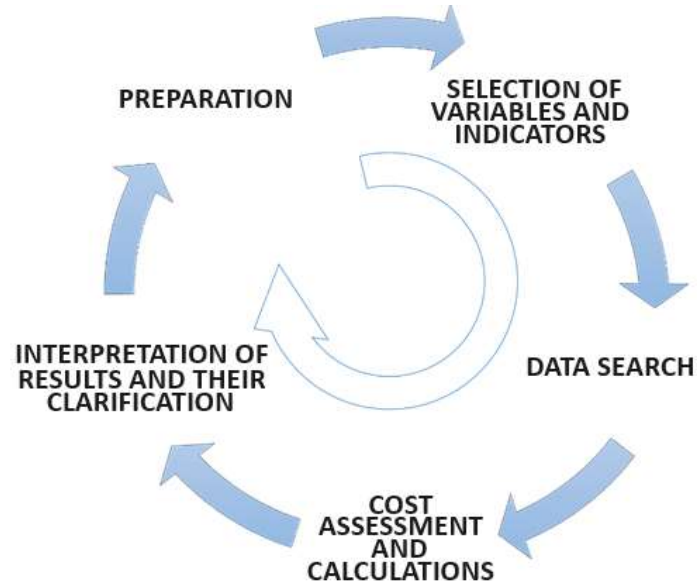


Figure 1: Five-stage cycle of improvement for assessing costs of workplace accidents and preventive measures

Comparing these findings with similar academic results, we note a large-scale project undertaken by the Institute for Work and Health in Canada in 2017. This research evaluated the extent of employer expenditures on occupational safety for workers, which were deemed significant across many sectors. Expenditures were categorized into five main areas: 1) organizational management and supervision; 2) occupational health and safety training; 3) personal protective equipment; 4) professional occupational health services; and 5) capital investments related to occupational safety, including expenses on new or refurbished facilities, vehicles, equipment, and tools aimed at improving health and safety.

We have conducted a detailed and comprehensive analysis of occupational safety costs across 17 expenditure categories.

3. Conclusion

International analysis has highlighted the significant role of professional pension schemes in regulating labor conditions for workers exposed to hazardous environments. In OECD countries such as Austria, Belgium, Germany, Italy, Hungary, Spain, and others, specific pension schemes are implemented for miners, a category vulnerable to adverse occupational conditions and various occupational diseases:

Early miner pensions (subject to two mandatory conditions: limited work experience and reaching a reduced retirement age).

Pension insurance (miner compensation benefits, pensions for occupational disabilities).

A mandatory condition for these professional pension schemes is a limitation on work experience, which serves as the basis for early retirement in global practice. For instance, in OECD countries, the maximum allowable period for working in coal mines ranges from 15 years (Austria, Italy, Germany) to 20 years (Hungary, Estonia, Spain). However, there are variations regarding the restrictions on work experience or its inclusion in retirement calculations. For example, in Belgium, 27 years of underground work entitles a miner to retirement regardless of age, while in Spain, the retirement age is reduced by 6 months for each year spent as a miner.

Thus, the analysis of occupational safety costs allows for the identification of dominant expenditures, their redistribution through planning new measures, and setting goals to improve working conditions. It involves the implementation of new approaches to labor regulation, among other initiatives. Occupational safety is not only a legislative obligation benefiting employees but also a critical factor for business success. Based on the findings of this study and considering the heightened global attention to occupational safety issues, this message warrants more active promotion at both national and international levels.

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REFERENCES

Yi Sun, Martin Arning, Frank Bochmann, JuttaBörger, ThomasHeitmman. Development and Validation of a Practical Instrument for Injury Prevention: The Occupational Safety and Health Monitoring and Assessment Tool (OSH-MAT). // Safety and Health at Work. - Volume 9, Issue 2, - 2018, P.140-143. URL: <https://www.sciencedirect.com/science/article/pii/S2093791117300586>.

D.Attwood, F.Khan, B.Veitch. Can We Predict Occupational Accident Frequency? // Process Safety and Environmental Protection. – V. 84, -I.3, - 2006, pp. 208-221. URL: <https://www.sciencedirect.com/science/article/pii/S0957582006713295?via%3Dihub#>!

Fu Gui, Xie Xuecai, Jia Qingsong, Li Zonghan, Chen Ping, Ge Ying. The development history of accident causation models in the past 100 years: 24Model, a more modern accident causation model. //Process Safety and Environmental Protection. –V. 134, –2020, pp. 47-82. URL: <https://www.sciencedirect.com/science/article/pii/S0957582019315125/>

Champoux, D., Brun, J. P. (2003). Occupational health and safety management in small size enterprises: An overview of the situation and avenues for intervention and research. *Safety Science*, 41(4), 301–318. [https://doi.org/10.1016/S0925-7535\(02\)00043-7](https://doi.org/10.1016/S0925-7535(02)00043-7).

Jallon, R., Imbeau, D., De Marcellis-Warin, N. (2011). Development of an indirect-cost calculation model suitable for workplace use. *Journal of Safety Research*, 42(3), 149–164. <https://doi.org/10.1016/j.jsr.2011.05.006>.

Rikhardsson P. (2006) Accounting for Health and Safety Costs. Review and Comparison of Selected Methods. In: Schaltegger S., Bennett M., Burritt R. (eds) *Sustainability Accounting and Reporting*. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-4974-3_6.

Battaglia, M., Frey, M., Passetti, E. (2014). Accidents at work and costs analysis: A field study in a large Italian company. *Industrial Health*, 52(4), 354–366. <https://doi.org/10.2486/indhealth.2013-0168>.

Micheli, G. J. L., Cagno, E. (2010). Dealing with SMEs as a whole in OHS issues: Warnings from empirical evidence. *Safety Science*, 48(6), 729–733. <https://doi.org/10.1016/j.ssci.2010.02.010>.

Oxenburgh M., Marlow P., The Productivity Assessment Tool: Computer-based cost benefit analysis model for the economic assessment of occupational health and safety interventions in the workplace, *Journal of Safety Research*, Volume 36, Issue 3, 2005, Pages 209-214, <https://doi.org/10.1016/j.jsr.2005.06.002>.

Gavious, A., Mizrahi, S., Shani, Y., Minchuk, Y. (2009). The costs of industrial accidents for the organization: Developing methods and tools for evaluation and cost-benefit analysis of investment in safety. *Journal of Loss Prevention in the Process Industries*, 22(4), 434–438. <https://doi.org/10.1016/j.jlp.2009.02.008>.

Guimarães, L. B. de M., Ribeiro, J. L. D., Renner, J. S. (2012). Cost-benefit analysis of a socio-technical intervention in a Brazilian footwear company. *Applied Ergonomics*, 43(5), 948–957. <https://doi.org/10.1016/j.apergo.2012.01.003>.

Oswald D., Ahiaga-Dagbui D.D., Sherratt F., Smith S.D., An industry structured for unsafety? An exploration of the cost-safety conundrum in construction project delivery, *Safety Science*, Volume 122, 2020, <https://doi.org/10.1016/j.ssci.2019.104535>.

Guido J.L. Micheli, Enrico Cagno, Alessandra Neri, Emanuele Cieri, Non-safety costs: A novel methodology for an ex-ante evaluation, *Safety Science*, Volume 133, 2021, <https://doi.org/10.1016/j.ssci.2020.105025>.

Tompa, E., Mofidi, A., van den Heuvel, S. et al. Economic burden of work injuries and diseases: a framework and application in five European Union countries. *BMC Public Health* 21, 49 (2021). <https://doi.org/10.1186/s12889-020-10050-7>.

Feng, Y., Zhang, S., & Wu, P. (2015). Factors influencing workplace accident costs of building projects. *Safety Science*, 72, 97–104. <https://doi.org/10.1016/j.ssci.2014.08.008>.

Rohani, J. M., Johari, M. F., Hamid, W. H. W., Atan, H., Adeyemi, A. J., & Udin, A. (2015). Occupational Accident Direct Cost Model Validation Using Confirmatory Factor Analysis. *Procedia Manufacturing*, 2, 286–290. <https://doi.org/10.1016/j.promfg.2015.07.050>.

Rohani, J. M., Johari, M. F., Wan Hamid, W. H., & Atan, H. (2015). Development of direct to indirect cost ratio of occupational accident for manufacturing industry. *Jurnal Teknologi*, 77(1), 127–132. <https://doi.org/10.11113/jt.v77.4095>.

Thepaksorn, P., Pongpanich, S. (2014). Occupational injuries and illnesses and associated costs in Thailand. *Safety and Health at Work*, 5(2), 66–72. <https://doi.org/10.1016/j.shaw.2014.04.001>.

Yilmaz, M., Yildiz, S., 2021. The Importance of Occupational Health and Safety (OHS) and OHS Budgeting in terms of Social Sustainability in Construction Sector. *J. Build. Mater. Sci.* 2. <https://doi.org/10.30564/jbms.v2i1.2591>.

Kamar, I, Che A.A, Mohmad M.D., (2019). Exploring the Relationship between Safety and Health Cost Dimensions and Accident Costs to the Employer of Urban Rail Infrastructure Projects. *MATEC Web of Conferences*. 266. 03014. 10.1051/matecconf/201926603014.

Quantitative analysis of European Union environmental funding sources in the 2014-2020 and 2021-2027 programming periods

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Abstract

Introduction: European funding for the environment has a significant impact on sustainable development indicators in the European Union (EU) and in Romania.

Aim: The motivation for choosing this theme is due to the need to address the current and future challenges facing Romania, as well as the other EU member countries, in terms of protecting the environment and managing natural resources.

Method: The evaluation of specialized literature was the starting point in this research. We also carried out the comparative analysis of the funds allocated for the environment in Romania with the other member countries of the European Union. To analyze the degree of concentration of financial allocations for the environment at the EU level we used the Gini Struck concentration coefficient and the Herfindhal index.

Findings: I proposed to address a current issue, which results from the need for the sustainable development of the Romanian economy and the other EU countries, taking into account the current global and regional priorities in terms of environment and sustainability.

Conclusion: Climate change, pollution, depletion of natural resources and other ecological problems pose serious threats to the country and the entire planet. The financing of sustainable development through European funds is a way to implement solutions and projects that contribute to combating these problems.

Originality and value: Originality and novelty were achieved through a practical study of the degree of concentration of environmental funding from 2014-2020 at the EU level and an analysis of European funding in the 2021-2027 programming period for EU countries.

Key Words: Sustainable development, environmental policy, European funds, the Gini-Struck concentration coefficient, the Herfindhal index

Jel Codes: Q01, Q56, H20, C19

1. INTRODUCTION

Financing sustainable development through European funds represents a significant opportunity for Romania, with the potential to stimulate economic growth, reduce regional gaps and promote sustainability. However, efficient management, fair distribution and long-term planning are essential to maximize the benefits of this financing and to contribute to the sustainable development of the Romanian economy.

One of the current aspects of financing sustainable development in Romania is the focus on the transition to a green and low-carbon economy. The European Union has set ambitious targets for reducing carbon emissions and developing renewable energy sources. In order to benefit from European funds, Romania must align its strategies with

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these objectives and develop projects that contribute to this transition. This requires massive investments in renewable energies, energy efficiency and green technologies.

The economic crisis caused by the COVID-19 pandemic brought to the fore the need to combine economic reconstruction with sustainable development goals. European funds can play a key role in this integrated approach, supporting economic recovery and at the same time promoting investments and projects that contribute to environmental sustainability and improving the quality of life.

2. THE EU'S POSITION TOWARDS THE ENVIRONMENT

The premise of the EU is *"Towards a greener and more sustainable Europe"*.

EU citizens are privileged to have among the highest environmental standards in the world. The EU and the governments of the member states have established well-defined objectives to guide the European environmental policy until the year 2020 and beyond, they have defined a forecast for the period 2020-2050, supporting them with a series of research programs, norms, but and financing possibilities.

The position of the European Union (EU) towards the environment is one of the most progressive and committed in the world. The EU has adopted a comprehensive set of policies and measures to protect the environment and promote sustainable development among member states and beyond its borders. This commitment to the environment is supported by strong values such as responsibility, solidarity and respect for natural resources and biodiversity.

The European Union (EU) stands out for its firm commitment to protecting the environment and combating climate change. This commitment is based on a deep understanding of the negative consequences of climate change and the need for immediate action to counter these global threats.

Protecting the environment is also a priority in financing sustainable development. European funds can be allocated to projects that reduce carbon emissions, promote the sustainable management of natural resources and protect biodiversity. These investments not only contribute to the achievement of the European Union's environmental objectives, but also to the creation of new and innovative industries, such as those related to renewable energies or recycling.

3. QUANTITATIVE ANALYSIS OF EUROPEAN UNION ENVIRONMENTAL FUNDING SOURCES IN THE 2014-2020 AND 2021-2027 PROGRAMMING PERIODS

The environmental funding opportunities from the EU were in the 2014-2020 programming period through the European structural and investment funds, called ESI funds, which include the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF), which also includes the Youth Employment Initiative (YEI), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF).

The European Commission has carried out an assessment of the implementation of environmental policies for each of the 27 EU member states. Analyzing the latest working documents of the services of the European Commission for the 27 member countries, regarding the application of environmental policies, we can gather the necessary data that can give us an image for each country of the European Union from this point of view.

In the 2014-2020 programming period, Romania received EUR 34.8 billion from ESI funds for investments in job creation and in a sustainable and healthy European economy.

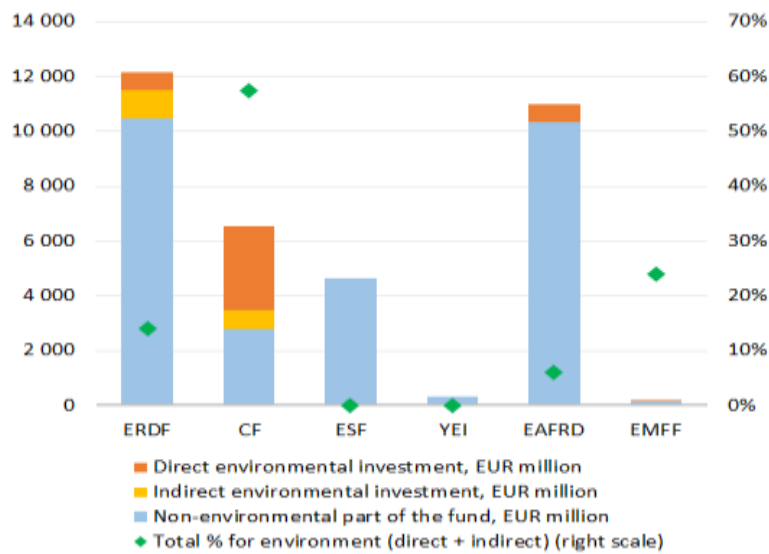


Figure 1.1 ESI Funds allocated to Romania, including environmental investments, 2014-2020

Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0271_FIN

In Figure 1.1 you can see an overview of the ESI funds allocated to Romania, from which we can see that the amounts from the Cohesion Fund (CF) were allocated in a higher percentage to direct and indirect environmental investments.

The direct and indirect environmental investments carried out within the ESI funds in Romania, in the period 2014-2020, are broken down in the table below.

Table 1.1 Direct and indirect environmental investments under the ESI Funds in Romania, 2014-2020

Instrument	Allocations for the environment (EUR million)
Under Cohesion policy (ERDF + CF)	5.447,7
<u>Direct environmental investments</u>	<u>3.686,8</u>
Water	2.224,3
Waste	318,2
air quality	390,6
biodiversity and nature	250,3
land rehabilitation	24,7
climate and risk management	478,7
<u>Indirect environmental investments</u>	<u>1.760,8</u>
renewable energy	19,6
energy efficiency	440,9
other energy ¹¹¹	22,6
sustainable transport	1.212,9
sustainable tourism	64,9
Under EAFRD/rural development	651,0
<u>Direct environmental investments</u>	<u>650,3</u>
Water	385,5
climate and risk management	264,8
<u>Indirect environmental investments</u>	<u>0,7</u>
renewable energy	0,7
Under EMFF	40,1
<u>Direct environmental investments</u>	<u>40,1</u>
environment protection & resource efficiency	40,1
<u>Indirect environmental investments</u>	<u>0,04</u>
business development, R&I	0,04
Under ESI Funds total	6.138,8
Direct environmental investments	4.377,2
Indirect environmental investments	1.761,6

Source: <https://eur-lex.europa.eu/legal->

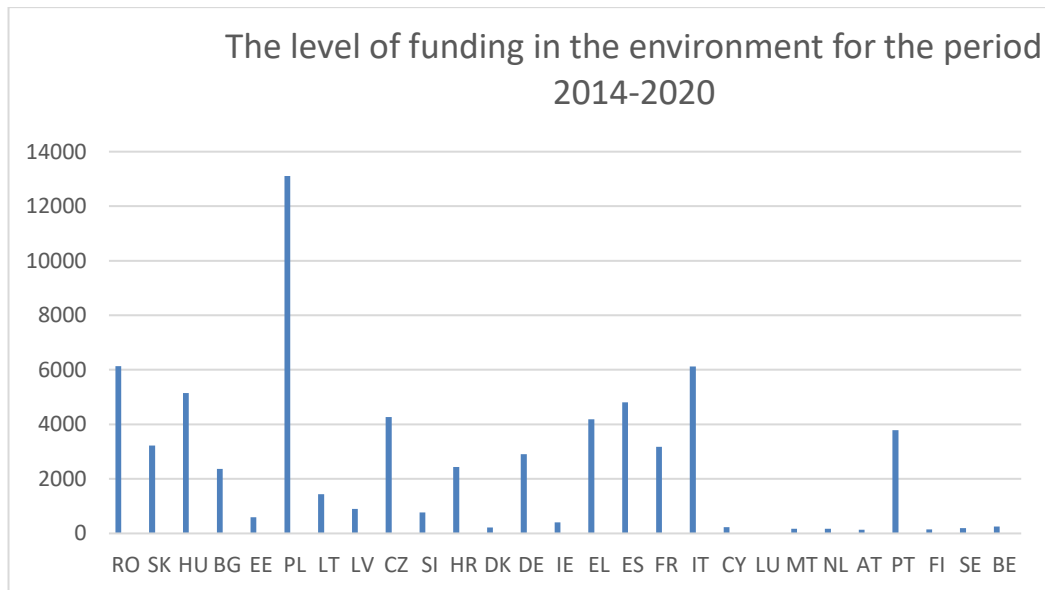
¹¹¹ Intelligent energy distribution systems (smart grids) and, respectively, cogeneration and high-efficiency district heating, based on intervention areas 53 and 54, respectively (under conditions of environmental coefficients of 40%) of Annex I to the Regulation (EU) 2021/1060.

content/EN/TXT/?uri=conmat%3ASWD_2022_0271_FIN

Analyzing Table 1.1, it can be seen that in the period 2014-2020, Romania received the sum of EUR 6.1 billion from ESI funds, of which EUR 4.4 billion were allocated for direct investments in the field of the environment, and EUR 1.8 billion were identified as indirect value of environmental investments.

Other EU funding programs are added to the funding from the ESI funds for the environment. These are the LIFE program or Horizon 2020, but also financing from the European Investment Bank (EIB). Thus, EU environmental funding for Romania in the period 2014-2020 amounted to EUR 6.6 billion. From the LIFE program, Romania received EUR 12.8 million for the implementation of state-of-the-art solutions, to which EUR 13.0 million is added through the Horizon 2020 program, especially for the circular economy. Also, the environment field in Romania was financed in the period 2014-2020 from the European Fund for Strategic Investments (EFSI) with the amount of EUR 41.3 million, but also from the EIB with the amount of EUR 421.5 million.

Another analysis carried out was the comparative analysis of the funds allocated for the environment at the EU level between 2014 and 2020. For the comparative analysis, we created a graph showing the level of funding for the 27 member countries:



Graph 1.1 – The level of funding in the environment for the period 2014 – 2020

Source: Graph created by processing data from reports on financing at the EU level for the period 2014-2020

From the analysis on Graph 1.1, it follows that the country with the largest financial allocation for the environment was Poland, the funding level being 13,110.7 million Euros, and at the opposite pole is Luxembourg with 4 million Euros.

In the period from 2014 to 2020, Romania was allocated the sum of 6138.8 million Euros for the environment.

After the comparative analysis, we proposed to carry out an analysis of the degree of concentration of financial allocations for the environment at the EU level. To analyze the degree of concentration, we used the Gini_Struck concentration coefficient and the Herfindhal index. With these two coefficients, we wanted to track whether a small number of countries out of the 27 benefited from a dominant funding from the total funding for the environment.

The Gini-Struck concentration coefficient is determined using the following equation:

$$G = \sqrt{\frac{n \sum g_i^2 - 1}{n-1}}$$

Where:

g_i – the structure of financing at the EU level

n – the number of countries taken into account (27 EU member countries).

The coefficient can take values between 0 and 1:

- If the value of the coefficient is close to 0, it means that the financing is distributed relatively evenly among the n countries.
- If its level is closer to 1, it means that in the financing structure there are a few countries that hold the largest part of the total weight of financing.

For the same purpose, the Herfindhal index can be used, which is determined with the equation:

$$H = \sum g_i^2$$

The value of this coefficient is:

equal to 1 if we had only one beneficiary country

Equal to $1/n$ if funding is shared equally between countries.

The level of G and H is reflected in the following table:

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Table 1.2 – Degree of concentration of environmental funding from 2014 to 2020 at EU level

Country	Average amount allocated	Funding structure (gi)	gi*gi
Romania	6138,80	0,091194044	0,008316354
Slovakia	3219,10	0,047820868	0,002286835
Hungary	5144,1	0,076417424	0,005839623
Bulgaria	2365	0,035132911	0,001234321
Estonia	593,5	0,008816652	7,77334E-05
Poland	13110,7	0,194764082	0,037933048
Lithuania	1442,3	0,021425876	0,000459068
Latvia	904,70	0,013439638	0,000180624
Czechia	4272,40	0,063468012	0,004028189
Slovenia	773,20	0,011486159	0,000131932
Croatia	2440,80	0,036258947	0,001314711
Denmark	213,00	0,00316419	1,00121E-05
Germany	2903,00	0,043125091	0,001859773
Ireland	411,30	0,006110007	3,73322E-05
Greece	4184,40	0,062160741	0,003863958
Spain	4809,90	0,071452764	0,005105498
France	3180,90	0,047253394	0,002232883
Italy	6121,00	0,090929618	0,008268195
Cyprus	225,30	0,003346911	1,12018E-05
Luxembourg	4,00	5,94214E-05	3,5309E-09
Malta	174,90	0,002598201	6,75065E-06
Netherlands	169,60	0,002519468	6,34772E-06
Austria	136,60	0,002029241	4,11782E-06
Portugal	3783,00	0,056197802	0,003158193
Finland	146,10	0,002170367	4,71049E-06
Sweden	194,20	0,00288491	8,3227E-06
Belgium	254,00	0,00377326	1,42375E-05
Total EU funding on the environment	67315,80	1	0,086393975
Gini-Struck	0,226396293	0,194764082	Max
Herfindhal	0,086393975	5,94214E-05	Min

Source: table made by processing financial allocations by country in the period 2014-2020

The analysis of the level of G and H reflects an allocation, a distribution, relatively uniform at the level of the EU, of course different according to the stage of development of each country, the investment needs in environmental matters, etc.

The investment plan of the European Green Pact of 2020 provides for the realization, until 2030, of some green investments (public and private). Sustainable finance increases transparency on environmental sustainability. The funding allocated for the 2021-2027 programming period will support investments in sectors aimed at sustainable urban development, energy efficiency, health, transport infrastructure, education, adapting the workforce to the current market, adapting the education and professional training system to the requirements of the business environment.

In the 2021-2027 programming period, a significant part of the Cohesion Fund and a relevant percentage of the ERDF will be allocated to environmental investments, taking into account the thematic focus. Moreover, other EU funds will also contribute to supporting environmental projects: FEADR, EMFAF, LIFE, Horizon Europe, etc. Funds from the Recovery and Resilience Mechanism will also be allocated.

Next, we will do a brief analysis of European funding in the 2021-2027 programming period for all EU countries.

Table 1.3 shows the funds allocated for all programs by the EU for member countries, in the period 2021-2027.

Table 1.3 European funding in the programming period 2021-2027 for EU countries

No. crt.	Country	Funds allocated through cohesion policy, the Just Transition Fund, EAFRD, FEAMPA (millions of EUR) period 2021-2027	Recovery and Resilience Mechanism (RMR) period 2021-2026 (€ million)	Total
1	Belgium	3331,80	5924,95	9256,75
2	Bulgaria	12559,20	6267,00	18826,20
3	Czechia	22771,20	7035,70	29806,90
4	Denmark	1188,20	1551,40	2739,60
5	Germany	26608,70	25613,50	52222,20
6	Estonia	3964,90	969,30	4934,20
7	Ireland	2982,90	989,00	3971,90
8	Greece	24438,2	17769,90	42208,10
9	Spain	43647,80	69512,60	113160,40
No. crt.	Country	Funds allocated through cohesion policy, the Just	Recovery and Resilience Mechanism	Total

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		Transition Fund, EAFRD, FEAMPA (millions of EUR) period 2021-2027	(RMR) period 2021-2026 (€ million)	
10	France	25747,20	39400,00	65147,20
11	Croatia	10624,20	6393,70	17017,90
12	Italy	51411,90	68880,50	120292,40
13	CYPRUS	1163,20	1005,90	2169,10
14	Latvia	5206,50	1826,00	7032,50
15	Lithuania	7414,30	2224,20	9638,50
16	Luxembourg	129,60	93,40	223,00
17	Hungary	24111,00	7200,00	31311,00
18	Malta	932,20	316,40	1248,60
19	Netherlands	2386,00	5400,00	7786,00
20	Austria	3893,20	3461,44	7354,64
21	Poland	83140,20	23858,00	106998,20
22	Portugal	26060,50	13907,30	39967,80
23	Romania	36356,40	14240,00	50596,40
24	Slovenia	3891,90	1776,90	5668,80
25	Slovakia	14127,60	6328,60	20456,20
26	Finland	2965,40	2085,30	5050,70
27	Sweden	3256,50	3288,50	6545,00
TOTAL		444310,70	337319,49	781630,19

Source: table created by processing financial allocations by country in the period 2021-2027

Regulation (EU) 2021/1060 of the European Parliament and of the Council, regarding the establishment of rules for the funds allocated for the period 2021-2027 (ERDF, FSE, FC, FTJ, FEAMPA) emphasizes the importance of combating climate change, taking into account the application of the Agreement from Paris, but also the objectives of sustainable development, and emphasizes the need to allocate 30% of funds to support the achievement of climate objectives. Also, a minimum allocation percentage of the European funds allocated to combat the decline of biodiversity is specified, which is 7.5% in 2024 and 10% in 2026-2027.

In the context of the crisis due to the COVID-19 pandemic, the EU established a recovery and resilience mechanism to provide direct financial support to member countries. In this sense, REGULATION (EU) 2021/241 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the Recovery and Resilience Mechanism, underlines that this mechanism is based on the European Green Deal, as a strategy for sustainable growth for Europe and the importance of combating related climate change with the Union's commitments to implement the Paris Agreement and the objectives of sustainable development. Regulation 2021/241 specifies that the funds allocated by the EU through the Recovery and Resilience Mechanism must be at least 37% of the total allocation for this purpose, in order to contribute to the green transition, including biodiversity.

Taking into account the 2 EU regulations and the allocations of the member states for the 2021-2027 programming period from Table 1.3, it appears that the amount allocated for the environment in this program is worth at least 166,616.51 million EURO from ERDF, ESF, FC ,FTJ, FEAMPA and at least 124,808.21 million EURO of funds allocated through MRR. The total minimum amount in the 2021-2027 program, allocated by the EU for the environment is in the total amount of 291,424.72 million EURO, which shows us an increase of 4.33 times compared to the allocations for the environment in the 2014-2020 program.

Our country, in the 2021-2027 programming period, has environmental allocations worth at least 16,175.72 million EURO, which indicates an increase of 2.64 times compared to the environmental allocations in the 2014-2020 program.

4. CONCLUSION

It is clear that the EU prioritizes sustainable development objectives for the 2021-2027 allocations, which focus on protecting the environment, reducing carbon emissions, sustainable economic growth, climate change, pollution, depletion of natural resources and other ecological issues.

European funding programs represent the main source of funding for sustainable development in Romania and for the other countries of the European Union, and at the same time the main funding opportunity for the environment.

REFERENCES

Călin Răzvan, Teodor Cristian, (2007), Environmental policy, Tritonic Publishing House, Bucharest

Regulation (EU) 2021/1060 of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and laying down the financial rules applicable to these

funds, as well as to the Asylum, Migration and Integration Fund, the Internal Security Fund and the Financial Support Instrument for Border Management and Visa Policy

Regulation (EU) 2021/241 of the European Parliament and of the Council establishing the Recovery and Resilience Mechanism

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https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0262_FIN

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0263_FIN

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0264_FIN

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https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0266_FIN

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Investment and Sustainable Development for Green tourism in Azerbaijan

Ragif Huseynov¹¹², Ramida Khalilova¹¹³

Abstract

Introduction: The concept of green tourism, which promotes sustainable, socially responsible, and environmentally friendly practices, is vital for countries at all development stages. It fosters economic growth while preserving the environment and culture of tourism destinations. Sustainability of tourism provides numerous important benefits, including supporting environmental conservation, protecting valuable ecosystems, creating economic opportunities, and preserving cultural identities, all of which help foster the involvement and development of local communities.

Aim: The main purpose of examine the current state of the investment on green tourism and identify the key driving factors for sustainable development of the tourism industry in Azerbaijan through qualitative research methods. The study also examines the strategies and rationales behind Azerbaijani government responses to both existing and potential investments in green tourism development supported by literature review with a focus on environmental and sustainable development issues. It reviews Azerbaijani government policy documents that advocates green investment for sustainable tourism development. Particularly, Azerbaijan's 2020 policy framework focuses on potential impact of climate change on country's economy and society and outlines the necessary mitigation measures. The government has established priority 17 Sustainable Development Goals (SDGs), 88 targets, and 119 indicators covering economic, social, and environmental aspects of sustainable development aiming to achieve the 2030 Agenda for sustainable development.

Method: Qualitative research methodologies were employed to analyze investment and sustainable development within the tourism industry in Azerbaijan. A thorough and detailed literature review was conducted, wherein relevant papers were meticulously examined.

Findings: The 2020 policy framework of Azerbaijan, aimed at implementing the 2030 Agenda for Sustainable Development adopted by all United Nations member states, has been critically analyzed and presented with precision. The investment policies and sustainable development strategies for green tourism have been depicted with considerable accuracy.

Conclusion: The findings elucidate the effectiveness of investments in enhancing sustainable development and advancing green tourism in Azerbaijan. These insights could serve as a basis for further research, providing policymakers with valuable information to inform decision-making processes.

Originality and value: The analysis indicates that the construct demonstrated satisfactory credibility and accuracy.

Keywords: investment, green tourism, sustainable development, environment

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Jel Codes: G18, Q5, R5, Z3

1. INTRODUCTION

The concept of green tourism, which offers sustainable, socially responsible and environmentally friendly tourism practices is increasingly crucial for countries at the all stages of development. It contributes to economic growth of countries by protecting the environment and culture of tourism destinations.

Sustainable tourism implies lots of significant benefits through contributing to the environmental preservation, valuable ecosystems protection, economic opportunities creation, and cultural identities maintenance, thereby promoting the involvement and development of local communities.

Tourism development is recognized as a means to enhance a country's economic and social well-being. The concept of green tourism—promoting sustainable, socially responsible, and environmentally friendly practices—is crucial for nations at all stages of development. It facilitates economic growth while safeguarding the environment and cultural heritage of tourism destinations. The tourism sector is among the fastest-growing segments of the global economy, contributing to over one-third of total global services trade (Bethapudi, 2013).

The tourism industry plays a vital role in developing a secondary sector, generating employment and stimulating foreign trade. Additionally, it significantly impacts key economic sectors, contributing to sociopolitical development. Consequently, this research aims to investigate investment opportunities and sustainable development goals for green tourism in the Republic of Azerbaijan. As one of the most profitable and rapidly expanding industries, tourism can accelerate economic growth while showcasing the country's geographical resources, opportunities, and culture. Recently, Azerbaijan has emerged as a rapidly growing destination in the tourism sector. When considered in the context of its commitment to sustainable development goals, it is clear that a key priority is to promote a healthy lifestyle and well-being for people of all ages. (Khusainova. et.al, 2024).

Key factors for tourism development include favorable climate, rich historical and cultural assets, good transportation links, a skilled labor force, and sufficient food supply.

Supporting tourism not only fosters job creation but also requires direct investments, qualified personnel training, a scientific approach, and the promotion of national tourism products in the global market. This includes incentivizing tourism activities through reduced taxes and fees.

2. LITERATURE REVIEW

Green tourism, synonymous with eco-friendly or sustainable tourism, encompasses a range of practices that resonate with consumers on a subconscious level (Furqan, Mat Som, and Hussin, 2010). While often considered a subset of eco-tourism, it carries distinct meanings and objectives. The term "green tourism" aims to fill the conceptual

gap in the industry, evoking a perception of attractive and unexplored destinations. This terminology functions as an implicit label for exotic nature-based holidays and signals that providers are committed to operating in environmentally responsible ways (Font and Tribe, 2001).

One of the key factors impacting tourism is the efficient management of financial resources. In a market economy, effective oversight of financial assets is essential across all sectors of the industry. Financing is regarded as the only resource that can be rapidly converted. Given the importance of financial resources in a market economy, the establishment of an independent management system is necessary (Sheremet and Ivanova, 2008).

Given that the tourism sector has the potential to be a cornerstone of economic development in Azerbaijan (Bayramli, 2019), a scientific evaluation of the country's recreational and tourism resources is essential. Azerbaijan aims to achieve:

- A steadily growing, competitive economy;
- Dynamic and inclusive society based on social justice;
- Competitive human capital and space for modern innovation;
- Great return to the liberated territories, including sustainable settlement and economic reintegration;
- A clean environment and green growth in the country (Azerbaijan Tourism Strategy 2023-2026).

This assessment should aim to enhance living standards and establish a well-developed tourism industry that meets contemporary economic, social, and environmental standards. The primary objective is to examine the current state of investment in green tourism and identify key driving factors for the sustainable development of the tourism industry in Azerbaijan.

3. RESEARCH METHODOLOGY

Qualitative research methodologies were employed to analyze investment and sustainable development within the tourism industry in Azerbaijan. A thorough and detailed literature review was conducted, wherein relevant papers were meticulously examined.

3.1. Investment for Green Tourism

In a market economy, proper supervision of financial assets is crucial across every sector of the industry. Azerbaijani businesses should have sufficient opportunities to secure loans and use them effectively to expand their operations, improve technical capabilities, produce competitive products, and achieve significant profits. Utilizing borrowed funds allows companies to expand their manufacturing capabilities and supports the effective use of private investments.

The Entrepreneurship Development Fund has provided AZN 368,000 in soft loans to finance investment projects for 23 entrepreneurs from internally displaced persons (IDPs) through authorized credit institutions. These projects have created 27 new jobs and led to the establishment of five Limited Liability Companies, facilitated by the Small and Medium Business Development Agency (SMBDA). These initiatives contribute to the implementation of Sustainable Development Goals (SDGs) 1, 8, 10, and 17.

Additionally, a preliminary agreement has been established through the Multilateral Platform for Sustainable Infrastructure (SIF) to incorporate the SIF SOURCE platform, which provides unique mechanisms and tools, into the development of public-private partnership (PPP) projects and related IT resources in Azerbaijan. This agreement enhances the effective planning of PPP projects managed by the Fund, ensures coordination with relevant agencies, and promotes monitoring and supervision, particularly attracting international investment.

As the host of the COP29 climate summit in November, Azerbaijan has committed \$2 billion to green investments, with the goal of increasing the share of renewable energy in its installed capacity to 33% by 2027.

3.2. Sustainable Development for Green Tourism

Azerbaijan is actively working to encourage the participation of both the private sector and public institutions in Sustainable Development Goal (SDG) initiatives. This involves raising awareness at all levels, addressing environmental issues, and improving access to funding for the private sector. The Azerbaijani government is committed to accelerating the development and diversification of the non-oil sector, enhancing innovation, boosting export capacity, and improving social services and the green economy.

The COVID-19 pandemic, along with significant fluctuations in global energy and stock markets, and necessary lockdowns to safeguard public health, began to affect economic activities—including trade, tourism, and construction—starting in the second quarter. In response, the government implemented an urgent Action Plan to mitigate the pandemic's negative impact on the economy and employment. The priorities include:

1. Inclusive Growth that Reduces Vulnerability and Builds Resilience
2. Stronger Institutions for Enhanced Public and Social Services
3. Environmental Protection and Climate Change Mitigation
4. A Gender-Equitable Society Empowering Women and Girls

The Azerbaijan Tourism Strategy for 2023-2026 provides a comprehensive framework for tourism development over the next four years. It articulates a strategic vision and guiding principles, envisioning tourism growth through a model based on nine pillars. The strategic vision aims to position Azerbaijan as an accessible, sustainable destination offering high-quality tourism experiences that blend the region's rich culture, stunning nature, and exquisite cuisine.

The strategy seeks to enhance the following areas:

- Tourism governance
- Regulatory capacity
- Destination development, heritage, and community engagement
- Branding, marketing, and communication strategies
- Tourism products and experiences
- Digitalization, technology, and innovation
- Data analysis and research
- Tourism investment and public-private partnerships
- Human resource development

A sustainable regional tourism industry requires robust infrastructure, including facilities, transportation, energy, water, and waste management systems.

Aligning the SDGs with national priorities in Azerbaijan adheres to the principles established for implementing the 2030 Agenda for Sustainable Development. Formulating a national development strategy in line with this agenda helps identify new opportunities within key policy documents. By integrating the SDGs into the national agenda, the "2030 Agenda" can be aligned with national, regional, and local plans, as well as relevant budget allocations.

The primary objective of the new state program is to ensure sustainable and balanced regional development. This involves creating a favorable environment and an effective environmental safety system to support a competitive economy based on SDG principles, maintaining high social welfare standards, promoting efficient resource use, and fully protecting the environment.

To achieve this goal, the government aims to undertake several initiatives, including:

- Analyzing recreational and tourism resources that affect regional development
- Assessing cultural and historical monuments for tourism potential
- Ensuring the quality of tourism services meets international standards
- Investigating discrepancies in the use of recreational and tourist resources and providing evidence-based recommendations.

The new state program, following previous regional development initiatives, prioritizes further development of the non-oil sector, supports the real economy, fosters entrepreneurship through innovative mechanisms, enhances the knowledge and skills of business entities, and provides consulting and other services. This new program aligns with SDG 4.

Additionally, the "Action Plan for Reducing the Negative Impact of Plastic Packaging Waste on the Environment in Azerbaijan (2019-2020)" was developed in accordance with the "Strategic Roadmap on the Production and Processing of Agricultural Products in Azerbaijan." This plan aims to mitigate pollution by assessing the detrimental effects of widespread plastic use on plants, animals, land, and water resources, aligning with SDG 5 and SDG 6. Drawing from international experience, the

initiatives will foster a supportive environment for entrepreneurs and investors in recycling, identify financing for collection and processing systems, and create new business opportunities using modern technologies. This will strengthen the recycling market, create jobs, and contribute to achieving SDG 11, SDG 12, SDG 13, SDG 14, and SDG 15.

The Action Plan for the efficient use of water resources, covering the period from 2020 to 2022, was created to evaluate, protect, and ensure the effective management of water resources. Its objectives include enhancing the electronic system for water management, accounting, and information delivery; improving water use efficiency in the energy sector; ensuring rational irrigation practices; identifying water resources; upgrading the drinking water supply system; and raising awareness regarding water resource issues. This Action Plan aims to identify optimal financing strategies for water resource infrastructure and aligns with SDGs 6, 9, 12, 13, and 14 of the 2030 Agenda. Sustainable water resources and ecosystem quality require the best management of these areas (Huseynov R. T. and Salik A.W. 2018).

The Strategy addresses key challenges such as legislative improvements, institutional capacity building, and the development of cooperation over transboundary waters, adhering to the principles of integrated water resources management. Its goal is to establish a system for managing, protecting, supplying, and treating wastewater in Azerbaijan that meets international standards. The National Water Strategy is crucial for implementing the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, along with its Protocol on Water and Health. The Strategy will also significantly contribute to effective water policy implementation in Azerbaijan, aligned with SDGs 6, 12, 13, 14, and 17.

On November 20, 2020, the Parliament of Azerbaijan adopted amendments to the Law “On Protection of the Environment” to support the achievement of environmental goals, targets, and indicators outlined in the 2030 Agenda. This legislation prohibits the import, manufacture, sale, or provision of plastic polyethylene bags under 15 microns thick, as well as disposable plastic utensils, aligning with SDGs 6, 12, 13, and 15.

The Ministry of Ecology and Natural Resources and the Ministry of Agriculture of Azerbaijan developed and approved a “Joint Action Plan to Support Green Agriculture (2020-2023),” which will aid in achieving SDGs 2, 8, 13, and 15. A key focus of the Strategic Plan is “Environmental Protection, Sustainable Use of Natural Resources, and Managing Climate Change Impacts on Agriculture,” which includes the following measures:

- Establish mechanisms to mitigate climate change and other natural impacts on agriculture.
- Enhance strategies to reduce agriculture's negative environmental effects.
- Improve sustainable practices for agricultural land and water resource use.
- Promote environmentally friendly agricultural production.

In 2020, the Chamber conducted its first performance audit, assessing the forest management activities of the Forest Development Service under the Ministry of Ecology and Natural Resources, in accordance with SDG 15 indicators.

By 2020, the goal was to achieve environmentally sound management of chemicals and waste throughout their life cycle, adhering to international frameworks, while significantly reducing their release into air, water, and soil. This also includes strengthening resilience and adaptive capacity to climate-related hazards and natural disasters while integrating climate change measures into national policies, strategies, and planning.

Azerbaijan has committed to the Bonn Challenge to restore forest landscapes degraded by climate change, aiming to restore 270,000 hectares of forest by 2030. By that time, reforestation efforts have already covered 24.5 thousand hectares, with 22,000 hectares restored through natural processes and 2,500 hectares through planting and other methods.

Additionally, the Ministry of Ecology and Natural Resources and the Ministry of Agriculture have developed and approved a Joint Action Plan to Support Green Agriculture (2020-2023) to enhance collaboration between the two agencies in promoting agrobiodiversity, protecting ecosystems, efficiently using natural resources, and improving information sharing. With the continuous development of society and the continuous improvement of people's living standards, leisure agricultural tourism based on agricultural production has gradually become popular (Gasimova A.A., Mustafayeva S.Y., 2023). It promotes food security by providing income for rural households, to meet their daily needs including the purchase of food (Huseynov R., *et al*, 2020).

4. FINDINGS

Sustainability is a crucial requirement for countries striving to enhance their tourism industry. When developing a tourism product, planners must ensure that it aligns with the local environment. Effective planning, accompanied by clear guidelines regarding the scope and scale of development, is essential for fostering sustainability.

The 2020 policy framework of Azerbaijan, designed to implement the 2030 Agenda for Sustainable Development endorsed by all United Nations member states, has been thoroughly analyzed and articulated with clarity. The investment policies and sustainable development strategies for green tourism have been accurately outlined. By 2030, Azerbaijan aims to develop and execute policies that foster sustainable tourism, generate employment, and promote local culture and products. The primary objective of the Strategic Plan for the Environmental Sector is to achieve sustainable development through environmental protection and the efficient use of natural resources. This includes safeguarding ecosystems, reducing environmental harm by adopting low-emission technologies and innovative practices, and restoring and protecting the natural environment. The plan will create new opportunities to enhance the environmental situation, protect ecological components, ensure the population's right to a healthy

environment, and promote the responsible use of natural resources. This objective can be achieved through the education and training of individuals involved in tourism, as well as through government and organizational initiatives that promote a positive relationship between tourism and the environment.

5. CONCLUSION

The findings highlight the effectiveness of investments in promoting sustainable development and advancing green tourism in Azerbaijan. These insights can serve as a foundation for further research and provide policymakers with essential information to guide their decision-making processes. Overall, it is crucial to develop the green tourism across Azerbaijan's regions and to incorporate regulatory and economic measures that align with market economy conditions. To achieve the overarching goal of sustainable tourism development, several issues need to be addressed: implementing a comprehensive state policy for the tourism sector, fostering entrepreneurship to create a competitive and sustainable tourism market, elevating tourism services to international standards, enhancing tourism infrastructure and its technical capacity, and establishing a favorable business environment to attract foreign investment. This study indicates significant potential for green tourism in Azerbaijan, which could positively impact the economy and improve the country's living standards.

REFERENCES

- Bethapudi, A. (2013), "The Role of ICT in Tourism Industry", *Journal of Applied Economics and Business*, 1, 67-79.
- Font, X., Tribe. J. (2001), "Promoting green tourism: the future of environmental awards", *Environmental Science, Business, International Journal of Tourism Research*.
- Furqan A., Mat Som A.P., Hussin R. (2010), "Promoting Green tourism for future sustainability", *Theoretical and Empirical Researches in Urban Managements*, 5(8(17), 64-74.
- Gasimova A.A., Mustafayeva S.Y., (2023). "The role and significance of agro-eco parks in the development of agro-eco tourism". *The scientific heritage*, 105, 97-101.
- Huseynov R. T., Salik A.W. (2018), "Environmental sustainability of irrigated agriculture in dry areas: Case study Afghanistan, a review article", *Prosperitas*, 5 (4). pp. 72-79. ISSN 2064-759X.
- Huseynov R., Vasa L., Varga I., David L., (2020). "The Regional And Geographical Aspects Of Food Security: A Spatial Analysis In The Case Of Azerbaijan, Hungary,

Austria, Singapore And Georgia”, DOI: 10.21163/GT_2020.152.16, Geographia Technica, Vol. 15, Issue 2, 161 to 170.

Khusainova I., Gasimova A., Mammadova I., Yekimov S., Tahirzade J., Khalilova R., Sobiro B. (2024), “Studying the principles of sustainable tourism development in Karabakh”. BIO Web of Conferences, 93.

Sheremet, A. D., Ivanova, A. F. (2008), “Finance companies: Management and analysis”. INFRA-M.

State Tourism Agency of the Republic of Azerbaijan (2023), “Azerbaijan Tourism Strategy 2023-2026”.

United Nations, Department of Economic and Social Affairs Sustainable Development. (2024), “Transforming our world: the 2030 Agenda for Sustainable Development”.

Digital Women Entrepreneurship and Tourism Examples from Turkey

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Abstract

Introduction: The title of digital transformation and tourism sector is becoming more strategic for Turkey, which has a rich cultural heritage and geography and high tourism potential. A tourism sector where women entrepreneurs can evaluate the opportunities offered by digital transformation brings dynamism to the country's economic and social structure. In this context, the sample business models discussed in the study and their contributions to the sector will be examined and the effects of women entrepreneurship on the future of the tourism sector will be analyzed.

Aim: By analyzing the studies on digital tourism and digital women entrepreneurship, it is aimed to reach findings regarding the approaches and developments related to these concepts in scientific studies and in the field of application.

Method: For this study based on secondary data, an in-depth literature review was conducted and digital media platforms such as LinkedIn, Instagram and YouTube were analyzed.

Findings: In the study, six digital women entrepreneurs and their business models were identified in the tourism sector in Turkey. The demographic characteristics of women entrepreneurs, their entrepreneurial motivations and the types of digitality of their enterprises were profiled.

Conclusion: The business models of six inspiring women entrepreneurs in the tourism sector in Turkey show the current situation. However, it has been observed that the presence of women in the digital tourism sector is very limited and few compared to the tourism potential of the country. It has been determined that more scientific studies are needed in the light of the reasons and consequences of this situation.

Originality and value: This study contributes to scientific studies on digital entrepreneurship and digital business models implemented by women entrepreneurs in the tourism sector. The study analyzes the business models of women entrepreneurs in the tourism sector in Turkey and explains the profile of digital women entrepreneurs and the entrepreneurial process.

Key Words: Digital Entrepreneurship, Women Entrepreneurship, Digital Tourism

Jel Codes: L26, Z32, M1

1. INTRODUCTION

Today, digitalization is needed in at least one part of the entrepreneurship process in all industries. Considering the rapid development in information technologies, it seems almost impossible to remain indifferent to digitalization, and it shows that this concept

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needs to be understood more deeply. In particular, the expansion of technology's boundaries, the creation of more opportunities and the formation of new digital platforms have become a phenomenon that must be constantly followed for the business world, as well as creating dizzying effects in our daily lives.

These developments in the light of digital transformation change the nature and process of entrepreneurship and offer countless opportunities for entrepreneurs; digital entrepreneurship is needed to benefit from these opportunities through digital technologies. Although it is still in its infancy in the literature, due to the Covid-19 virus, many processes in business life have been digitalized and examples of digital entrepreneurship, which has gained great importance, have been encountered more frequently (Özay & Kök, 2022, p. 239).

Digital entrepreneurs use technological innovations to develop their newly established businesses or existing businesses by following technological trends, developing innovative business ideas, or marketing the goods and services they produce digitally (Alay, 2023, p. 4). They increase efficiency by acting with digital activities within existing boundaries, not only on new platforms, but also within existing boundaries, bringing the economy closer to the technological limit (Sussan & Acs, 2017, pp. 56-57).

Conceptually, the fact that entrepreneurship has a gender requires women entrepreneurs to evaluate it in digital entrepreneurship. Women entrepreneurs, especially in the entrepreneurial process, turn the inequality of opportunity they experience and the disadvantages they experience due to their gender into opportunities with the conveniences created by digitalization (spatial, temporal and structural). While the diversity in the sector increases thanks to the creative solutions, different perspectives and skills developed by women; they make positive contributions to the development of new digital products and services. Strengthening competition with the contributions of women will ensure that the economy and social structure they are in becomes stronger.

In the context of the tourism sector, which is also a sectoral limitation of the study, when digital women entrepreneurs are examined, it is seen that there are unfortunately very few studies on this subject. However, considering both the digital transformation process in the tourism field and the strategic importance of the role of women entrepreneurs in this transformation, more studies are needed.

Digitalization has radically changed the language and concepts adopted in the tourism and travel industry; many things have become "smart"; therefore, we can talk about smart tourists, smart cities, smart destinations, smart glasses, smart cards, smart cars and smart ecosystems (Pencarelli, 2020, p. 470). The convergence between the Internet and informatics, communication and multimedia has provided new channels to strengthen communication processes while reducing search and distribution costs for both tourists and destinations (Minghetti & Buhalis, 2010, p. 267). The tourism sector, which is a large global industry in terms of the number of participants (tourists and operators) and total expenditure (Benyon, Quigley, O'Keefe, & Riva, 2014, p. 521), has strengthened

its strategic importance in terms of both the success of individual entrepreneurs and the competitiveness of economies with the power of digitalization.

Considering all the explanations, literary studies and current entrepreneurship practices were examined to gain a different perspective on the impact of digitalization on tourism and digital tourism on women entrepreneurs. It is expected that this study will conceptually evaluate the concepts of digitalization, tourism and women entrepreneurs as a whole and will guide future research in this sense.

2. THE CONCEPT OF DIGITAL ENTREPRENEURSHIP

Today, with the economic crises that we must struggle with every day, many factors such as economic growth, employment, new markets, new ideas and the creation of new business areas and their introduction to the market have caused great pressure on world economies (Arthur & Hisrich, 2011, p. 1). For these reasons, the concept of entrepreneurship, which contributes to the development of the economy by opening new business areas (Özcan, Çeltek, Sönmez, & Kırım, 2018, p. 37), is important for a country's economy and is considered the locomotive of business life. Entrepreneurship, which refers to the ability to see opportunities that others look at but do not see and to turn them into business ideas and the tendency to take risks, constitutes the dynamics of economic development and progress (Başar, Altın, & Doğan, 2013, p. 10).

Entrepreneurship is an important source of employment, economic growth and innovation and is an integral part of the process of economic renewal. Entrepreneurship is also a mechanism through which many people enter the economic and social stream of society, facilitating many functions such as culture formation, population integration and social mobility (Hisrich, Janice, & Sharon, 2007, p. 575)

The concept of entrepreneurship has four different dimensions. First, the new-business dimension; It means pursuing and entering new business areas/markets related to the firm's existing products or markets. Second, the innovation dimension; It refers to the creation of new products, services and technologies. Third, the self-renewal dimension; It emphasizes strategy reform, reorganization and organizational change. Finally, the proactivity dimension; It reflects the top management orientation in increasing competitiveness and includes initiative and risk taking, competitiveness, aggressiveness and courage. While they differ to some extent in their emphases, activities and orientations, all four dimensions belong to the same concept of entrepreneurship (Antoncic & Hisrich, 2001, p. 495; Güngör, 2023, p. 339).

Digital entrepreneurship is defined as the search for opportunities based on the use of digital media and other information and communication technologies (Davidson & Vaast, 2010, p. 1), the idea owners meeting a need more usefully through digital means or transforming the interest and demand for a new product or service into a need (Çelebi, 2021, p. 80), and the transformation of all new ventures and existing businesses by creating and using new digital technologies (Bican & Brem, 2020, p. 4). In short, digital entrepreneurship is the inclusion of digital format in some or all the entrepreneurial

process (product, distribution, promotion or more) (Hair, Hull, Perotti, & Hung, 2012, pp. 2-3).

Digital entrepreneurship is considered as a type of entrepreneurship that defines the works related to information technology fields using information technology tools, then covers and carries out them in the web environment (Rashidi, Yalda sani , & Rezaei, 2013, p. 1); In recent years, it has transformed the nature of traditional entrepreneurship with the inclusion of new digital technologies such as mobile computing, cloud computing, social media, 3D printing and data analytics in various aspects of innovation and entrepreneurship (Nambisan, 2016, p. 2). In recent years, billion-dollar digital enterprises such as Airbnb (sharing economy), Amazon (e-commerce), Google (search business) and Facebook (social media) are among the examples that have initiated the great waves of digital innovation and have increased the interest in digital entrepreneurship in both the business world and academia. It has been the subject of research originating from different disciplines such as information systems, innovation, management, policy and strategy (Sahut, Iandoli, & Teulon, 2021, p. 1159).

To express the dimensions related to digital entrepreneurship, these dimensions are; (1) the degree of digital marketing carried out by a firm, (2) the digital sales of a firm, (3) the digital nature of a firm's goods or services, (4) the digital distribution potential of a good or service, (5) potential digital interactions with key external stakeholders within the value chain, and (6) the digital potential of virtual internal activities related to a firm's operation (Hull, Hung, Hair, Perotti, & DeMartino, 2007). These expressions are also expressed as the level of digitalization in many sources. Digital entrepreneurship types emerge according to the changes experienced in digital levels.

The types of entrepreneurs classified according to the ways and degrees of using digitalization in business activities are as follows (Kişi, 2018, p. 392; Hull, Hung, Hair, Perotti, & DeMartino, 2007; Kişi, 2018, p. 392; Eysel & Sağlam, 2021, p. 9; Ekiyor & Altan, 2022, pp. 100-101):

-Light digital entrepreneurship; While traditional entrepreneurial activities are continued, digital is implemented as a complement to traditional.

-Medium level digital entrepreneurship; At this level, the business carries out its activities with digital infrastructure. Company value chain components such as product and product delivery use digital as a significant number of resources. There are important digital focuses such as digital product and digital delivery.

- Extreme digital entrepreneurship, unlike traditional entrepreneurship, involves the presence of digital in all processes from production to customer. Digital now dominates the entire enterprise. The building block of business functions such as production of goods and services, distribution, advertising, and customer relations is digital itself.

Table 1: Classification of Digital Entrepreneurship

	Degree of Digitalization		
	LOW	MIDDLE	HIGH
Marketing	The website is an additional service.	Digital marketing is the primary method.	Digital marketing is one method.
Sales	The product may also be available for sale digitally.	The product can be personalized and offered for sale digitally.	The product may only be sold digitally.
Product (Goods or Service)	The product is not digital.	The product may or may not be digital.	The product is digital.
Distribution	The product may be delivered by physical means.	The product can be delivered physically or digitally.	The product can be delivered digitally.
Stakeholder Management	Traditional interactions and basic digital elements like email are used.	Traditional interactions are widely used, along with significant levels of digital interaction.	Digital interactions take precedence. Traditional interactions are rarely or never used.
Operations	Transactions occur primarily in physical locations, but sometimes in virtual environments.	Transactions occur primarily in physical locations, but also frequently in virtual environments.	Transactions primarily occur in virtual environments; there is a possibility, but not necessarily, that they may occur in physical locations.

Source: Hull, C. E., Hung, Y.-T. C., Hair, N., Perotti, V., & DeMartino, R. (2007). Taking Advantage of Digital Opportunities: A Typology of Digital Entrepreneurship. *International Journal of Networking and Virtual Organisations*, 43(3), s. 290-303.
 Çelebi, F. (2021). *Dijital Çağda Liderlik ve Girişimcilik*. Ankara: İksad Yayınevi.

2.1. Digital Entrepreneur and Its Characteristics

Entrepreneurship, as first conceived by Schumpeter (1934), is vital to economic development. Schumpeter distinguished between the entrepreneurial function and the entrepreneurial person. An entrepreneur can be anyone who creates an innovation, an independent businessman, an employee or a manager of a firm. The range of innovations created by entrepreneurs is almost limitless, including the development of a new product or service, a new distribution channel, or the reorganization of an entire industry (Hult, Snow, & Kandemir, 2003, p. 403).

Entrepreneurship involves recognizing and evaluating opportunities to create new value and transform them into marketable goods or services, taking on risk and realizing rewards. Digital entrepreneurship is a subcategory of entrepreneurship in which some or all of what is physical in a traditional organization is digitized. The process of starting a

new venture, whether traditional or digital, involves finding, evaluating, and developing an opportunity by overcoming forces that oppose the creation of something new (Fouskas, 2019, p. 102).

Digital entrepreneurs use technological innovations to develop their newly established businesses or existing businesses by following technological trends, developing innovative business ideas, or marketing the goods and services they produce digitally (Alay, 2023, p. 4). In short, they are people who increase productivity by acting with digital activities within the boundaries of existing platforms and bringing the economy closer to the technological limit (Sussan & Acs, 2017, pp. 56-57).

Digital entrepreneurs are people who engage in initiatives that will be directly included in the economic sphere, such as the creation of a new company or the commercialization of an innovation, and who, like any entrepreneur, aim to make financial profit (Davidson & Vaast, 2010, p. 2). A digital entrepreneur is someone who uses the same tools to create business opportunities, exchange information, and collaborate with customers and shareholders (Rashidi, Yalda sani, & Rezaei, 2013, p. 1).

The individual characteristics of digital entrepreneurs are specified in two ways. The first is the internal characteristics of digital entrepreneurs, which include business, technology and management skills. The other consists of external characteristics of digital entrepreneurs who continue their activities successfully, such as researching investments and key technologies, finding market opportunities, including experienced personnel in the work activity and creating external collaborations. Due to these characteristics, digital entrepreneurs are seen as patient, determined, able to operate in uncertain environments, have leadership skills, have commercial intelligence, love research, know the market and customer well, can take risks, have high imagination and motivation to win, work carefully and meticulously, are experienced in their field, honest and get the job done (Ünsal, 2013, p. 26; Tekin & Küsbeci, 2021, p. 88).

The leading competitive advantage of digital entrepreneurship lies in the fact that they can do important work that creates a very, very big impact in relatively small spaces. Because the basic need is a work environment that includes a screen, keyboard and ergonomic seating. In traditional entrepreneurs, this space need can be tens of square meters (Özeroğlu, 2018, p. 27). Digital entrepreneurs bring their business ideas to life using technologies such as the internet, mobile applications, e-commerce, digital marketing, social media and artificial intelligence. Digital entrepreneurship offers advantages such as low start-up costs, easy access to global markets, rapid growth potential and the use of technological tools and resources to develop innovative business ideas. However, technological knowledge, business knowledge and entrepreneurial spirit are required for the success of digital entrepreneurship (Eyel & Sağlam, 2021, p. 9; Alay, 2023, p. 2).

APEC (2017) listed the critical skills and characteristics that are necessary and should be possessed as a result of their studies in which they asked founders of newly established companies, business managers, government officials, incubators, venture capitalists and training providers to state the skills and characteristics that they consider

most critical for digital entrepreneurship: (APEC, 2017, p. 60; Özdemir & Özdemir, 2022, p. 136).

Table 2: Skills That a Digital Entrepreneur Should Have

Absolute Skills for Digital Entrepreneurship	Absolute Skills for Digital Entrepreneurship
<ul style="list-style-type: none"> • Business model development • Verbal communication skills • Change management • Risk taking • Adaptability • Basic computer skills • Customer focus • Foresight and vision • Critical thinking and problem solving • Passion • Patience • Effective resource planning • Managerial and strategic leadership • Sales skills • English language proficiency • Industry awareness 	<ul style="list-style-type: none"> • Creativity • Coding • Networking • Scanning for emerging technology trends (what’s on the horizon) • Marketing (including customer preferences and purchasing behavior) • Local ecosystem awareness • Understanding of legislation and regulations

2.2. Digital Female Entrepreneur

Although it is strange that entrepreneurship has a gender, female entrepreneurship is defined as follows (Kumkale, 2015, pp. 21-22) (Durukan, 2021, p. 18)

- A person who has a workplace outside of home, in his/her own name and account,
- A person who establishes personal relations with the private sector or the public for the supply of goods and services produced or marketed,
- A person who undertakes the production and marketing of goods or services,
- A person who creates employment opportunities for other people as a business owner,
- A person who has a say in the business, converts his/her earnings into investment or makes necessary expenses and assumes the possible risks of the business.

As the boundaries of existing power hierarchies are being broken down by digital developments, the use of digital technologies offers new ways and opportunities to “destabilize traditional gender differences.” This is due to the disruptive potential of the internet in lowering the barriers to entry into entrepreneurship for a group traditionally

underrepresented in entrepreneurship. Women can benefit from digital developments in terms of increased job flexibility and reduced mobility restrictions (Ughetto, Rossi, Audretsch, & Lehmann, 2020, p. 308).

With the impact of technological transformation and globalization experienced worldwide, it is seen that women have begun to take on more roles in social and cultural life. The importance women give to education and their different perspectives have enabled them to be successful in many areas. Their discipline, attention to detail and sensitivity have led to the emergence of a new approach called women's entrepreneurship in the business world (Kırçıçek & Aytar, 2021, p. 495).

The emergence of different digital platforms has increased women's entrepreneurial tendencies. Online environments minimize the negativities women entrepreneurs face. In addition, women entrepreneurs need to develop various business ideas in online environments and perceive the essence of digital entrepreneurship and show a tendency for entrepreneurship in a technological environment (Özkılınç, 2006, p. 69).

There are various factors that externally push and internally pull women to start a business (Muştu, 2023, p. 59).

- Unemployment due to the country's economic situation
- The inequality between men and women that women must face in business life
- Working conditions not being suitable for women
- Intense working hours
- Traditional behavioral patterns
- Gender-based wage gap
- Glass ceiling syndrome (Invisible barriers resulting from behavioral and organizational prejudices that prevent women from advancing to higher positions)

The factors that attract women to entrepreneurship are.

- Desire to be independent
- Innovative thinking
- Comfortable life thinking
- Desire to realize oneself
- Entrepreneurial Motivation
- Ambition

Digital technologies provide better access to information, knowledge and resources related to markets, customers, production methods, technologies, marketing and business models. In particular, the emergence of social media, which can be easily accessed and used by different users, has expanded opportunities for mutual communication, collaboration and contact with partners, customers, potential customers, etc. In addition, with the creation of digital platforms to support entrepreneurship,

women have been provided with access to different information on legal issues, intellectual property rights, management, business models, design thinking, creativity, leadership, growth, etc. (Paoloni, Secundo, Ndou, & Modaffari, 2018, p. 187). McAdam et al. (2019) concluded in their study that digital entrepreneurship significantly eliminates institutional gaps in the social and cultural context. Another important result is that digital technology creates a significant liberating potential for women in developing economies (McAdam, Crowley, & Harrison, 2019, p. 921). Bayrakçı and Köse (2019) concluded as a result of their study; They stated that women use digital environments for ordering, selling, advertising, reaching the target audience and exchanging information, that women benefit from social media to reach wider audiences and that they prefer Instagram primarily because it is easy to use, and users return to shared images faster on Instagram. Accordingly, women stated that digital environments offer opportunities for reaching wider audiences, designing new products, advertising, learning about innovations, ease of use and cost advantage, while they stated the difficulties experienced in security and following updates as negative aspects (Bayrakçı & Köse, 2019, p. 103).

The positive results of the research on digital women's entrepreneurship aim to implement more incentive programs for women entrepreneurs, especially in societies where social norms are associated with masculinity within the framework of entrepreneurship.

2.3. Digital Women Entrepreneurship in the Tourism Sector

The existence of women entrepreneurs in the tourism sector began with their activities in the agricultural sector. Changing living conditions, individuals taking part in different business lines, the increase in vacations and free time, and the ease of vacations for different income groups have increased the progress of the service sector and this increase has also affected employment rates (Bayram, 2018).

Tourism is an economic sector that includes various sectors such as accommodation, food and beverage, and entertainment. In addition to basic tourism service providers, there are also stores, venues selling local products, and shops where souvenirs are exhibited and sold. The people who work as managers or intermediaries in these companies are usually women. Thanks to the incentives provided by the European Union and some international organizations, microcredit, support services, and training, women have started to participate more effectively in the tourism sector. Women who establish their own businesses in various areas such as food and beverage, souvenirs, and local products are increasingly taking part in tourism as entrepreneurs (Çıkmaz, 2024, p. 1220). The tourism sector is characterized as labor-intensive as well as women-intensive because it offers employment opportunities to women with different knowledge and skill levels (Demiral & Hassan, 2020, p. 363).

It is seen that digitalization affects almost every sector, especially the tourism sector. When we examine the tourism sector, which is the limitation of the study, in the context

of digitalization and women entrepreneurs, it is seen that digitalization creates inequalities of opportunity as well as the positive aspects listed above.

It is observed that high technology limits the participation of women in decision-making positions in tourism organizations and that women's digital competencies are underestimated among tourism entrepreneurs. Limited resources, constant need for new digital skills and digital burnout are some of the challenges expressed by women in running tourism businesses in an increasingly digital environment (Khoo, et al., 2024).

While it is seen that there are insufficient studies on the tourism sector and women entrepreneurs in Turkey; it is seen that there are very few studies that evaluate the tourism sector and women entrepreneurs together in the digitalizing world. The concept of women entrepreneurs, which the literary field has shown late interest in traditional entrepreneurship studies, has not been prioritized in a digitalizing ecosystem either. However, women entrepreneurs supported by many organizations, especially public institutions, will be able to benefit from the advantages of digitalization and produce more work in terms of quantity and quality. Therefore, there is a need for more studies in practice and in the literary field that show the correlation between digitalization and women entrepreneurs.

3. RESEARCH METHODOLOGY

The purpose of this study is to examine the examples of high-profile digital initiatives carried out by women in the tourism sector in terms of the number of entrepreneurs, their founding years, their fields of activity, their motivations for the initiative, their level of digitalization, the digital platforms they use, and the demographic characteristics of the founders.

3.1. Research Model

The entrepreneurs in the sample were identified by examining social media platforms such as LinkedIn, Twitter, Instagram, searching the keywords “digital women entrepreneurs in the tourism sector” on the Google search engine, and scanning the media through news, interviews, blog posts, and articles featuring entrepreneurs.

Data Analysis

Digital Women Entrepreneurs and Model Practices in Tourism in Turkey

There have been very few studies on digital women entrepreneurs in Turkey. As in traditional entrepreneurship, there is insufficient focus on women entrepreneurs in academic studies and practice. In the face of this situation, which may have many economic, political or socio-cultural reasons, the business models of well-known women entrepreneurs in Turkey within the boundaries of digital entrepreneurship have been examined. Within the scope of a field limitation such as the tourism sector, six examples that we can classify as digital women entrepreneurs in Turkey have been reached.

Ben İyiyim Anne/ Merve USTA

After traveling to more than 40 countries in 4 years, Merve Usta moved to Cape Town, South Africa in 2017 and discovered Cape Town, where she began organizing group-specific, personal city tours and safaris. Later, in addition to tours, she also offered services such as car rental, language school, and accommodation. She currently has 352 000 followers on her Instagram account Ben İyiyim Anne and 10,600 subscribers on her YouTube channel. She actively produces digital content about her travels and tours on Instagram and YouTube. The tours she organizes, and other services can be accessed via beniyiyimanne.com.

Gezimanya/ Tuğçe YILMAZ

Tuğçe Yılmaz studied Market Research and Advertising at Istanbul University and Public Relations and Advertising at Marmara University. After working at institutions such as Milliyet Newspaper, Universal McCann, Veritas Media, she left corporate life in 2012 and developed Gezimanya, which she founded as a hobby in 2011.

Gezimanya, which she founded with her husband Murat Özbilgi in 2012, is described as the most comprehensive Turkish travel guide on the internet. Gezimanya.com, which has 1850 destinations and 18,000 pages, organizes tours with Gezimanya Tur, offers content marketing activities for contracted brands and launched Blogger Casting, Turkey's first agency focused solely on bloggers and content marketing activities, which started operating in 2014. This agency regularly produces digital content with a team consisting of travel bloggers, fashion bloggers, Instagram and YouTube phenomena. They currently have 106,000 followers on their Instagram account; and 18,700 subscribers on their YouTube channel.

Gezgin Kadınlar/ Cemre Nur MELEKE

Cemre is the founder of the country's first women's travel platform. She is the founder of the Gezginkadınlar platform, who combines travel with her job, travels a lot, loves nature and lives by the motto "There are women travelers in Turkey". Born in Istanbul in 1991, she graduated from Marmara University Faculty of Business Administration with a BA in Business Administration and a MA in Cinema from Marmara University. She has written travel articles for Milliyet newspaper, worked as a book critic for Vatan newspaper, as an editor for a travel magazine and as a copywriter for a social media agency. Cemre Nur Melek organizes camps, trainings, domestic and international trips and meetings that encourage women to travel thanks to the Gezginkadınlar initiative she founded in 2015. She sells the tours and other activities she organizes through her website "Gezginkadınlar.com". While she actively uses YouTube,

X, Facebook and Instagram; the platform she uses the most is Instagram with 127,000 followers (Gezginkadınlar, 2014-2024).

Biz Evde Yokuz/Duygu ŞAR

Duygu ŞAR, born in 1983, managed projects in various culture and art institutions after graduating from Koç Özel Lisesi, Brown University (USA), L'IEP (France). She describes Biz Evde Yokuz, which she founded with her husband Bilgehan Çelik in 2014, as an activity, event, adventure and discovery site. Biz Evde Yokuz is an experience blog. Every year, travel guides that benefit millions of readers are published on the website Bizevdeyokuz.com. They received the Best Blog of Turkey and Best Travel & Tourism Website awards at the Golden Spider Web Awards; and the Best Blog of Turkey award at Uzak Rota. They have 352,000 subscribers on Instagram and 127,000 subscribers on their YouTube channel (Bizevdeyokuz, 2024).

Seyahat Mekiği/ Hatice MEKİK

Hatice Mekik was born in 1992. After graduating from Ankara University, Insurance Department, she works as a Bodily Damage Manager at a private insurance company. In 2020, she and her husband Umut Mekik founded the Travel Mekiği website. Today, they actively provide services such as drone shooting and social media management on seyahatmekigi.com with blog posts, videos and digital content they create from their national and international travels. YouTube and Instagram are the social media platforms they use most. They currently have 143 thousand followers on their Instagram accounts (Seyahatmekigi, 2024).

Rotahane/ Pervin Ersoy

Pervin Ersoy was born in 1972 and graduated from Istanbul University Faculty of Economics. Pervin Ersoy, the wife of Minister of Tourism and Culture Mehmet Ersoy, founded Rotahane in 2019 to raise awareness in domestic tourism. Rotahane shares content on YouTube and Instagram, and is accompanied by a famous artist, businessperson, writer, etc. from that city during her travels. She currently has 285 thousand followers on Instagram.

Table 3: Demographic Characteristics and Digitalization Levels of Digital Women Entrepreneurs

Company	Entrepreneurs	Age	Educational Status	Work Experience	Partner	Digitality Level
Ben İyiyim Anne	Merve Usta	34	Istanbul Bilgi University Stage and Performing Arts Management	Founder of a Public Relations Firm	-	Medium Digital Entrepreneurship
Gezimanya	Tuğçe Yılmaz	33	Market Research and Advertising at Istanbul University, Public Relations and Advertising at Marmara University	Milliyet Newspaper, Universal McCann, Veritas Media	Murat Özbilgi	Medium Digital Entrepreneurship
Gezgin Kadınlar	Cemre Nur Meleke	33	Bachelor of Business Administration and Master of Cinema from Marmara University	-Milliyet Newspaper, -Vatan Newspaper	-	Medium Digital Entrepreneurship
Biz Evde Yokuz	Duygu Şar	41	Brown University (USA) Business Administration, L'IEP (France) Political Science	-Freelance Arts & Culture Project Coordinator Partner -KTT International Logistics	Bilgehan Çelik	High Digital Entrepreneurship
Seyahat Mekiği	Hatice Mekik	32	Ankara University Insurance Department	-Bodily Injury Manager at a Private Insurance Company	Umut Mekik	Medium Digital Entrepreneurship
Rotahane	Pervin Ersoy	52	Istanbul University Faculty of Economics	-Show TV Presenter, -Klas FM Presenter	-	Medium Digital Entrepreneurship

Six digital women entrepreneurs were examined in terms of demographic characteristics and their initiatives in terms of digital initiative type. As shown in the table, while the common aspects of the entrepreneurs were seen as high education level,

it was also seen that they had work experience. The point where they differed was that three of the entrepreneurs established this initiative with their spouses and continue their activities. Another important result about the entrepreneurs is that the field of activity they carried out and their graduation or work experience are not similar. In their biographies, the women entrepreneurs stated that being dissatisfied with their jobs and loving to travel were the main sources of motivation for establishing their initiatives.

Merve Usta (I'm Good Mom), one of the entrepreneurs, actively uses her website, YouTube and Instagram. She sells tours through the website she has established. In addition to the Cape Town travel tours she guides, she also provides accommodation, car rental and language school services. She produces digital content about her travels on her social media page, shoots travel videos and writes blogs. Unlike other ventures, the ventures of Merve Usta, Cemre Nur Melek (Traveler Women) and Tuğçe Yılmaz (Gezimanya) do not only produce digital content but also offer tour sales and other complementary travel services that they organize online. Cemre Nur Melek and Tuğçe Yılmaz also make their sales through the website they have established. They actively use YouTube, X and Instagram. Gezimanya, unlike these common features, offers digital content production services with Blogger Casting, Turkey's first agency focused on content marketing activities.

Hatice Mekik (Seyahat Mekiği) differentiates itself from other initiatives by producing digital content, social media marketing via its website, and selling drone shooting services. Pervin Ersoy (Rotahane) differentiates itself from other initiatives in terms of content, primarily in terms of motivation. With the mission of increasing interest in domestic tourism, content is not only produced about travels in Turkey. Pervin Ersoy, who shares this content on YouTube and Instagram, makes various collaborations with businesses, institutions, or organizations in the cities she visits. The communication and agreement process with these collaborations takes place through social media accounts.

Finally, Duygu Şar (Biz Evde Yokuz) who has the highest number of followers and subscribers among entrepreneurs, produces digital content that is followed by millions of readers as an experience blog. They sell products specific to the content they produce through the website they established as Biz Evde Yokuz Store.

When all the initiatives are evaluated in terms of digital entrepreneurship level; as indicated in Table 3; all of them except Biz Evde Yokuz are included in the medium level digital class because digital marketing is the priority, the products they produce are digital or traditional, and the purchasing process and interaction are significantly digital. This class was selected because there is a product that we can describe as a traditional product among the products they produce. However, Biz Evde Yokuz initiative is thought to be included in the extreme level digital enterprise type since it only offers digital content production service.

Information about the digital platforms used by entrepreneurs and their followers is summarized in Table 4.

Tablo 4: Entrepreneurs and Digital Platform Information

Company	Entrepreneur	Web Sitesi	Instagram Follower	YouTube Subscribers
Ben İyiyim Anne	Merve Usta	Beniyiyimanne.com	352 000	16.100
Gezimanya	Tuğçe Yılmaz	Gezimanya.com	106.000	18.700
Gezgin Kadınlar	Cemre Nur Meleke	Gezginkadınlar.com	127.000	351
Biz Evde Yokuz	Duygu Şar	Bizevdeyokuz.com	352.000	127.000
Seyahat Mekiği	Hatice Mekik	Seyahatmekigi.com	143.000	18
Rotahane	Pervin Ersoy	-	285.000	652

Table 5: Activities and Entrepreneurial Motivations of Women Entrepreneurs

Company	Entrepreneur	Business Activities	Motivation
Ben İyiyim Anne	Merve Usta	-Organizing Cape Town Trips and Safir Tours -Producing digital travel content -Car, house rental -Language school consultancy	- Desire for self-realization - Desire to explore the world - To be a pioneer for women to travel more - To support travelers who do not want to travel alone but cannot find anyone
Gezimanya	Tuğçe Yılmaz	-Organizing domestic and international tours -Creating digital travel content -Providing content marketing activities for contracted brands -Offering Blooger Casting service	-Spirit of Exploration -Entrepreneurial Drive -Desire to Work Independently
Gezgin Kadınlar	Cemre Nur Meleke	-Organizing domestic and international tours -Creating digital travel content -Blogger	- To raise awareness and find solutions to the disadvantages that women experience while traveling.
Biz Evde Yokuz	Duygu Şar	-Writes digital travel articles - Writes a tourism and travel blog - Sells products suitable for digital content with Biz Evde Yokuz Store	- To have more experiences and to share these experiences with others - Dream of traveling - Desire to work independently

Seyahat Mekiği	Hatice Mekik	-Provides social media management services. -Produces professional drone footage -Produces digital travel content.	-Experiencing different cultures -Desire for Self-Actualization -Desire for Discovery
Rotahane	Pervin Ersoy	-Creates digital content from domestic travels. -Makes brand and business collaborations.	-It started as a project to revitalize domestic tourism.

4. CONCLUSION

Six digital business models with female entrepreneurs were identified by considering the number of followers and subscribers in digital areas such as LinkedIn, Instagram and YouTube. The websites of the enterprises were examined, the blogs written by the entrepreneurs were scanned, interviews were watched, and internet news were scanned. In the light of the data obtained from here; the year the business models were established, their fields of activity, the motivations of the entrepreneurs, their digitalization levels, the digital platforms they use most frequently, and the demographic characteristics of their founders were examined.

It is seen that the ages and education levels of women entrepreneurs are similar. It is seen that the ages at which they established their enterprises are 30 years old and above; their education levels are undergraduate and above. It is seen that the motivations of women entrepreneurs to establish their enterprises are boredom with their current jobs, their desire to work independently, their desire to be a pioneer in women's self-realization and their desire to travel and explore the world. Only one of the entrepreneurs has the motivation to revitalize domestic tourism, which is different from the other entrepreneurs.

Another result is that the startups receive more interaction on Instagram. When Instagram posts are examined, it is seen that travel videos are shot and shared more. Women entrepreneurs who want to raise awareness that women can travel alone are producing digital content especially in this sense.

All these six initiatives are related to travel-tour organization, travel content production, tourism-related blog writing and other digital marketing activities. When we look at digital tourism initiatives in Turkey; it is seen that there are platforms where accommodation, vehicle, event, restaurant, hotel etc. rentals are evaluated and recommended. Examples of these are digital initiatives such as Tatilsepeti.com, O-bilet, Bavul.com. However, the founders of these initiatives are men, and their founding purposes include commercial gain and profit motivation. It is seen that the entrepreneurial women in this study act more with the motivation to realize themselves and to pioneer other women rather than commercial concerns. In future studies, the sources of motivation and differences of female and male entrepreneurs can be examined. Addressing these reasons in terms of socio-cultural, economic and digital

knowledge level can clarify the differences of female entrepreneurs compared to male entrepreneurs.

Another interesting result of the study is that half of the entrepreneurs established their ventures with their partners who were also their husbands. The reasons behind this result can be the subject of future studies.

Finally, when evaluated as a type of digital enterprise; except for Biz Evde Yokuz, all others are included in the medium level digital enterprise type. It differs from the extremely digital type because the service they produce includes physical features. However, Biz Evde Yokuz enterprise is included in the extremely digital enterprise type because all functions such as the product they produce, marketing, distribution, communication are completely digital.

Considering all these results, more business models are needed to capture the advantages of the fierce competition brought about by digitalization. Especially thanks to digitalization, women can be encouraged to balance both work and family, protect themselves from negative gender-based behavioral norms, and act as inspiring leaders by developing women's potential, self-belief, and competence. For this, more studies are needed, especially on digitalization and women entrepreneurs. In future studies, studies can be conducted in wider and different sectors without the tourism sector restriction. The advantages and disadvantages experienced by women entrepreneurs can be investigated by making a comparison between digital women entrepreneurs in the world and Turkey.

REFERENCES

- Alay, H. K. (2023). The New Normal's New Entrepreneurship: Digital Entrepreneurship. *Sosyal Bilimler Araştırmaları Dergisi*, 3(1), s. 1-9.
- Antoncic, B., & Hisrich, R. D. (2001). Intrapreneurship: Construct Refinement and Cross-Cultural Validation. *Journal of Business Venturing*, 16, s. 495–527.
- APEC. (2017). *Digital Entrepreneurship Across the APEC Region: Assessing the Needs of the Region's Digital Start-Ups*. RMIT University,. apec-digital-entrepreneurship-report.pdf
- Arthur, S. J., & Hisrich, R. H. (2011). Entrepreneurship Through The Ages: Lessons Learned. *Journal of Enterprising Culture*(1), s. 1-40.
- Başar, E., Altın, H., & Doğan, V. (2013). *Meslek Yüksekokulları İçin Girişimcilik* (2. b.). ANKARA: Nobel Akademik Yayıncılık.
- Bayrakçı, E., & Köse, S. (2019). Kadın Girişimciliğinde “Bir Tık” Ötesi: Kadın Dijital Girişimciler Üzerine Nitel Bir Araştırma. *Girişimcilik İnovasyon ve Pazarlama Araştırmaları Dergisi*, 3(6), s. 95-106.

- Bayram , G. E. (2018). Kadın Girişimciler ve Turizm: Mevcut Durum ve Sorunlar Üzerine Sinop İlinde Bir Araştırma. *İşletme Araştırmaları Dergisi*, 10(2), s. 56-88.
- Benyon, D., Quigley, A., O'Keefe, B., & Riva, G. (2014). Presence and Digital Tourism. *AI & Soc*, 29, s. 521–529.
- Bican, P. M., & Brem, A. (2020). Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable “Digital”? *Sustainability*, 12, s. 2-15.
- Bizevdeyokuz. (2024). *bizevdeyokuz*. www.bizevdeyokuz.com: <https://www.bizevdeyokuz.com/biz-kimiz/>
- Çelebi, F. (2021). *Dijital Çağda Liderlik ve Girişimcilik*. Ankara: İksad Yayınevi.
- Çıkmaz, E. (2024). Turizm Sektöründe Kadın Girişimciliğin Bibliyometrik Analizi. *Gaziantep University Journal of Social Sciences*, 23(3), s. 1214-1227.
- Davidson, E., & Vaast, E. (2010). Digital Entrepreneurship and its Sociomaterial Enactment. *System Sciences (HICSS), 2010 43rd Hawaii International Conference on*, (s. 1-8).
- Demiral, N. Ö., & Hassan, A. (2020). Kadın Girişimciler ve Sosyal Medya: Bozcaada Konaklama İşletmelerinin Instagram Sayfalarına Yönelik Bir Araştırma. *AHBVÜ Turizm Fakültesi Dergisi*, 23(2).
- Durukan, L. (2021). Türkiye'de Kadın Girişimcilerin Desteklenmesinde KOSGEB'in Rolü. *Gazi İktisat ve İşletme Dergisi*, 7(1), s. 17-37.
- Ekiyor, A., & Altan, F. (2022). Dijital Girişimcilik. M. Baş, İ. E. Tarakçı, & R. Aslan (Dü) içinde, *Dijitalleşme 2* (s. 95-108). İstanbul: Efe Akademi Yayınları.
- Eyel, C. Ş., & Sağlam, H. (2021). Dijital Dönüşüm ve Girişimcilikteki Değişim: Dijital Girişimcilik. *Atlas Ulusal Sosyal Bilimler Dergisi*, 1(6), s. 7 - 20.
- Fouskas, K. (2019). Entrepreneurial Opportunity Scanning in the Digital Age. *The Malopolska School of Economics in Tarnów Research Papers Collection*, 42(2), s. 101-114.
- Gezginkadınlar. (2014-2024). *gezginkadınlar*. 2024 tarihinde gezginkadınlar.com: <https://gezginkadınlar.com/gezgin-kadınlar-kimdir/>
- Güngör, F. (2023). Türkiye'de Girişimcilik İle Belirsizlikten Kaçınma Arasındaki İlişkinin Yönetim Yazınındaki Yansımaları. *Cumhuriyet 9th International Conference on Social Siences* (s. 337-350). Afyon: Academy Global Publishing House.

- Hair, N., Hull, C. E., Perotti, V., & Hung, Y.-T. C. (2012). Digital Entrepreneurship and Its Sociomaterial Enactment. *International Journal of Innovation and Technology Management*, 9(6), s. 1-18.
- Hisrich, R., Janice, L.-F., & Sharon, G. (2007). Entrepreneurship Research and Practice: A call to Action for Psychology. *American Psychologist*, 62(6), s. 575–589.
- Hull, C. E., Hung, Y.-T. C., Hair, N., Perotti, V., & DeMartino, R. (2007). Taking Advantage of Digital Opportunities: A Typology of Digital Entrepreneurship. *International Journal of Networking and Virtual Organisations*, 43(3), s. 290-303.
- Hult, G. M., Snow, C. C., & Kandemir, D. (2003). The Role of Entrepreneurship in Building Cultural Competitiveness in Different Organizational Types. *Journal of Management*, 29(3), s. 401–426.
- Khoo, C., Yang, E. C., Tan, R. Y., Vazquez, M. A., Quijano, C. R., Pécot, M., & Canales, D. B. (2024). Opportunities and Challenges of Digital Competencies for Women Tourism Entrepreneurs in Latin America: A Gendered Perspective. *Journal of Sustainable Tourism*, 32(3), s. 519-539.
- Kırçışek, Ö. B., & Aytar, O. (2021). Kadın Girişimciliği: Motivasyon Faktörleri Üzerine Bir Araştırma. *Bartın Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 12(24), s. 493-515.
- Kiş, N. (2018). Dijital Çağda Yeni Bir Girişimcilik Yaklaşımı:Dijital Girişimcilik. *C.Ü. İktisadi ve İdari Bilimler Dergisi*, 19(2), s. 389-399.
- Kumkale, İ. (2015). *Kadın Girişimciliğinin Stratejik Liderlik Yetkinlikleri Açısından İncelenmesi ve Bir Araştırma*. Bursa: Ekin Basım Yayın Dağıtım.
- McAdam, M., Crowley, C., & Harrison, R. T. (2019). “To Boldly Go Where No [Man] Has Gone Before” - Institutional Voids and The Development of Women's Digital Entrepreneurship. *Technological Forecasting & Social Change*, 146, s. 912-922.
- Minghetti, V., & Buhalis, D. (2010). Digital Divide in Tourism. *Journal of Travel Research*, 49(3), s. 267–281.
- Muştu, Y. (2023). Dünyada ve Türkiye'de Dijital Kadın Girişimciliği. *Journal of Business in the Digital Age*, 6(1).
- Nambisan, S. (2016). Digital Entrepreneurship: Toward a Digital Technology Perspective of Entrepreneurship. *SAGE Publications*, s. 1-27.
- Özay, E., & Kök, S. B. (2022). eni Nesil Girişimcilik Örneği Olarak Dijital Girişimcilik ve Girişimcilerin Dijital Özellikleri. *Pamukkale Üniversitesi İşletme Araştırmaları Dergisi*, 9(1), s. 211-246.

- Özcan, B., Çeltek, E. E., Sönmez, N., & Kırım, B. (2018). Girişimci Kişilik Özelliklerinin ve Girişimcilik Eğitiminin Girişimcilik Eğilimine Etkisi- Kocaeli Üniversitesi Örneği. *Uluslararası İktisadi ve İdari İncelemeler Dergisi*(18), s. 37-58.
- Özdemir, F., & Özdemir, S. (2022). Dijital Girişimcilik. F. Özdemir, & S. Özdemir içinde, *İşletme Biliminde Yeni Yaklaşımlar* (s. 123-141). Iksad Publications.
- Özeroğlu, A. C. (2018). Girişimcilik Faaliyetlerinde E-Ticaret Uygulamaları: İnovasyon ve Dijital Girişimcilik. *İstanbul Gelişim Üniversitesi Sosyal Bilimler Enstitüsü*. Yayınlanmış Yüksek Lisans Tezi.
- Özkılınç, N. (2006). Dijital Dönüşüm Çağında Kadın Girişimcilerin Bireysel Girişimcilik Eğilimleri İle Dijital Vatandaşlık Davranışları Arasındaki İlişki Üzerine Bir Araştırma. Aksaray: *Aksaray Üniversitesi Sosyal Bilimler Üniversitesi* Yayınlanmış Yüksek Lisans Tezi.
- Paoloni, P., Secundo, G., Ndou, V., & Modaffari, G. (2018). Women Entrepreneurship and Digital Technologies: Towards a Research Agenda. *Advances in Gender and Cultural Research in Business and Economics, 1*, s. 181-194.
- Pencarelli, T. (2020). The Digital Revolution in the Travel and Tourism Industry. *Information Technology & Tourism, 22*, s. 455–476.
- Rashidi, R., Yalda sani , S., & Rezaei, S. (2013). Presenting a Butterfly Ecosystem for Digital Entrepreneurship Development in Knowledge Age. *7th International Conference on Application of Information and Communication Technologies*, (s. 1-4).
- Sahut, J.-M., Iandoli, L., & Teulon, F. (2021). The Age of Digital Entrepreneurship. *Small Bus Econ, 56*, s. 1159–1169.
- Seyahatmekigi. (2024). *Seyahatmekigi*. www.seyahatmekigi.com: <https://www.seyahatmekigi.com/>
- Sussan, F., & Acs, Z. (2017). The Digital Entrepreneurial Ecosystem. *Small Bus Econ, 49*, s. 55–73.
- Tekin, İ. Ç., & Küsbeci, P. (2021). Dijital Dönüşüm Sürecinde Yükselen Bir Değer: Dijital Girişimcilik. *Stratejik Yönetim Araştırmaları Dergisi, 4*(1), s. 81-102.
- Ughetto, E., Rossi, M., Audretsch, D., & Lehmann, E. E. (2020). Female Entrepreneurship in the Digital Era. *Female entrepreneurship in the digital era.*, 55, s. 305-312.
- Ünsal, S. (2013). Dijital Girişimcilik Rehberi Girişim Ekosistemi ile İlgili Temel Soruların Cevapları. İstanbul: Bankalararası Kart Merkezi (BKM). Ağustos 11, 2024

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Risk Management of Talent' Migration and Diaspora Inclusion in the Republic of Moldova and Bosnia and Herzegovina

Popa Marina¹¹⁷, Plămădeală Olivia¹¹⁸

Abstract

Introduction: Due to Globalization, worldwide migration has become a prominent phenomenon in the last decades, with the establishment of GATT and free movement rights.

Aim: The main purpose of this research is to analyze the effect of brain drain, being a major risk for small countries with an economy in development, such as the Republic of Moldova and Bosnia and Herzegovina.

Method: We utilize both national and international migration statistics portals to provide a better understanding of the historical and current trends. Moreover, we employ a theoretical framework to list some policies, developed by the national governments of the selected countries, with the aim to mitigate the risk of talent emigration.

Findings: Most studies demonstrate the importance of diaspora engagement as a solution to the problem of brain drain. We identify some national governmental policies aiming to increase the level of collaboration between a state and its citizens outside the borders.

Conclusion: The findings show the effective ways to support for sustainable development in the insurance sector. We can say the findings will be important data source for policy makers to make decisions.

Originality and value: While in the past, brain drain became a problem for numerous states, brain gain is seen as a future economic driver. In that way, more interactive governmental policies should be created, aiming to foster a dynamic link between a skilled human force and the economy in development.

Key Words: Migration, brain drain, diaspora, brain gain, talents' emigration.

Jel Codes: F22, O15, J24.

1. INTRODUCTION

With the globalization process, the level of migration is annually increasing. The brain drain is particularly prominent, especially for countries in development, such as states in Eastern Europe and the Balkan region. Likewise, with the rise in emigration from these countries, which will be named homelands, the number of projects with the aim of diaspora integration into the economic life has also increased. To analyze the impact of talents' emigration on Balkan and Eastern European countries, we selected one country from each region, similar in terms of population size, emigration level, economic development, and cultural specificity. The main goal of our paper is to analyze

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the impact of the brain drain on the Republic of Moldova and Bosnia and Herzegovina. While the objectives of the research are to identify and compare the cultural specifics of the host lands with the homeland, identify the causes of emigration, identify diaspora integration projects in these two countries, and analyze the investment potential in each case.

2. LITERATURE REVIEW

As was pointed by Frederic Docquier (2006) the term” brain drain” illustrates the international transfer of human capital and it is mainly used in case of the migration of relatively highly educated individuals, who move from developing to developed countries.

Based on Young exist 2 types of brain drain first Geographic brain drain, which occurs when talented professionals decide to move to a country that they think can give them better life quality and more opportunities. According to the same author, the second type of brain drain, organizational, involves the emigration of talented workers from a firm, often because of instability or a lack of opportunities within the firm, to a new place of work situated outside the state.

As was indicated by Chen, Wong and Law (2023) global migration is based on general economic and social factors, being joined by specific policy responses.

As the result we have 2 environments of policy responses the first from home countries and the second one from the home states.

From the point of view of Vertovec (2004) the first one is represented by political engagement with homelands that because of party politics, electioneering or post-conflict reconstruction and support for terrorism. According to Waldinger and Fitzgerald (2004) from the perspective of host countries, migrants become foreigners that can deal with domestic and foreign policy.

According to Icoski (2022) the Western Balkan’s starting with the end of the Second World War, experienced three significant waves of migration: first - in the early 1960s because of a high level of unemployment in Yugoslavia, second – in 1970 due to an open door migration policy in the EU, third – after 1990 as the result of a violent dissolution of Former Yugoslavia. At the same time, based on Tejada, Varzari and Porcescu (2013) the problem of mass emigration appeared after independence in 1991 as the result of severe economic crises and a long political transition the period when talents and skilled people were neglected.

3. RESEARCH METHODOLOGY

Objective of this paper is to study an impact of the Brain Drain on a home country development. We are focused on identification of different mechanisms of diaspora engagement in the economic and social life of the national state.

3.1. The Brain Drain causes and effects

Due to the Brain Drain, countries, industries, and organizations lose a core portion of valuable talented work force. In actual, very dynamic world, a most hazardous is the decision of emigration from a country, of both highly and lower skilled workers. and the term is often used to describe the departure of certain professionals.

There are 2 outcomes caused by Brain Drain:

- Lost Experience - areas affected by brain drain end up with a dearth of qualified people
- Harmed economy of the home state - a mass exodus leads to a drop in tax payments that can decrease the economic growth and development.

Several factors can lead to this phenomenon:

- Higher Economic opportunities
- Political instability in the home state
- War
- Better education standards
- Other motives

3.1.1. Examples of Talents' emigration from the Republic of Moldova

According to Denis Roșca's book there are Moldovans from diaspora who are known worldwide for their contributions in various fields such as medicine, astronomy, IT, cinematography, chemistry, and physics. Some of them are:

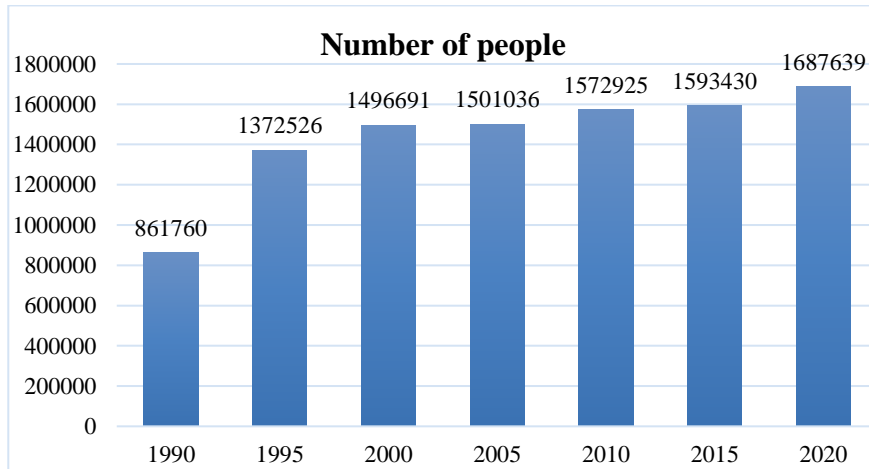
- Boris Katz - born on October 5, 1947, in Chișinău, Moldova, at that time part of the Soviet Union. He is a well-known figure in the field of computer science, especially for his contributions to AI and natural languages understanding. He works at the Massachusetts Institute of Technology (MIT) and is associated with the Computer Science and Artificial Intelligence Laboratory. He developed a prototype of AI system equal with SIRI from iPhone.
- Adrian Păunescu - a prominent Romanian poet, journalist, and politician, born on July 20, 1943, in Soviet Moldova. After his emigration in Romania he played a crucial role for Romanian literature, being widely known for his poetry book volumes. Moreover, he had a crucial role in Romanian political life.
- Regina Barzilay – born in 1970, Chisinau, Republic of Moldova. She is an Israeli-American computer scientist, being a professor at the Massachusetts Institute of Technology and a head of the Faculty for AI. In 2017, Barzilay won the "Genius Grant", for "developing machine learning methods that enable computers to process and analyze vast amounts of human language data and numerous awards connected with machine learning. Furthermore, her teaching

capacities were recognized by MIT with the Jamieson Teaching Award in 2016. In 2023, she was elected to the American National Academy of Medicine and American National Academy of Engineering.

- Vitaly Bulgarov – born in 1986 in Moldovan, is 3D artist with an outstanding career in the entertainment and technology industries. After his experience at Blizzard, Bulgarov worked at Industrial Light & Magic, where he started his film career. He worked for blockbuster movies industry in such film's projects as "RoboCop" (2014) and the "Transformers" series. Currently, Bulgarov is heavily involved in game design, known for its incredible game "Mortal Shell."

3.2. Brain Drain - the Case of Bosnia and Herzegovina

The institutions of the former Yugoslavia have not been transferred to the newborn states because of their tangencies with centrally planned economies and the political past of former Yugoslavia. As was indicated by Williams and Vorley (2017) that aspect has provided an obstacle for reforms inside the newborn courtiers, that have been taking an inspiration from Western states policies without a good analyze of their individual capacities to create a new government system.



Graph 1: Emigration size of Bosnian population by year

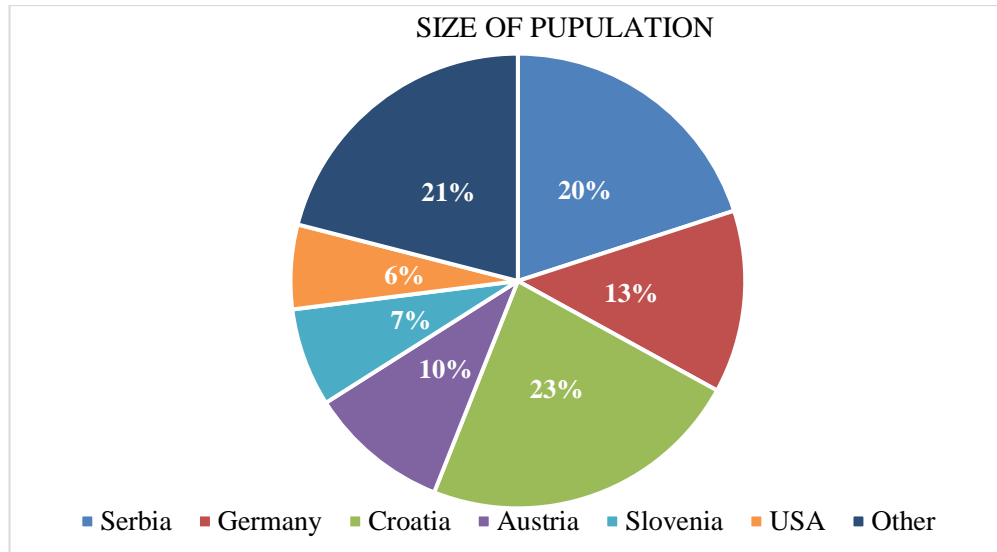
Source: UN DESA International Migration Database (2020).

According to the provided information from the Graph 1 on Emigration size of Bosnian population in 1990 was the lowest, around 86 760 people. With the beginning of 1995 it has a steady increase until 2000, followed by a small decrees in 2005, around 1 501 036 inhabitants. Based on the illustrated data in the Graph 1, with 2010 the number of Bosnian emigrants has a dramatic increase until 2020 from 1 572 925 to 1 687 639 people.

Recognizing the vitality of its emigrants as a qualified workforce, Bosnia and Herzegovina has taken steps to develop a more sustainable migration system. For example, one of the most prominent was to expand its legislative framework and strengthen institutions to a better management of migration and engagement of its diaspora. Moreover, were strengthen the diplomatic relationship with numerous countries through bilateral labor agreements, that have facilitated formal migration channels, showing the fact that working abroad diaspora receives needed support and services from its homeland.

According to some studies provided by Domazet (2020) and Čičić (2019) we identify different economic, political, and social factors as the core drivers of the emigration from BiH. As was listed that push factors are poor working conditions, corruption, low quality of public services, and poor education system for the future generation.

Due to the Efendić (2014) point of view, always pull factors outweigh other push factors as the most powerful drivers of emigration, providing a better opportunity for the emigrant. At the same time, as was mentioned Kadušić and Suljić (2018) the reunification with family, education factors and improved job prospects also play a pivotal role, making a shift from push to pull factors.



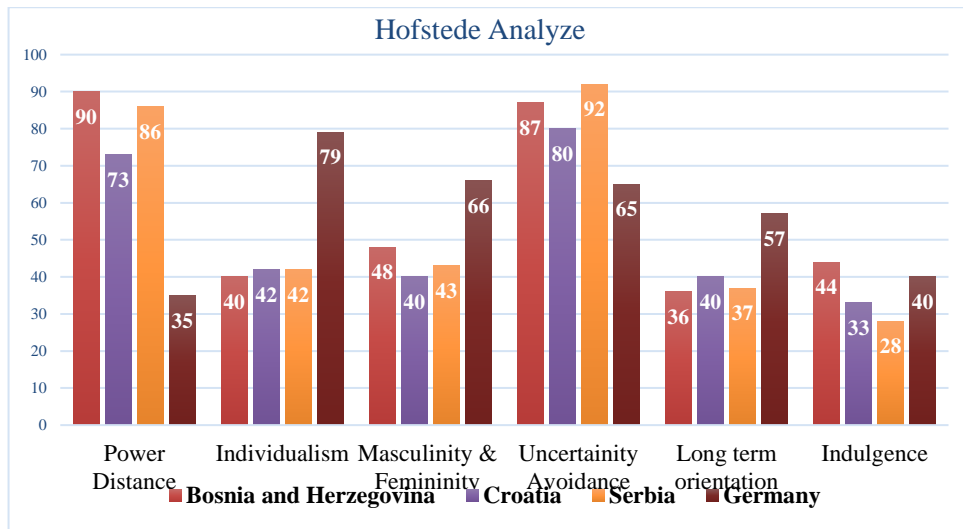
Graph 2: Main countries of destination for Bosnian emigrants in 2020

Source: UN DESA International Migration Database (2020)

The Graph 2 illustrates the statistic regarding the main states of destination for Bosnian emigrants. The largest amount of people emigrates in the neighboring countries such as Croatia, around 23% of population emigrate there, and Serbia with an amount of 20%. Other part of the population chose a totally different environment for their future life, around 13% of emigrants decided to move in Germany and 10% in Austria.

3.2.1. Hofstede Analyze: Bosnia and Herzegovina Case

For the better understanding of the selected environments as a main point of emigration we decided to make a cultural comparison of Bosnia and Herzegovina and main host countries of Bosnian emigrant such as: Croatia, Serbia and Germany.



Graph 3: Cultural Comparison between Bosnia and Herzegovina and 3 main host lands for its emigrants

Source: The Cultural Factor Group

<https://www.theculturefactor.com/country-comparison-tool?countries=bosnia+and+herzegovina%2Ccroatia%2Cgermany%2Cserbia>

The Graph 3 provides data about the cultural difference between Bosnian society and other 3 main destinations of emigration flow out of the country such as Serbia, Croatia and Germany. According to the Graph 3 Bosnia has a high level on the dimension of Power Distance, around 90 points, which means that people accept a hierarchical order from most powerful individuals without a need for justification. The same level of Power Distance is in Serbia, being a little bit lower in Croatia. Totally

different situation is in Germany, that has 35 points at this dimension meaning that in that country human rights are comparatively extensive and have to be taken into account by the government.

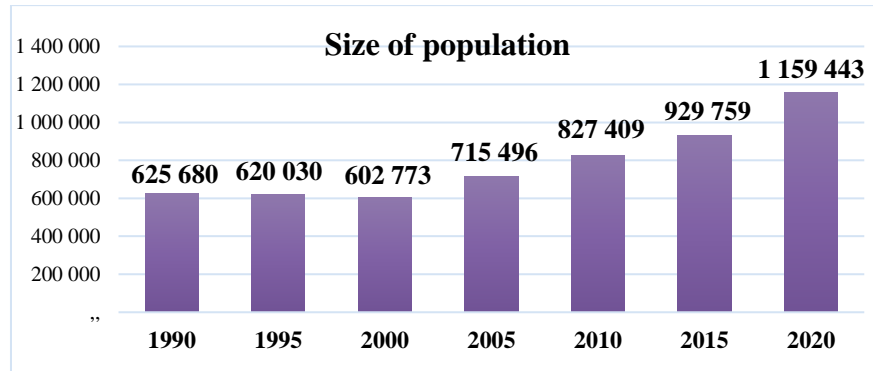
While for the dimension of Individualism Bosnia, Serbia and Croatia all have the same level of 40-42 points, being a collective society that foster strong relationships where each member takes responsibility for fellow individual of the group. Conversely, Germany culture, with 79 points, is based on personal preferences for people as well as a sense of higher responsibility.

Other dimension that must be analyzed is Uncertainty Avoidance. Bosnia and Herzegovina scores 87 points on that, being not far from Serbia with 92 and Croatia with 80. Countries with high level of Uncertainty Avoidance are based on an emotion need for rules, being always involved in hard work and keeping a high level of security in all life aspects. Also, at long term orientation Bosnia has only 36 points, being at the same level with its neighbors, but far from Germany. A score achieved by Bosnia at Long term orientation means that the society exhibits great respect for traditions and a focus on achieving quick results. Conversely, Germany with 57 points shows an ability to adapt easily to changed conditions, being very perseverant in achieving big results.

After that analyze we conclude that a major part of Bosnian people is more used to emigrate in states with the same cultural aspects as their homeland is. Only 23% of emigrants chose such countries as Austria or Germany, which are stricter and more successful oriented than other countries of destination for Bosnian.

3.3. Brain Drain - the Case of the Republic of Moldova

According to Cebotari (2018) after its independence in 1991, the Republic of Moldovan, like other Eastern European countries, tackled a considerable level of pressure during its transition from a totalitarian and centralized economic system to a democracy and market economy. Moreover, in 1990-2000 the country had an extremely limited access to basic public services for a large amount of its population. Also, Transnistrian problem increased the level of tension within the country, being a catalysator for Moldova's political instability.

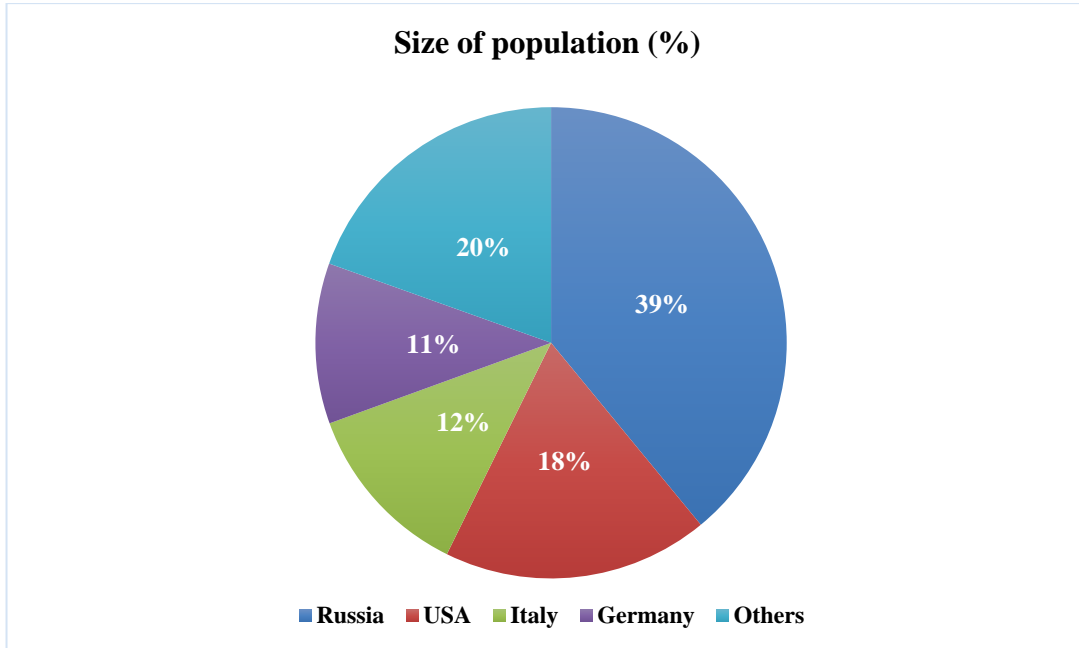


Graph 4: Emigration size of Moldavian population by year

Source: UN DESA International Migration Database (2020).

According to the provided information from the Graph 4 on Emigration size of Moldavian population in 1990 was 625 680, and started to decrease until 2000, the number of emigrants being 602 773. After 2000, the number of populations who decided to move had a sharp increase, being at its highest level in 2020, when around 1 159 443 people were outside the country.

During our work we observed that push factors in Moldova are stronger than pull factors in destination countries, because the home context is the main issue behind the brain drain of skilled Moldovans. Due to a political and economic instability, professional future and development a great majority of talented people emigrates in search of higher living standards, improved career prospects with a better reward system, and higher level of education.



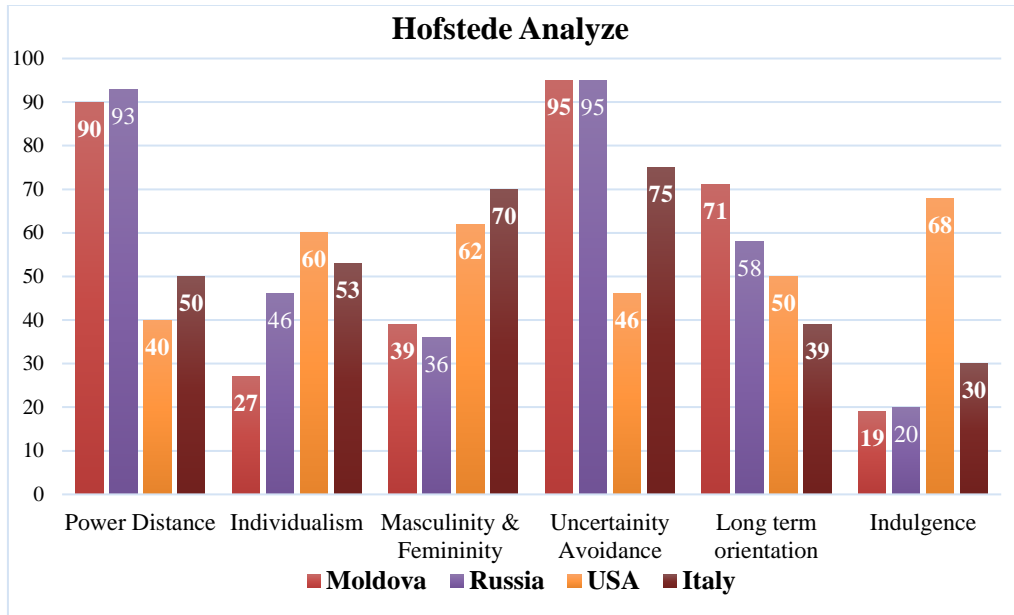
Graph 5: Main countries of destination for Moldavian emigrants in 2023

Source : NBS

https://statbank.statistica.md/PxWeb/pxweb/en/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice_POP070/POP070300.px/table/tableViewLayout2/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774

According to the Graph 5 Talented Moldovans choose their destinations based on opportunities offered by a specific country than because of its geographical and cultural proximity. The main destination countries for the emigrants in 2023 are Russia, around 39% of total population who decided to emigrate in 2023. Conversely, around 18% of population in 2023 decided to move in the USA. Based on the provided information other 2 states as a main destination for Moldovan people are Italy with 12% of emigrants and Germany with 11%. The rest 20% of population selected other states as a host land for them.

3.3.1. Hofstede Analyze: Moldova Case



Graph 6: Cultural Comparison between The Republic of Moldova and 3 main host lands for its emigrants

Source: The Cultural Factor Group

<https://www.theculturefactor.com/country-comparison-tool?countries=italy%2Cmoldova%2Crussia%2Cunited+states>

The Graph 6 provides data about the cultural difference between Moldovan society and other 3 main destinations of emigration flow out of the country such as Russia, Italy and Germany. According to the Graph 6 Moldova has a high level on the dimension of Power Distance, around 90 points, that shows that the society accepts a hierarchical order from most powerful people without a need for justification. The highest level of Power Distance is in Russia, around 93 points. Conversely in The USA and Italy people used to be engaged in the political life of the party.

While for the dimension of Individualism registered the lowest level of 27, being a collective society that foster strong relationships with each member of a group. Other

states have a higher level at that dimension, Russia 46, The USA 60, Italy 53, being used to a sense of higher responsibility.

Other crucial dimension is Uncertainty Avoidance. Moldova scores 95 points, means that the society is always involved in a hard work and keeps a higher level of security. On that dimension Moldova is equal with Russia, but far from Italy and the USA with 75 and with 46 points. Also, at long term orientation Moldova has 71 points, showing a high ability to adapt easily to changed conditions, with a big level of results achievement. Other 34 states have a lower score meaning that their societies are not as flexible as Moldavian.

After that analyze we conclude that a large amount of Moldova's people are more used to emigrate in states with a different cultural aspects. As the result, emigrants from the Republic of Moldova are more interested in finding a place with a higher life quality than an environment with the same social tangeites.

3.4 The Diaspora engagement's policy development

A was pointed by Carling the OECD created around 150 official national development plans between 1997 and 2023 years. Due to them, diaspora engagement is a highly increasingly topic especially now.

Due to an important role in world policy making process and social transformation, diaspora institutions, whose number has a staidly increase, are studying more systematically. Furthermore, with the faster evolution of diaspora organizations some new forms of global governance, national and transnational citizenship, and new social ties around international migration were developed.

While the policy making process of immigrants was at a highest top of development, the necessity of national governmental engagement in home courtiers management of emigrants only starts to rise.

According to Başer (2015) the specific of the host land migration regime determines the degree of opportunities and resources available for the participation of migrants in both homeland and host state social life. The host land migration policy shows how the government formulates foreign citizens' incorporation. At the same time, the way in which the host state developed the core principles of migrants' rights regarding their democratic participation and representation in the country of residence.

Based on Waldinger and Fitzgerald (2004) in most of the cases emigration movements typically create a hazardous situation for home states. While a large number of scientists pointed out a lot of weaknesses of emigration, a part of them noticed a variety of strengths connected with that process. On the one hand, people exit might stagnate states' ability to penetrate their social resources. On the other hand, the access to financial flow and knowledge resources from outside the border catalases the development and scientific movement within the national environment. Due to the second point of view, many Governments worldwide start to be increasingly aware about

the vitality of diaspora networks to increase sustainable development, primarily in countries of origin.

With the beginning of 2018, the Global Compact on Migration fortified a special policy framework that allows diaspora to contribute to a sustainable movement of the home countries through the transfer of skills, social and financial resources as key factors for national development strategies, with a great number of initiatives under way.

According to Bauböck (2003) there are mainly three areas of benefits that illustrate a sustainable cooperation between emigrants and their home countries. These three areas are: human resources upgrading, political lobbying of receiving governments and remittances' flow. Based on Levitt and de la Dehesa's (2003) point of view there is a larger variety of policy choices such as: ministerial or consular reforms; investment policies, extension of political rights based on dual citizenship; the right to vote from overseas, the increased level of state protections to nationals from abroad that go beyond common consular services and the creation of different policies with the aim to reinforce emigrants' social engagement.

3.4.1. Diaspora engagement in Bosnia and Herzegovina

- *Diaspora Invest Project*

In 2017, by the USAID was launched the Diaspora Invest Project to engage around 2 mln. emigrants from Bosnia and Herzegovina into social life of their homeland.

Objectives of that project was to benefit from knowledge resources, new technologies, business ties, and finance.

Results: USAID has supported around 200 diaspora start-ups and early-stage firms established in Bosnia. Were created 2,800 jobs in over 74 cities and towns from Bosnia, creating more opportunities for citizens to make a living and raise families here in BiH. Moreover, in that way people inside the state are not as depended on diaspora's money as they were in the past.

- *Diaspora for Development – D4D*

The Government of the Bosnia and Herzegovina, with the support of Swiss Development Council, developed a 4-year project. Also, the project has the same mission as IOM and UNDP organizations, working together at the same task along with the state-level Ministry of Human Rights and Refugees, and several local governments and communities in Bosnia and Herzegovina.

Main objective of the D4D project was to stimulate diaspora engagement, through the establishing of an institutional capacities network. Moreover, was initiated a collaboration between MFA with the institutions of host countries aiming to establish diaspora representative bodies in Germany, Italy, Austria and Sweden.

In the following stages, the D4D project increases socio-economic opportunities and perspectives for women and men in Bosnia and Herzegovina. Due to an effective use of diaspora cooperation mechanism were developed different municipal ideas to the diaspora strategy, providing higher quality services to emigrants, increase the number of horizontal initiatives for the transferred business-related know-how and knowledge in home state.

3.4.2. Diaspora engagement in The Republic of Moldova

- *Diaspora Business Forum*

Yearly the Moldovan Government organizes the Diaspora Business Forum in cooperation with UNDP, IOM, WHO, and UNICEF within the joint UN Migration Multi-Partner Trust Fund project.

The aim of the event is to create a stronger tie between diaspora, local entrepreneurs, government body, investors, and different stakeholders. Due to different discussions about challenges, and existing opportunities, programs, and policies it becomes easier to explore business opportunities, foster economic cooperations, and strengthen relationship between the emigrants and the home state.

- *Leveraging the positive impact of migration on Moldova's development through improved policy evidence and better engaged diaspora*

A new project of 36 months (2023-2026) is implemented by the International Organization for Migration, UNDP, UNICE and WHO, based on the UN Migration Multi-Partner Trust Fund (MMPTF).

The objectives of the project are to provide positive impact of migration on Moldova's socio-economic development and minimize all the connected risks.

Through an effective management the project will foster innovative mechanisms to strengthen diaspora engagement, including the establishment of some special platforms for consultation and capitalization of diaspora's skills and expertise for future initiatives. It is crucial to collect highly qualified expatriated practitioners and engage them in various priority areas of development at the national and local levels.

It is expected to be developed a national data portal to notice diaspora's impact, extending beyond remittances. Also, a nationally platform will increase a diaspora engagement in public governance and development opportunities and a special mechanism will stimulate temporary return to Moldova for 30 highly qualified practitioners in priority development areas.

4. Research Model

Through the following model is represented the process of diaspora engagement provided by home state. The whole process is based on 4 main steps to be implemented for as a fundament for an efficient cooperation between a homeland government and its

diaspora. The most prioritized steps are to create a strong legal framework as a platform for future activities. Also, is crucial to engage some workforce outside and inside the country to maintain and mediate the relationship between these 2 main parts.

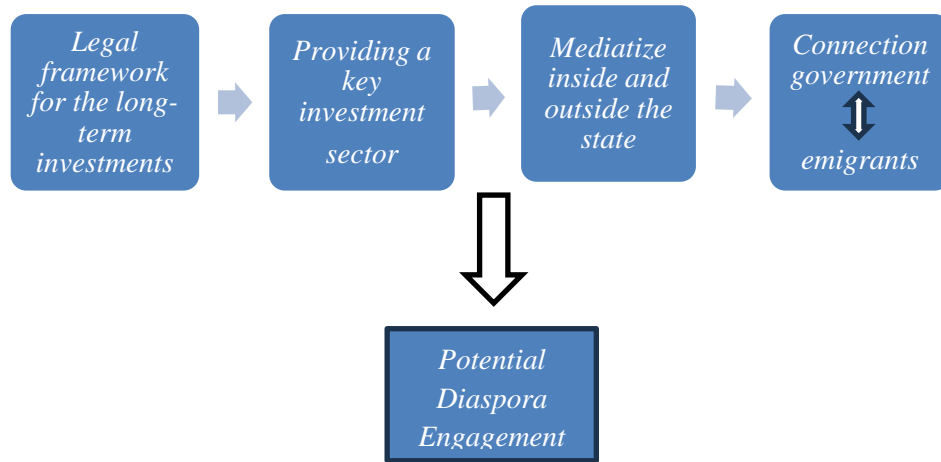


Figure 1. Research Model
Source: Created by authors

4.1. Explanation of the process

As was mentioned below is crucial to establish a clear legal structure to encourage long-term investments from the diaspora. For that is necessary to analyze the current law that deals with diaspora investments and to initiate new legal initiatives, if it's necessary. While the legal framework will be completed, a new governmental institution must be created with a representation in host land. Through that organization all future negotiation between national government of homeland and its diaspora must be done. Moreover, it is vital to launch a new digital platform to make the communication between parties more efficient and faster.

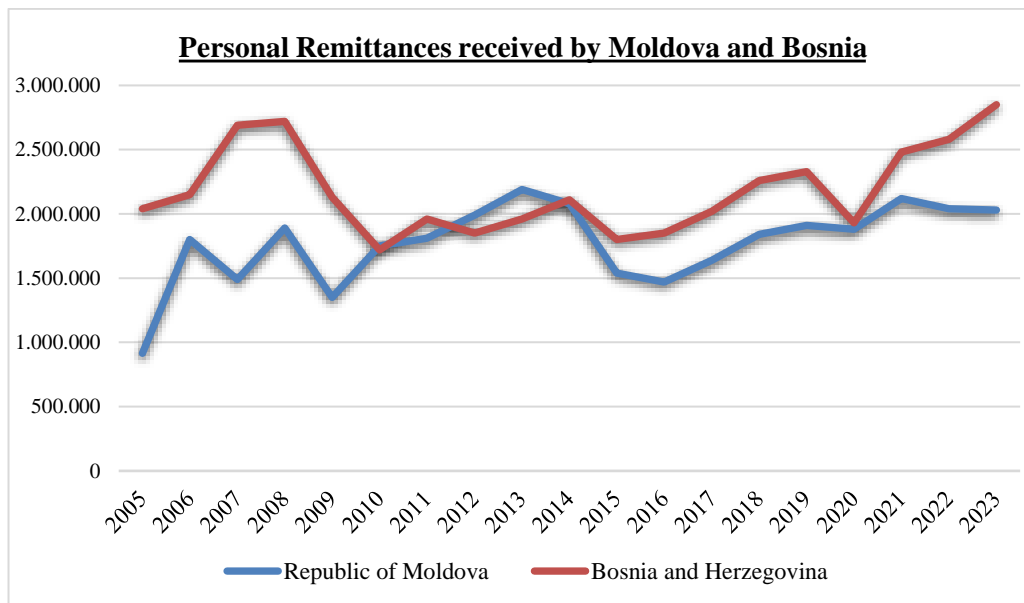
The next important step is to analyze the most vulnerable home sectors where the future investments will have the biggest impact. At that stage is important to align the strategy with national main priorities and the most attractive options for diaspora. The identification of that options can be done through a selection of 10 main preferences for diaspora in which a largest amount of emigrants will be interested to invest. Also, emigrants who send the highest level of remittance during the last years have the biggest potential of becoming future partners in the project.

After the preparation work will be finished the project has to be mediatized within the home state and in the host land through the institution which was created in the first stage of the project. To foster the work, it is necessary to create a platform where mission,

vision, all legal aspects, opportunities and ideas regarding the project will be listed. At the beginning necessary information will be mentioned on TV. After, the main platforms for mediatization will be Government home page, Instagram, Facebook, Twitter.

A whole dialog between diaspora and homeland will be done through the organization responsible for the project.

4.2. Data and Results Analysis



Graph 7, Personal Remittances received by Moldova and Bosnia and Herzegovina during 2005-2023 in \$

Source: data.worldbank.org

<https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?end=2023&locations=M D-BA&start=2005&view=chart>

To understand better the potential of the project and future diaspora engagement in the economic life of its homeland we decided to analyze the statistical data of the remittance received by those 2 states.

According to Chart 7, in both countries, the flow of remittances received during the period 2005-2023 was quite fluctuating. Starting in 2005, both countries experienced a positive trend, in Bosnia of 2.04 mln. \$ and Moldova 915. 080\$. Due to a financial crisis in 2008, the remittance level was negatively impacted causing a decline in the first year

of the crisis. After 2010, the flow of remittances recovered again, with Moldova reaching its highest level of 2.19 mln. \$ in 2013. However, between 2014 and 2017, the flow of money gradually decreased. Starting with 2017, remittance levels had a sharp increase, until 2019 in Bosnia of 2.33 mln. \$ and Moldova of 1.91 mln. \$, being negatively affected by COVID-19 for a short period. Since 2020, remittances have increased, especially in Bosnia, where they reached pre-financial crisis levels. In 2023, Bosnia recorded the highest remittances of 2.85 mln. \$ in the entire analyzed period, while in Moldova, the level decreased until 2.03 mln. \$. It is needed to mention that the amount of money received by Bosnia is higher than the one received by Moldova.

In both states the potential of a higher diaspora engagement through investment from remittance can be mentioned with the larger amount of money received in last 3 years.

5. CONCLUSION

In conclusion, talents' emigration represents a major problem for small economies in development. Analyzing the statistical data of Bosnia and Herzegovina and the Republic of Moldova, we can observe that due to the transition from totalitarian regimes to democratic ones and the slowly developed economies, the number of emigrants is increasing.

According to Hofstede's analysis, for the diaspora of these countries such factors as economic and political stability, a high level of education, and professionalism are more important than the cultural difference of host countries. Thus, what has been observed, especially in the case of the Republic of Moldova, is that the diaspora prefers to emigrate in more advanced economies, even if the cultural differences between these countries and Moldova society are significant. We find that a numerous disadvantages for countries with a growing diaspora can be managed through special policies of integration.

Therefore, we have demonstrated that the governments of Bosnia and Moldova, in collaboration with international organizations, are launching numerous projects to attract investments from the diaspora and integrate them into the development of various sectors in the homelands. With the help of statistical data, we have shown that the flow of remittances received by both countries is increasing, representing potential financial resources for investment for the development of Bosnia and Moldova.

Our research leaves room for further studies regarding the level of interest within the diaspora to invest in the development of their home countries, the comparison between diaspora integration before and after the expansion of these opportunities.

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REFERENCES

Arrocha, W. and Xenii, E. (2023) Migrations and Diasporas. Emerald Publishing Limited. <https://www.perlego.com/book/4174781>

Biroul Migrației și Azil., (2016)., Profilul Migrațional Extins al Republicii Moldova 2010-2015'. Ministerul Afacerilor Interne al Republicii Moldova.

https://mai.gov.md/sites/default/files/document/attachments/raport-analitic-pme_2010-2015_ed.2016.pdf

Carling J., (2024). 'How can governments better support diaspora contributions to social, cultural and economic development?'

<https://odi.org/en/insights/how-can-governments-better-support-diaspora-contributions-to-social-cultural-and-economic-development/>

Cebotari M., (2018)., 'The impact of high skilled migration (brain drain) on Republic of Moldova, an analysis of possible consequences and approaches to manage this phenomenon'. csei working paper series.

Chen F., Wong V., Low S. H., (2023). 'Brain drain: what is the role of institutions?'. ResearchGate.

https://www.researchgate.net/publication/376099571_Brain_drain_what_is_the_role_of_institutions

Devdiscourse., (2024). 'Unlocking Bosnia's Diaspora: The Key to National Revival'.

<https://www.devdiscourse.com/article/headlines/3068458-unlocking-bosnias-diaspora-the-key-to-national-revival>

Docquier F., (2006). 'The brain drain'. ResearchGate.

https://www.researchgate.net/publication/228394436_The_brain_drain

Efendić, A., B. Babić, and A. Rebmann. (2014). 'Diaspora and Development'. Sarajevo: Embassy of Switzerland in Bosnia and Herzegovina.

https://www.i-platform.ch/sites/default/files/diaspora_and_development_-_bih_engl.pdf

Halilovich H., Karabegovik D., Hasic J., Oruc N., (2018). ‘Mapping the Bosnian Herzegovinian Diaspora: Utilizing the Socio-Economic

Icoski M., (2022). ‘Toward a New Youth Brain-drain Paradigm in the Western Balkans’. GMF Policy Paper.

IOM, (2024). ‘IOM Moldova at the Diaspora Business Forum 2024 in Chişinău’.

<https://moldova.iom.int/news/iom-moldova-diaspora-business-forum-2024-chisinau>

Jahića H., Hadžiahmetović-Milišić N., Dedovića L., Kuloglijaa E., (2024). ‘Diagnosing the Issue: Understanding and Combating KuloglijaaMedical Brain Drain in Bosnia and Herzegovina’. *Naše gospodarstvo / Our economy* 70 (2) 2024.

Kayani A., (2023), ‘The Global Brain Drain: Understanding its Causes, Impacts, and Solutions’’, The Issue.

<https://theissue.co.uk/insights/the-global-brain-drain-understanding-its-causes-impacts-and-solutions/>

Kiner A., (2020). ‘Are they highly skilled? labour migration and education of Moldovan emigrants with information card – the case of Slovakia: part 1’. *Revista Moldovenească de drept internaţional şi relaţii internaţionale* nr. 2 (vol.15).

King, R., Frykman, M. P. and Vullnetari, J. (2018) *Migration, Transnationalism and Development in South-East Europe and the Black Sea Region*. 1st edn. Routledge.

Kadušić, A. & Suljić A. (2018) *Migration and demographic changes: The case of Bosnia and Herzegovina*. *European Journal of Geography*.

<https://www.eurogeojournal.eu/index.php/egj/article/view/52>

Maciuca O., (2024). *Engaging diasporas in local development: An operational guide based on the experience of Moldova*. UNPD.

National Biro of Statistic of the Republic of Moldova,
https://statistica.gov.md/en/statistic_indicator_details/34

NATO (2021). ‘Defending euro- Atlantic values’. NATO’s Public Diplomacy Division

Noack M., (2017). ‘Driving the sustainable development agenda forward – the role of migrants and diasporas’. ICMPD.

POPA, M., PLAMADEALĂ, O. (2023) ‘Trends and opportunities for the young human factor in the context of international migration of the workforce.’ 12th EURINT International Conference: Challenges and future prospects for a resilient Europe, 19-20 may 2023, edition a XII-a, Iasi, Romania.

<https://eurint.uaic.ro/proceedings/EURINT2023.html>

Roșca D. (2024). ‘100 de inventatori din Moldova’. Libro.

Sabadie, J. A., (2010) Migration and Skills. [edition unavailable]. World Bank.

<https://www.perlego.com/book/1483935>

Soldo A., Spahić L., Hasić J. (2021). ‘ Survey on youth emigration in Bosnia and Herzegovina - research report’. UNFPA.

Tejada G., Varzari V., Porcescu S., (2013). ‘Scientific diasporas, transnationalism and home-country development: Evidence from a study of skilled Moldovans abroad’. ReasearchGate.

https://www.researchgate.net/publication/263492706_Scientific_diasporas_transnationalism_and_home-country_development_Evidence_from_a_study_of_skilled_Moldovans_abroad

The Culture Factory Group, Country comparison tool.

<https://www.theculturefactor.com/country-comparison-tool?countries=italy%2Cmoldova%2Crussia%2Cunited+states>

The World Bank, (2024), International Mobility as a development strategy: Bosnia and Herzegovina Country Report., The World Bank Group.

<https://openknowledge.worldbank.org/entities/publication/7b079e72-3cab-4679-92cc-22fb27da726d>

United Nations., (2020). ‘International Migrant Stock’. UN Populution Division.

<https://www.un.org/development/desa/pd/content/international-migrant-stock>

UNPD., (2024). ‘Leveraging the positive impact of migration on Moldova’s development through improved policy evidence and better engaged diaspora’.

<https://www.undp.org/moldova/projects/leveraging-positive-impact-migration-moldovas-development-through-improved-policy-evidence-and-better-engaged-diaspora>

USAID., (2024). ‘U.S. government’s diaspora project harnesses BiH diaspora as a catalyst of progress’.

<https://www.usaid.gov/bosnia-and-herzegovina/success-stories/aug-09-2024-us-governments-diaspora-project-harnesses-bih-diaspora-catalyst-progress>

Waldinger R., Fitzgerald D., (2004)., ‘Transnationalism in Question’, UC San Diego.

<https://escholarship.org/uc/item/2bk9034r>

World Bank. World Development Indicators. Data Bank.

<https://databank.worldbank.org/source/world-development-indicators#>

Young J., (2024), ‘Brain Drain: Definition, Causes, Effects, and Examples’. Investopedia.

https://www.investopedia.com/terms/b/brain_drain.asp

Robotic Process Automation In Audit

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Abstract

Introduction: The purpose of robotic process software is to support people in carrying out their activities or to completely relieve them of individual activities. Robotic software shortens business processes by communicating with other digital systems, collecting and managing data and adding it to other applications. It offers easier solutions because it does not require fundamental changes in the existing information infrastructure. Since the issue of ethics is also important in independent auditing, no matter how technological the systems are, the human factor and ethical understanding ensure the creation of the independent audit report.

Aim: The aim of this study is to examine the contributions of robotic process automation to the auditing process where the human factor is very important.

Method: In this study, a detailed literature review was conducted on artificial intelligence components, robotic process automation, types of Robotic Process Automation and the use of robotic processes in generally accepted control techniques.

Findings: As a result of the literature review, many published scientific studies were found regarding the importance of using artificial intelligence in auditing.

Conclusion: The findings show that over time the audit process will be managed entirely by artificial intelligence or other automation and are supported by sample applications.

Originality and value: Robotic process automation, which shortens working times, increases efficiency and accelerates decision-making processes, can be integrated into audit processes and allows the auditor to focus on issues requiring judgment. The auditor examines business processes using Generally Accepted Auditing Techniques to form an audit opinion.

Key Words: Audit, Robotic Process Automation, Artificial Intelligence,

Jel Codes: M42, M48, M15

1. INTRODUCTION

The 2010s took their place in the pages of history as the years when technological developments entered our lives with rapid acceleration. The process that started with the question of can machines think? enabled us to meet artificial intelligence, which is considered a revolution in technology and is used in every area of life. Human-machine integrations, which are new generation technologies accepted as the fourth revolution after the industrial revolution, have entered every area of life.

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Artificial intelligence and robotic automation applications are widely used in many areas in businesses. When evaluated in terms of accounting processes, applications for robotic processes, artificial intelligence and cloud systems facilitate accounting processes.

The evolution of technology is very fast, especially in labor-intensive areas. The audit process is a labor-intensive process and automation systems that will support the process without ignoring the human factor are needed in this process. In this context, robotic process automation will facilitate business processes in the audit process.

Can robots be auditors? The starting point of this question is the philosophically debated question of “Did human beings create themselves with artificial intelligence?” What does a robot do in an ethical dilemma? How do robots evaluate visual or verbal evidence? Will robots become auditors through exams? How can professional judgment be assigned to robots? Can a robot be the lead auditor?

2. LITERATURE REVIEW

Robotic Process Automation (RPA) software can provide significant return on investment to both business process owners and the organization in general, in addition to automating repetitive tasks. Robotic Process Automation software allows companies to automate manual processes in a cost-effective manner, as the price point of RPA software is generally lower than traditional business applications (Amini, 2019: 8). Robotic process automations are planned to mimic human actions.

When the studies in the literature on the use of robotic process automation in the fields of accounting, finance and auditing are examined, it is seen that it is widely used in repetitive business processes. In the study conducted by Kaya and Türkyılmaz in 2019, it was stated that robotic process automation reduces costs and increases efficiency in business operations, and is especially useful in internal audit and special financial reports (Kaya et al., 2019: 246).

Robotic Process Automation (RPA) and Artificial Intelligence (AI) are two closely intertwined terms that have had and will continue to have a major impact on accounting and auditing practices. RPA and AI are at opposite ends of the intelligent automation continuum. Robotic process automation automates highly process-oriented, i.e. rule-based tasks, while AI provides the quality data needed (CFB Bots, 2018; Gothardt et al. 2020; 91).

Koçak (2023) stated that robotic process automation can be used to perform accounting functions such as data entry, accounts payable and receivable, general ledger entries, bank reconciliations, financial reporting and compliance.

Huang et al. (2022), in their study on data analytics in auditing, explained that robotic process automation will be effective in evaluating audit evidence and will allow the entire evidence to be examined instead of sample selection, thus increasing the effectiveness and efficiency of the audit process.

3. ROBOTIC PROCESS AUTOMATION

The concept of Robotic Process Automation (RPA) refers to the vision of physical robots roaming around offices and performing human tasks, and the term essentially refers to the automation of service tasks previously performed by humans. For business processes, the term RPA most commonly refers to structuring software to perform tasks previously performed by humans, such as transferring email and spreadsheets from multiple input sources to systems of record, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems (Lacity, Willcocks, & Craig, 2015: 3).

Robotic Process Automation (RPA) is an innovative approach to transforming process execution without changing the underlying application systems (Houy, Hamberg, & Fettke, 2019; Smeets, Erhard, & Kaußler, 2019; Langmann & Turi, 2020).

RPA is a new preview of future technologies. RPA is one of the most advanced technologies in the field of computer science, electronics and communications, mechanical engineering and information technology. It is the combination of both hardware and software, networking and automation to do things very simply (Madakam, Holmukhe and Jaiswal, 2019: 250). Artificial intelligence is the ability of computers or robots to perform tasks that usually require human intelligence. Artificial intelligence programming is based on three techniques: learning, reasoning and self-correction. The applications of artificial intelligence are endless and can be applied to many different sectors and industries. Some of the widely used technologies of artificial intelligence are (İnce et al., 2021: 52):

- **Image Recognition:** A technology that identifies and detects objects or features in images or videos.
- **Speech Recognition:** A technology that identifies words and sentences in spoken language and converts them into a machine-readable format.
- **Natural Language Generation:** A technology that converts structured data into natural language.
- **Sentiment Analysis:** A technology that uses natural language processing, text analysis, and biometrics to identify, extract, measure, and examine subjective information.

All these technologies have come together to make RPA an effective technological platform. The turning point in RPA technology was the period when the technology was officially recognized by large-scale enterprises and businesses were looking for ways to reduce their expenses. Businesses realized the need for a digital environment and RPA was seen as an easy and convenient solution for digital transition. These factors have led to RPA starting to have a greater impact on the world as more and more businesses

started to adopt RPA in their critical tasks (Javed, et al., 2021). Table 1 shows the characteristics of Robotic Process Automation.,

Table 1: Features of RPA

Feature	Explanation
User Interface	RPA typically uses the (graphical) user interface, i.e. the graphical user interface of the applications to be automated.
Imitation of man	Human mimicry: RPA mimics human input in the applications to be automated, even if no decision is made by the user.
No programming knowledge required	No programming knowledge is required to configure bots (although a basic understanding of IT is helpful and often required). Configuration is performed on the basis of, for example, flowcharts.
Outside-in approach	Unlike traditional automation solutions (STP, WfM, etc.) that follow an inside-out approach (the application is adapted from scratch or newly developed), automation with RPA does not interfere with existing applications in terms of programming.
Software	RPA is software, not hardware. For example, RPA should not be confused with industrial robots.
Structured routine tasks	RPA executes structured processes whose procedures are fixed and therefore unchanging. No AI or Machine Learning is used.

Source: (Van der Aalst 2018: 269-271; Allweyer, 2016: 2-3; Willcocks vd., 2017: 19-20).

RPA software typically consists of a development environment that creates business processes, virtual workers (bots) that perform these jobs, and a control panel that controls these jobs. The development environment allows step-by-step creation of business processes and definition of tasks at an extensible level. It works desktop/cloud-based for coding robotic processes. Bots are applications that run bots created in a development environment that integrates with the application to perform predefined tasks. The robot keeps a comprehensive record of each step of the task execution. These help with analytical studies such as auditing and monitoring (Baştürk, 2023: 16). The core of an RPA system consists of input sensors, an intelligence center, and output actuators. It can be implemented by one or more RPA software systems. This basic part is supported by management functions such as management and monitoring performed by each software system or by a general RPA management system. A software robot, also called a bot, is a single instance of an RPA system that automates a concrete process instance. A software robot is equivalent to a single worker. Each software robot requires a separate login to existing application systems (Czarnecki and Fettke, 2021: 11). Today, RPAs are marketed as commercial software. Blueprism is the market leader among the companies that develop these software. Apart from this, UiPath, Automation Anywhere,

WorkFusion can be listed as other RPA developers. The process steps for Blueprism application are as follows:

- Login to the system,
- Create an Excel sheet,
- Receive data from an Excel sheet,
- Transfer the received data to the order system,
- Create a document related to the order.

Similarly, in the ProcessFlows application;

- Acquisition
- Document management
- Workflow
- Reporting

four components are used. The IBM-RPA application developed by IBM has the following components:

- Control room
- Customer
- Process management

With the help of this component, the current status of the business can be easily observed. In addition, a new bot is created for each new customer in the IMB-RPA application and the process activity is carried out through this bot (Karabacak, 2019: 25-26).

3.1. Types of Robotic Process Automation

Each automation deployment model provides the end user with the ability to determine the best way to interact with a robot based on the task at hand, as well as careful consideration of the variables present in each environment. RPA includes a variety of tools to meet the different needs that organizations may require. With these tools, organizations can configure the software bot that suits their business processes according to various options (Sen, 2020). Various automation deployment models can be used interchangeably as part of a holistic enterprise-level automation platform and

digital transformation strategy. The term RPA does not always refer to the same type of technology. There are three different types of RPA in the relevant literature (Willcocks et al., 2017: 19):

- Participatory RPA
- Non-participatory RPA
- Intelligent process RPA

Participatory RPA: Participatory RPA is an RPA bot that interacts with humans simultaneously to initiate and control processes. In Participatory RPA2, the bot works directly on the user's desktop and receives commands from the user to execute business processes. In processes that require human intervention, RPA robots work with humans and the process takes place interactively (Yilmaz, 2021: 37). Bots help users perform certain parts of a process. It is usually used in cases where the entire business process cannot be automated end-to-end (Amini, 2019: 19). Participatory RPA is a bot that is located on the end-user computer or virtual machine and is used to automate simple manual processes that can be triggered by user actions. It is the first form of RPA and is known as Robotic Desktop Automation. It is a software that works with individuals to perform specific tasks.

Non-participatory RPA: Unattended RPA can be configured to reside on-premises (physical server-based) or off-premises (VM/cloud-based) machines to automate more complex background functions, which are usually scheduled to run at specific times or at specific times. Generally speaking, unattended automation is suitable for data-intensive tasks such as batch jobs and high-throughput processes. Unattended RPA is the second generation of RPA that automates processes without human intervention and is often used for back-office functions. It usually refers to a bot that runs on a server, starts itself, and performs operations without user interaction (Özdem and Bora, 2022: 5). Unattended RPA stands out as an innovative technology that brings significant changes to business processes. Businesses use this automation solution to increase efficiency, reduce errors, and automate repetitive tasks. RPA saves time and resources by automating tasks that people perform manually, and increases the speed of business processes. Unattended RPA also plays an important role in complex data processing and analysis processes, allowing businesses to make smarter, more informed decisions. This technology, which has great potential to increase the competitive advantage of businesses, is expected to be used more widely in business processes in the future (Yilmaz, 2021: 37).

Intelligent Process Automation: Intelligent process automation is available in a combination of end-user and on-premise/off-premise solutions to enable a combination of attended and unattended style processing, enabling end-to-end automation of

processes that require human support and back-end capabilities. It is the next-generation cognitive RPA technology that uses artificial intelligence to enable the system to learn over time and make decisions based on its own insights and judgments, minimizing human intervention (Javed, et al., 2021: 6).

4. APPLICATION AREAS OF ROBOTIC PROCESS AUTOMATION

The use of RPA is related to process selection and automatic execution. The selection can be centralized or decentralized, manual or automated. In an automatic process selection, RPA will be related to the concepts of process mining. A centralized selection means a standardized RPA implementation method and management. In addition, the execution of the process varies according to the level of centralization and the participation of the IT department. The biggest difference between RPA and traditional information systems projects is the possibility of being carried out autonomously by business units. However, more complex RPA applications can be expected to require the participation of IT departments (Czarnecki and Fettke, 2021: 7).

The general application and outputs of RPA technology are given in Figure 1.



Figure 1: RPA Application and Outputs, Source: KPMG, 2018

RPA determines how businesses generally operate. It undertakes structured, repetitive computer-based tasks while interacting with multiple systems simultaneously to perform complex algorithm-based decisions. RPA bots can log in to the system using a username and then interpret text, tables and graphs, move and click the mouse,

compose emails, fill out application forms and check quality control data (Çivak, 2022: 18).

In addition, these robotic software provide a number of benefits such as minimizing labor costs, strengthening customer relations, overcoming multiple tasks with fewer errors or without errors and more easily, not being affected by factors that may affect the motivation of the human workforce, being more effective and efficient, and increasing profitability, which increases the level of use (Albayrak, 2021: 97). In light of this information, the benefits of RPA to the accounting process are given in Figure 2 below.



Figure 2. Benefits of RPA in Accounting Processes (Source: Mookerjee and Rao;2021: 3679)

5. APPLICATIONS OF ROBOTIC PROCESS AUTOMATION IN AUDIT

Audit is the process of examining, verifying and controlling the financial statements prepared as a result of business activities and the financial information used for the preparation of these financial statements by independent auditors who are experts in their fields according to certain criteria. Audit is a process. This process is carried out by auditors and an audit report is prepared as a result of the process. In the audit process, the accuracy of the information contained in the financial statements prepared under the responsibility of the management is evaluated by auditors from outside the business.

Considering today's diversity and volume of information, traditional audit methods may be inadequate in providing reasonable assurance. In traditional auditing, auditors focus on limited transactional data and try to provide reasonable assurance regarding the overall financial statements by using this data. Big data enables the acquisition of higher quality audit evidence and more detailed evaluation of transactions. (Alles, 2015:2).

Today, with the development of information technologies, various artificial intelligence technology tools (deep learning, machine learning, natural language processing, etc.) are widely used. Artificial intelligence refers to the simulation of human intelligence in machines programmed to perform tasks that require human intelligence, such as learning, problem solving and decision making (Marr and Ward, 2019: 146).

Considering the features of artificial intelligence for the audit function, many auditing firms around the world, especially the “Big 4 (Deloitte, Ernst&Young, KPMG and PwC)” companies, are investing in various technologies related to artificial intelligence.

For example, KPMG uses “Clara”, an audit platform integrated with artificial intelligence and automation, to read and extract data from both structured data (general ledger) and unstructured source documents (e.g. paper-based invoices, emails, instant messages, social media). With this program, data is compared with company records and any inconsistencies are flagged for review by the relevant persons. This allows the audit team to focus on higher risk areas (KPMG, 2019).

Robotic process automation simplifies business processes and saves time and costs. This technology, which shortens working times, increases efficiency and accelerates decision-making processes, can be integrated into audit processes, allowing the auditor to focus on issues that require judgment. The auditor examines business processes using Generally Accepted Audit Techniques to form an audit opinion. Robotic process automation can be used in the application process of basic audit techniques in audit.

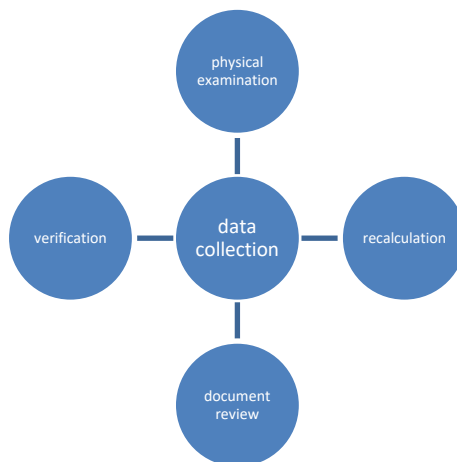


Figure 3: Generally Accepted Auditing Techniques

In order to form an audit opinion, the auditor conducts a physical examination and examines the documents. Robotic process automation can be used in physical examinations while inventory and counting. In large-scale enterprises, making warehouse counts independent of humans will both save time and reduce human-related errors.

Technological developments, in addition to their impact on human-power-based processes in the auditing profession, allow auditors to focus on necessary applications for the future. The necessity of automation transformation in auditing has been on the agenda for a long time in order for auditors to be more professional in repetitive work and effective in judicial processes.

Organizations are plagued by inefficient processes for accounting and auditing across different work units. Currently used spreadsheets tend to be chaotic due to the heavy involvement of manual processes and the high potential for delays, errors, and outdated data, and they can be referred to as “shadow systems” because they are not formally recognized as part of the corporate system” (Drum and Pulvermacher 2016, p. 181).

Robotic processes and intelligent automation have great potential for accounting and auditing. However, traditional RPA has its limitations, and according to Ernst & Young, more digitalization and, in particular, machine learning are needed to reach its full potential and create value effectively and efficiently (EY 2018).

The application of RPA in auditing takes place in three stages. The first stage is understanding the process. In other words, it is the stage of determining the audit area where RPA can be applied and conducting the necessary examinations. The second stage is the stage of determining standardized audit data. The most important point here is to make an effort to create standards that will ensure that RPA works smoothly, since there is a need for compatibility between data in the audit area where RPA will be applied. The last stage is the stage of determining the necessary processes and starting the software programming process after standardization (Adrian, 2020).

Data volume and quality are of great importance in carrying out audit activities in businesses in a healthy and successful manner. It has become inevitable for auditors who want to keep up with developing technology to improve themselves and raise their awareness to a higher level regarding innovations. In addition, auditors have had to start giving the necessary importance to digital service delivery for newly developing industrial areas, new production and business models, funding models and new payment systems (ACCA, 2016: 29).

RPA enables the advancement of dual-purpose auditing and inspection processes.

Robotic process automation can be used to evaluate whether prices and quantities differ in sales processes such as sales, invoices, shipping documents, etc., and to send sales notifications for any transaction that includes quantity or price. RPA, which helps automate these processes, allows inspectors to focus on activities that will create added value. As a result, both time is saved and audit efficiency and productivity are increased. In this way, inspectors understand their customers' business processes better, which

eliminates the risk of them misunderstanding the information and increases customers' trust in inspectors (Mookerjee and Rao, 2021: 3677).

RPA is known as a form of quality improvement that uses the most up-to-date tools and is applied to the audit process. In this respect, the RPA program is designed not only to replace the previous tedious, time-consuming and manual auditing procedures, but also to encourage the restructuring of the entire auditing process (Moffitt et al. 2018:8).

RPA, a system that enables the automation of well-defined and repetitive office processes, automatically performs the verifications to be made by the auditor, creates audit analysis according to the manager's needs, provides control solutions as well as decision-making, reduces errors and problems, and can produce very efficient solutions. (Qiu&Xiao, 2020).

6. CONCLUSION

Today, many technological products are currently used in the execution of audit activities and there is a human resource with a certain competence in this field. However, new generation technologies that offer significant advantages in terms of cost, time, resources and efficiency should be followed and integrated into audit processes. RPA is one of the new generation technologies that has been frequently mentioned in recent years. It can be said that this technology has many benefits such as not being very costly, being able to perform all defined operations simultaneously and ensuring that physical human resources are used in more efficient areas. RPA technology can be considered as a digital transformation tool that can be used in the audit field as well as in all business lines.

It is possible to perform a full review using robotic process automation instead of sample selection in document review during auditing. Thus, audit risk can be minimized.

Robotic process automation, which is based on the infrastructure of information technologies and can be applied without causing complexity, allows businesses operating in different sectors to automate business processes in different units such as finance, accounting, auditing, production, marketing, purchasing, supply chain management, human resources management, customer services and to progress processes more easily.

An effective internal control system designed with RSA reduces control risk by detecting account balances and account classifications by checking accounts that will negatively affect the financial statements. Thus, it contributes to the prevention of accounting errors and frauds and reduces the workload of the auditor.

RSA facilitates the auditor in stock control and stocktaking system. According to the independent audit procedures, the auditor is obliged to participate in the actual stock count and verify the inventory and stock information presented in the financial statements. In this context, RSA contributes to the independent audit process in terms of the existence of assets presented in the financial statements, comparison of the records

in the accounting system with the actual inventory, easier and more systematic presentation of the actual situation and detection of deficiencies and frauds.

It should also be noted that there will be some technical (Lack of Time and Capacity, Technical Experience and Training, etc.) and organizational (Lack of Supportive Corporate Culture, Unexpected Costs, Bureaucracy, etc.) obstacles to the implementation of RPA.

Considering that the information technology era is developing very rapidly and its areas of use are becoming widespread, it is important to overcome all kinds of difficulties in using RPA technology in businesses and especially in control units. In this context, both the public and private sectors should be aware that technology is an inevitable necessity and institutions should adapt themselves to technological systems in line with their needs and take the necessary precautions against possible problems.

REFERENCES

Adrian, A. (2020). Pemanfaatan Robot Process Automation Dalam Audit Keuangan. *JISAMAR (Journal of Information System, Applied, Management, Accounting and Research)*, 4(3), 112-116.

Alles, M. G. (2015). Drivers of the use and facilitators and obstacles of the evolution of big data by the audit profession. *Accounting horizons*, 29(2), 439-449.

Amini, B. (2019). *Robotic Process Automation: Implementation within an Organization*. Bachelor's thesis. https://www.theseus.fi/bitstream/handle/10024/226996/Borhan_Amini_Opinan%C3%A4ytety%C3%B6_Final.pdf?sequence=2

Baştürk, Ö. (2023). *Bankacılık Sektöründe Robotik Süreç Otomasyonu-Bir Uygulama Örneği*. (Yayınlanmamış Yüksek Lisans Tezi). Sakarya: Sakarya Üniversitesi Fen Bilimleri Enstitüsü.

Czarnecki, C. ve Fettke, P. (2021). *Robotic process automation: Positioning, structuring, and framing the work*. C. Czarnecki, & P. Fettke içinde, *Robotic Process Automation-Management, Technology, Applications* (s. 1-24). Walter de Gruyter GmbH.

Çivak, H. (2022). *Robotik Süreç Otomasyonu: Bir Uygulama Örneği*. (Yayınlanmamış Yüksek Lisans Tezi). Karabük: Karabük Üniversitesi Lisansüstü Eğitim Enstitüsü.

Drum, Dawna M.; Pulvermacher, Andrew (2016): *Accounting Automation and Insight at the Speed of Thought*. In *Journal of Emerging Technologies in Accounting* 13(1), 181–186. DOI: 10.2308/jeta-51441.

EY (2018). *Intelligent automation Reshaping the future of work with robots*. Retrieved from

[https://www.ey.com/Publication/vwLUAssets/EY_intelligent_automation/\\$FILE/EY-intelligent-automation.pdf](https://www.ey.com/Publication/vwLUAssets/EY_intelligent_automation/$FILE/EY-intelligent-automation.pdf)

Gotthardt, M., Koivulaakso, D., Paksoy, O., Saramo, C., Martikainen, M., & Lehner, O. (2020). Current State and Challenges in the Implementation of Smart Robotic Process Automation in Accounting and Auditing. *ACRN Journal of Finance and Risk Perspectives*, 9(1), 90-102. <https://doi.org/10.35944/jofrp.2020.9.1.007>

Houy, C., Hamberg, M. ve Fettke, P. (2019). *Robotic Process Automation in Public Administrations*. Bonn: Digitalisierung von Staat und Verwaltung Gesellschaft für Informatik e.

Huang, F., No, W. G., Vasarhelyi, M. A., & Yan, Z. (2022). Audit data analytics, machine learning, and full population testing. *The Journal of Finance and Data Science*, 8, 138-144.

Huang, F., No, W. G., Vasarhelyi, M. A., & Yan, Z. (2022). Audit data analytics, machine learning, and full population testing. *The Journal of Finance and Data Science*, 8, 138-144.

İnce, H., İmamoğlu, S.E. & İmamoğlu, S.Z. 2021. Yapay zeka uygulamalarının karar verme üzerine etkileri: Kavramsal bir çalışma. *International Review of Economics and Management*, 9(1), 50-63. Doi: <http://dx.doi.org/10.18825/iremjournal.866432>

Javed, A., Sundrani, A., Malik, N. ve Prescott, S. M. (2021). *Robotic Process Automation using UiPath StudioX*. Apress.

Karabacak, P. (2019). *Farklı Sektörlerde Robotik Süreç Otomasyon Potansiyellerinin İstatistiksel İncelenmesi*. (Yayımlanmamış Yüksek Lisans Tezi). İstanbul: Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü.

Kaya, C.T., Türkyılmaz, M., Birol, B. (2019). Impact of RPA Technologies on Accounting Systems. *Muhasebe ve Denetim Bakış*, 82, 235-250. <https://dergipark.org.tr/en/pub/mufad/article/536083>.

Koçak, Z.S. (2023). *Robotik Muhasebe: Muhasebe Uygulamalarında Robotik Süreç Otomasyonu*. Teori ve Uygulamada Muhasebe ve Pazarlama Konuları. Editör: Şahin Karabulut. Ekin Yayınları. 115-128.

KPMG (2022). *Robotik süreç otomasyonu* <https://assets.kpmg/content/dam/kpmg/tr/pdf/2018/11/robotik-surecotomasyonu.pdf> adresinden alındı. (Erişim Tarihi: 26.03.2023)

Lacity, M., Willcocks, L. ve Craig, A. (2015). Robotic Process Automation: Mature Capabilities in the Energy Sector. The Outsourcing Unit Working Research Paper Series, 15(6), 1-16

Madakam, S., Holmukhe, R. M. ve Jaiswal, D. K. (2019). The future digital work force: Robotic Proses Automation (RPA). Journal of Information Systems and Technology Management, 16, 1-16

Marr, B., Ward, M. (2019), “Artificial Intelligence in Practice: How 50 Successful Companies Used AI and Machine Learning to Solve Problems”, Wiley.

Mookerjee, J. & O,R.S.,Rao (2021). A review of the robotic process automation's impact as a disruptive innovation in accounting and audit Turkish Journal of Computer and Mathematics Education, 12 (12), 3675-3682.

Qiu, Y. L.,&Xiao, G. F. (2020). Research on cost management optimization of financial sharing center based on RPA. Procedia Computer Science, 166, 115-119.

Rana, K. (2019). Effects of advanced automation on accounting processes. <https://ranakapil.medium.com/effects-of-advanced-automation-on-accounting-processes21a385fc9c97> (Erişim Tarihi: 30.05.2023)

Sen, S. E. (2020). RPA Türleri: Attended, Unattended ve Hybrid RPA! Medium: <https://medium.com/@s.erdem/rpa-t%C3%BCrleri-attended-unattended-vehybrid-rpa-438908627d54>

Van der Aalst, W. M., Bichler, M. ve Heinzl, A. (2018). Robotic Process Automation. Business & Information Systems Engineering, 60(4), 269-272.

Willcocks, L., Lacity, M. ve Craig, A. (2017). Robotic process automation: strategic transformation lever for global business services? Journal Inf Technol Teaching Cases, 7, 17-28

Yılmaz, B. (2021). Elektronik Belge Yönetim Sistemlerinde Robotik Süreç Otomasyonu. (Yayınlanmamış Yüksek Lisans Tezi). Ankara: Ankara Üniversitesi Sosyal Bilimler Enstitüsü.

Relationship between Physical Activity Enjoyment, Stress and Life Satisfaction

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Abstract

Introduction: The aim of this study was to determine the effects of physical activity on life satisfaction and job stress.

Aim: A review of the literature did not find any studies on the effects of physical activity on life satisfaction and work stress. It can be said that this study is unique in this respect.

Method: In this study, in which the survey model was used, scales of life satisfaction, job stress and enjoyment of physical activity, whose validity and reliability studies were conducted, and a questionnaire with demographic questions prepared by the researcher were used. The study group of the research consisted of 336 participants who participated in all types of physical activity with variable rate (activity duration) and variable interval (non-periodic). The data obtained were transferred to SPSS 22.0 programme and frequency, mean, standard deviation, Cronbach alpha, Pearson correlation and regression analyses were performed.

Findings: Physical activity has a positive relationship with life satisfaction and a negative and significant relationship with job stress.

Conclusion: There is a negative and significant relationship in the prediction of physical activity on job stress.

Originality and value: The analysis suggests that it had decent construct credibility and accuracy.

Key Words: Job stress, life satisfaction, physical activity.

Jel Codes: I31, I12, J28, J81, L83

1. INTRODUCTION

Physical activity is any repetitive and regular physical movement performed in daily life. Exercise, games and daily chores that we encounter in the form of social activities such as physical education, games or sports (Barbosa Filho et al., 2016), that is, all activities related to leisure time (Pitts, Fielding, & Miller, 1994), seem to be a form of physical activity (Hardman & Stensel, 2009). In addition to the positive effects of physical activity on physical health, it is also known to have positive psychological effects. Regular participation in physical activity is known to contribute positively to physical and mental health in all age groups.

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Technological developments have led to a rapid increase in sedentary lifestyles, with desk jobs, inactive phone and computer use, and the use of vehicles for travel. Research shows that people who do not take part in physical activity, or who do so irregularly, have more health problems and a lower quality of life. Physical, mental and spiritual health benefits from physical activity.

Job stress is a psychological condition that has psychological or physical effects on the behaviour of employees and reduces the expected behaviour of employees as a psychological condition resulting from work-related factors (Gül, 2007). Therefore, work stress leads to a decrease in the employee's efficiency, deviation from the organisation's goals, increase in work accidents, initiation of harmful habits and a number of mental negativities. Psychological and physiological imbalances occur in individuals who experience work stress in the work environment, such as social relations and interactions at work and work processes. Studies have shown that work stress affects homeostatic mechanisms in the brain by causing physiological, endocrinological, immunological and behavioural changes (Avci, 2019).

An individual's perception of how they live and the pleasure they derive from living is called life satisfaction. Life satisfaction expresses an individual's perspective on all aspects of life. It is a personal assessment. It is the result of an individual's assessments of all aspects of his or her life (Diener, et al., 1999) and the comparison of expectations and the current situation (Yiğit, et al., 2011).

Physical activity is known for its beneficial impact on life satisfaction and work stress. In the literature, significant positive relationships have been found between engaging in physical activity and feeling satisfied. Fang, et al. (2019) found that physical activity increased quality of life in their study of overweight and sedentary individuals; Dinç et al. (2018) found that participation in recreational physical activity positively affected quality of life; Yıldırım (2019) found a significant relationship between the level of exercise and life satisfaction in undergraduates; Çetiner and Yayla (2021) found that activity engagement positively affected life satisfaction. Furthermore, there are significant negative relationships between physical activity and job stress. There is some evidence to suggest that engaging in physical activity reduces work-related stress. Hartfield et al. (2011) found that physical activity reduced job stress and increased emotional well-being; Sliter et al. (2014) found that physical activity reduced job stress and depression and increased work and life engagement. Due to the existence of a strong relationship in the literature, physical activity has become an important factor.

2. RESEARCH METHODOLOGY

The present study has been carried out within the framework of the relational model of research. The relational research model is the determination of the existence or degree of change between variables (Fraenkel & Wallen, 2009; Karasar, 2005).

2.1. Research Hypothesis

The focus of the research is on the enjoyment of physical activity rather than participation. It has been found that people who engage in physical activity experience a reduction in work stress and an increase in life satisfaction. However, the question is how the effect on the individual at the end of these activities is related to work stress and life satisfaction. In this context, it is assumed that the level of enjoyment of physical activity will further reduce work stress and increase life satisfaction. There is a lack of research on the relationship between the positive effect of these activities on the individual and the stress at work and the satisfaction with life. For this reason, the level of enjoyment of physical activity that is the subject of the research is likely to be an important contribution to the literature.

In this context, the research hypothesis was formulated as follows

- Is the level of enjoyment of physical activity effective in the relationship between job stress and life satisfaction?
- Is physical activity enjoyment effective on job stress?
- Is physical activity enjoyment effective on life satisfaction?

2.2. Data collection tools

In order to determine the socio-demographic characteristics of the participants, the researcher prepared a 'personal information form' covering the topics such as age, gender, educational status, physical activity participation status, etc.

In the preparation of the questionnaire form; In order to determine the level of life satisfaction of the participants, the “*Life Satisfaction' scale*” ($\alpha=0.876$), which was developed by Diener et al. (1985) and adapted to Turkish by Bekmezci and Mert (2018) and prepared as a 5-point Likert type was used. The Job Stress Scale developed by De Bruin (2006) and the Turkish validity and reliability study conducted by Teleş (2020) were used to measure the level of job stress of the participants. Teleş found that the scale explained 58,72% of the variance with its unidimensional structure and had high reliability ($\alpha=0.91$). The 'Physical activity participation scale' developed by Mullen et al. (2011) and adapted into Turkish by Özkurt et al. (2022) was used to measure the participants' enjoyment of physical activity. The scale has a high reliability coefficient ($\alpha=0.98$).

As part of the research purpose, the reliability and validity of the scales were first tested using reliability analysis and exploratory factor analysis. Correlation and regression analyses were carried out for relationships between variables and hypothesis testing. The SPSS package was used for data analysis.

2.3. Study group

The study includes all types of physical activity with variable rates (duration of activity) and variable intervals (non-periodicity);

- a) Individual sports activities such as aerobics, dance, yoga, fitness, tennis, swimming, table tennis, billiards, cycling, etc.
- b) Daily physical activity such as housework, light lifting, gardening, walking, etc.
- c) Participation in team sports such as astroturf football, basketball, folk dancing, trekking, etc,
- d) Not an active licensed sportsperson
- e) Continuing her life as a professional or homemaker,

It will be carried out with the data to be obtained from the participants. Convenience sampling will be used to determine the study group. Convenience sampling is the simplest, quickest and most economical method of collecting data from the bulk of the population (Aaker et al., 2007; Malhotra, 2004; Zikmund, 1997). According to Yazicioğlu and Erdoğan (2014) 357 valid questionnaires are sufficient to represent a population of 5000 participants with a sampling error of ± 0.05 and significance level $p=0.05$ in determining the sample for this type of research in social sciences. The aim is to carry out the analyses with approximately 400 data. The method will be used to collect the data. The data will be collected through personal application of the questionnaire prepared by the researchers.

2.4. Research limitations

The limitations of the research are;

1. Having any health problem that prevents participation in the study,
2. Having a disability in understanding Turkish,
3. Language barrier,
4. Not volunteering for the research,

3. RESULTS

The main focus of the research is on the relationship between job stress and life satisfaction. In this relationship, there are findings that individuals who engage in physical activity have decreased job stress and increased life satisfaction. The purpose of this research focuses on finding the effectiveness of the level of physical activity enjoyment of members of social networking sites, especially Labour. Therefore, it aims to determine how physical activity has an effect on job stress and life satisfaction, which are important factors in working life.

3.1. Data Analysis

3.1.1. Demographics

In this study, data analysis was carried out with the SPSS 22.0 software package. The scales consist of 5 items and the scoring intervals are as follows.

Table 1. 5-point Likert scale arithmetic mean evaluation range

No		Life Satisfaction Scale	Job Stress Scale	Physical Activity Enjoyment Scale
1	[1,00-1,80]	Strongly disagree	Never	Strongly disagree
2	[1,81-2,60]	Disagree	Rarely	Disagree
3	[2,61-3,40]	Undecided	Sometimes	Undecided
4	[3,41-4,20]	I agree	Frequently	I agree
5	[4,21-5,00]	Absolutely agree	Always	Absolutely agree

Table 2. Reliability analyses of the scales used

	Life Satisfaction Scale	Job Stress Scale	Physical Activity Enjoyment Scale
Cronbach's Alpha	,807	,906	,948

The Cronbach's alpha values for scales used in this study were .807 for life satisfaction, .906 for work stress and .948 for enjoyment of physical activity. Findings on the demographic characteristics of the participants (gender, undergraduate status, age, marital status, years of occupation, frequency of physical activity, purpose of participating in physical activities) are given in the table below.

Table 3. Frequency (f) and percentage (%) values according to the demographic information of the participants

N=336	Variables	f	%
Gender	Female	175	52,1
	Male	161	47,9
License Status	Yes	27	8,0
	No	309	92,0
Age	30-40	201	59,8
	40-50	115	34,2
	50-60	15	4,5
	60+	5	1,5
Marital Status	Married	191	56,8
	Single	145	43,2

Professional Seniority	10-19	253	75,3
	20-29	71	21,1
	30 +	12	3,6
Frequency of Physical Activity	1 time per month	139	41,4
	2 time per month	55	16,4
	3 time per month	32	9,5
	4 times a month or more	110	32,7
Purpose of Participating in Physical Activities	To be healthy	202	60,1
	To be fit	48	14,3
	To socialize and gain status	31	9,2
	To spend free time	49	14,6
	To escape work or family responsibilities	4	1,2
	To escape/get rid of responsibilities	2	0,6

According to demographic data; 52.1% female and 47.9% male, as shown in the table. 8% of the participants have a bachelor's degree and 92% do not have a bachelor's degree. 59.8% of the participants are 30-40 years old, 34.2% are 40-50 years old, 4.5% are 50-60 years old and 1.5% are 60 years and older. 56.8% of the participants are married, 43.2% are single. 75.3% of the participants have 10-19 years of work experience, 21.1% have 20-29 years of work experience and 3.6% have 30 and more years of work experience. 41.4% of the participants exercise once a month, 16.4% twice a month, 9.5% three times a month and 32.7% four or more times a month. 60.1% of the participants take part in physical activities to be healthy, 14.3% to be fit, 9.2% to socialise and gain status, 14.6% to spend their free time, 1.2% to escape from work or family responsibilities and 0.6% to escape/get rid of responsibilities.

Table 4. Pearson correlation relationship between physical activity and job stress and life satisfaction

	Physical Activity	Work Stress
Work Stress	-,152** (p= ,005)	
Life Satisfaction	,227** (p= ,000)	-,391** (p= ,000)

Correlational analysis revealed a negative ($r=-.152$; $p < 0.001$) and significant relationship between physical activity and job stress; a positive ($r=.227$, $p < 0.001$) and significant relationship between enjoyment of physical activity and life satisfaction; and a negative ($r=-.391$; $p < 0.001$) and significant relationship between job stress and life satisfaction.

Table 5. Regression analysis of physical activity predicting life satisfaction

Predictor Variable	B	Std.Deviation	Beta	t	p
Fixed	1,873	,241		7,778	,000
Physical activity enjoyment scale	,222	,052	,227	4,256	,000

The regression model relating physical activity to life satisfaction is significant. It is observed that engaging in physical activity has a significant positive effect on satisfying life.

Table 6. Regression analysis on the prediction of job stress by physical activity

Predictor Variable	B	Std.Deviation	Beta	t	p
Fixed	2,980	,243		12,242	,000
Physical activity enjoyment scale	-,148	,053	-,152	-2,802	,005

The regression model for the prediction of the relationship between participation in physical activity and life satisfaction is significant. It is observed that engaging in physical activity has a significant positive effect on satisfying life.

4. CONCLUSION

In this study, the effect of physical activity on life satisfaction and work-related stress was investigated. The data we obtained from the research is consistent with the problem statements of the research. From these data, it can be concluded that physical activity has a positive effect on life satisfaction and reduces work stress.

In the research, the term physical activity includes individual sporting activities such as aerobics, dance, yoga, fitness, tennis, swimming, table tennis, billiards, cycling, etc., daily physical activities such as housework, light carrying, vineyard gardening, walking, etc., team sports such as indoor football, basketball, folk games, hiking, etc., and the participants were selected from non-professional individuals. When analysing the demographic data of the participants, the gender distribution (52-48%) shows homogeneity. Almost all participants (92%) were unlicensed. Looking at the purpose of participation in physical activity, it can be seen that participation is mainly for health reasons (60%).

According to the correlation results between physical activity and job stress and life satisfaction, physical activity increased life satisfaction ($r=.227$) and decreased job stress ($r=-.152$). Job stress also has a negative effect on life satisfaction ($r=-.391$). In the research conducted by Biçkes et al. (2018), it was found that job stress has a negative effect on quality of life.

Studies have shown that physical activity has an effect on life satisfaction (Somoğlu & Cihan, 2021; Yazıcı & Somoğlu, 2021). There is a significant relationship between the level of quality of life and physical activity (Tekkanat, 2008) and a positive relationship between life satisfaction and physical activity (An et al., 2020). However, Acree et al. (2006) found no significant statistical difference between physical activity and quality of life, contrary to the results of this study. Vural et al.'s (2020) study found no significant relationship between individual physical activity and quality of life, which is inconsistent with our findings. In the prediction of physical activity on work stress, there is a negative and significant relationship. In a study based on literature review, it is stated that physical activity habits of employees reduce absenteeism at work and positively affect the psychosocial health of employees by positively influencing the health status of employees (Brown et al., 2011).

Comparison of research results with literature shows that enjoyment of physical activity reduces work stress and increases life satisfaction, indicating a relationship between variables. The effect of physical activity on the reduction of work stress, the increase of work efficiency and the increase of life satisfaction of employees is very important. With this result, necessary measures should be taken to encourage people who are active at work but passive in terms of sport to be physically active in their daily lives.

REFERENCES

- Aaker, D. A., Kumar, V., & Day, G. S. (2007). *Marketing research* (9th ed.). John Wiley & Sons.
- Acree, L. S., Longfors, J., Fjeldstad, A. S., Fjeldstad, C., Schank, B., Nicke, K. J., Montgomery, P. S., & Gardner, A. W. (2006). Physical activity is related to quality of life in older adults. *Health and Quality of Life Outcomes*, 4(1), 37. <https://doi.org/10.1186/1477-7525-4-37>
- An, H. Y., Chen, W., Wang, C. W., Yang, H. F., Huang, W. T., & Fan, S. Y. (2020). The relationships between physical activity and life satisfaction and happiness among young, middle-aged, and older adults. *International Journal of Environmental Research and Public Health*, 17(13), 4817. <https://doi.org/10.3390/ijerph17134817>
- Avcı, A. (2019). İş ve iş stresi yönetimi. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi (ASEAD) Eurasian Journal of Researches in Social and Economics (EJRSE)*, 6(11), 2148–9963.
- Barbosa Filho, V. C., Minatto, G., Mota, J., Silva, K. S., de Campos, W., & Lopes Ada, S. (2016). Promoting physical activity for children and adolescents in low- and middle-income countries: An umbrella systematic review: A review on promoting physical activity in LMIC. *Preventive Medicine*, 88, 115–126. <https://doi.org/10.1016/j.ypmed.2016.03.025>
- Bekmezci, M., & Mert, İ. S. (2018). Yaşam tatmini ölçeğinin Türkçe geçerlilik ve güvenilirlik çalışması. *Toros Üniversitesi İİSBF Sosyal Bilimler Dergisi*, 5(8), 166–177.
- Biçkes, D. M., Demirtaş, Ö., & Yılmaz, C. (2018). Mesleki stres, tükenmişlik, iş tatmini ve yaşam tatmini ilişkisi. *International Journal of Disciplines Economics & Administrative Sciences Studies*, 4(9), 414–422.

- Brown, H. E., Gilson, N. D., & Burton, N. W. (2011). Does physical activity impact on presenteeism and other indicators of workplace well-being? *Sports Medicine*, 41(3), 249–262. <https://doi.org/10.2165/11539180-000000000-00000>
- Çetiner, H., & Yayla, Ö. (2021). Aktivite bağlılığının yaşam tatmini ve yaşam kalitesi üzerine etkisi: Bisiklet kullanıcılarına yönelik bir araştırma. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 42, 209–222. <https://doi.org/10.30794/pausbed.746900>
- De Bruin, G. P. (2006). The dimensionality of the general work stress scale: A hierarchical exploratory factor analysis. *SA Journal of Industrial Psychology*, 32(4), 68–75. <https://doi.org/10.4102/sajip.v32i4.247>
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13
- Diñç, N., Güzel, P., & Özbey, S. (2018). Rekreasyonel etkinlikler ile yaşam kalitesi arasındaki ilişki. *Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi*, 5(4), 181–186.
- Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). McGraw Hill Higher Education.
- Gül, H. (2007). İş stresi, örgütsel sağlık ve performans arasındaki ilişkiler: Bir alan araştırması. *Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*, 2, 318–332.
- Hardman, A. E., & Stensel, D. J. (2009). *Physical activity and health: The evidence explained*. Routledge.
- Hartfiel, N., Havenhand, J., Khalsa, S. B., Clarke, G., & Krayner, A. (2011). The effectiveness of yoga for the improvement of well-being and resilience to stress in the workplace. *Scandinavian Journal of Work, Environment & Health*, 37(1), 70–76. <https://doi.org/10.5271/sjweh.2916>
- Karasar, N. (2005). *Bilimsel araştırma yöntemi* (17th ed.). Nobel Yayın Dağıtım.
- Malhotra, N. K. (2004). *Marketing research: An applied orientation* (4th ed.). Pearson Prentice Hall.
- Özkurt, B., Küçükbiş, H. F., & Eskiler, E. (2022). (FAKÖ): Türk kültürüne uyarlama, geçerlik ve güvenilirlik çalışması. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 10(1), 21–37. <https://doi.org/10.18506/anemon.976300>
- Pitts, B., Fielding, L. W., & Miller, L. K. (1994). Industry segmentation theory and the sport industry: Developing a sport industry segment model. *Sport Marketing Quarterly*, 3(1), 15–24.
- Sliter, K. A., Sinclair, R., Cheung, J., & McFadden, A. (2014). Initial evidence for the buffering effect of physical activity on the relationship between workplace stressors and individual outcomes. *International Journal of Stress Management*, 21(4), 348–360. <https://doi.org/10.1037/a0038110>
- Tekkanat, Ç. (2008). Öğretmenlik bölümünde okuyan öğrencilerde yaşam kalitesi ve fiziksel aktivite düzeyleri. (Unpublished master's thesis). Pamukkale University.
- Teleş, M. (2020). Validity and reliability of the Turkish version of the general work stress scale. *Journal of Nursing Management*. <https://doi.org/10.1111/jonm.13211>

Vural, Ö., Eler, S., & Güzel, N. A. (2010). Masa başı çalışanlarda fiziksel aktivite düzeyi ve yaşam kalitesi ilişkisi. *Sportre Beden Eğitimi ve Spor Bilimleri Dergisi*, 8(2), 69–75. <https://doi.org/10.1501/Sporm.0000000178>

Yazıcı, Ö. F., & Somoğlu, M. B. (2021). A study on vitality and happiness levels of sports high school students. *Journal of Educational Issues*, 7(3), 214–229. <https://doi.org/10.5296/jei.v7i3.19274>

Yazıcıoğlu, Y., & Erdoğan, S. (2011). *SPSS uygulamalı bilimsel araştırma yöntemleri*. Detay Yayıncılık.

Yıldırım, Y. (2019). Egzersiz yapan ve yapmayan üniversite öğrencilerinin fiziksel aktivite ile yaşam doyum düzeyleri arasındaki ilişki (Unpublished master's thesis). Sakarya University.

Yiğit, R., Dilmaç, B., & Deniz, M. E. (2011). İş ve yaşam doyumu: Konya Emniyet Müdürlüğü alan araştırması. *Polis Bilimleri Dergisi*, 13(3), 1–18.

Fang, Y.-Y., Huang, C.-Y., & Hsu, M.-C. (2019). Effectiveness of a physical activity program on weight, physical fitness, occupational stress, job satisfaction, and quality of life of overweight employees in high-tech industries: A randomized controlled study. *International Journal of Occupational Safety and Ergonomics*, 25(4), 621–629. <https://doi.org/10.1080/10803548.2018.1438839>

Zikmund, W. G. (1997). *Business research methods* (5th ed.). The Dryden Press.

Economic Growth and Energy Security: Evidence From Countries With Similar Economic Growth Processes

Gazi Polat¹²⁴

Abstract

Introduction: Energy security is of strategic importance for developed and developing countries. Stable economic growth for countries is only possible with reliable and continuous access to energy resources.

Aim: This study aims to examine the effects of globalization and trade on Argentina, Brazil, Mexican and Türkiye's economic growth by controlling the impacts of energy security for the 1980-2018.

Method: Energy security index data was used in the study. Panel regression analysis was performed to analyze the panel data set.

Findings: The results are as follows: first, energy security increased economic growth. Second, trade worsened economic growth. Third, globalization increased economic growth.

Conclusion: A unidirectional causality relationship was found from economic growth to energy security. However, energy security positively affects economic growth. Therefore, energy security may indirectly affect economic growth positively using renewable energy resources.

Originality and value: The relationship between economic growth and energy security has been analyzed in countries with similar economic development.

Key Words: Economic Growth, Energy Security, Globalization, Trade, Panel Data Analysis.

Jel Codes: S40, F60, F40, F10, C33

1. INTRODUCTION

Economic growth is a primary goal for nations globally, as it is intricately linked to enhancements in living standards, employment generation, and technical advancement (Ojeaga, et. Al, 2014). Comprehending the determinants of growth is crucial for policymakers seeking to promote sustainable development and guarantee economic stability. Although various causes affect economic growth, energy security has been a pivotal component in recent decades (Kusumawardani & Agusti, 2024). The growing dependence on energy supplies, together with apprehensions regarding supply interruptions, geopolitical threats, and environmental factors, has rendered energy security a crucial component in influencing economic results (Feinstein, 2002).

Energy security denotes the accessibility of dependable, cost-effective, and sustainable energy resources essential for industrial operations, transportation, and overall economic efficiency (Kartal, 2022). Disruptions in energy supply or fluctuations

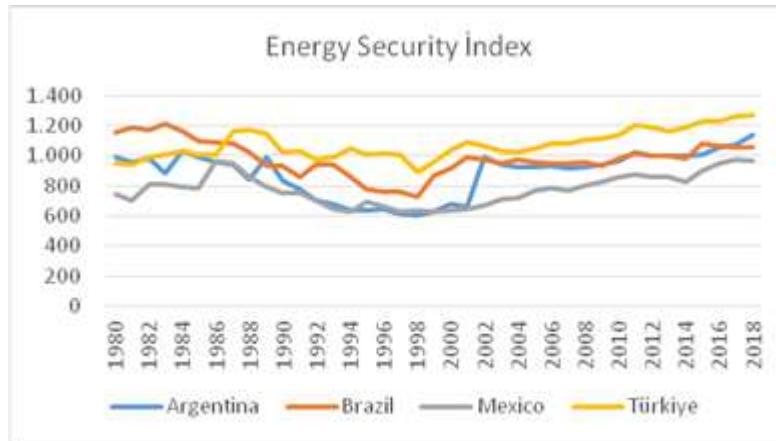
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in energy prices can significantly impact a nation's economic performance, resulting in inflationary pressures, diminished competitiveness, and decelerated growth. Consequently, examining the correlation between economic growth and energy security has gained significance amid global economic concerns and the shift towards sustainable energy sources (Kusumawardani and Agusti, 2024).

Energy is a fundamental resource for ensuring economic growth and increasing the level of welfare. Different definitions have been developed in the literature on Energy Security. While the European Commission (2000) defines it as the continuous and physical availability of energy products in the market at an affordable price for all consumers, Yergin (2006) defines it as the supply of the required amount of energy at an affordable price for developed countries. Asia Pacific Energy Research Center (2007) defines it as the supply, the cost and timing of energy resources in the economy at a level that does not negatively impact economic performance. Cherp and Jewell (2010) stated that there is no clear accepted definition of Energy Security. Narula (2014) defines it as the provision of uninterrupted energy services in an affordable, fair, efficient and environmentally friendly manner.

Although the concept of energy security seems clear at first glance, it varies from country to country and from study to study in literature. Different studies in the literature on energy security have calculated indices and tried to measure the effects on growth through these calculated indices (Sovacool & Mukherjee 2011).

Finally, in its 2020 report, the Global Energy Institute defined the Energy Security Index under 8 main headings (global fuels, fuel imports, energy expenditures, price and market volatility, energy use intensity, electricity sector, transportation sector, environment) and 39 sub-headings. Graph 1 shows the energy security index of selected countries.



Graph 1: Energy Security Index (Global Energy Institute, 2020)

In addition to energy security, globalization and trade are also crucial factors influencing economic growth (Staff, 2001). Globalization facilitates the flow of goods, services, capital, and knowledge across borders, enhancing economic integration and creating opportunities for countries to expand their markets. Trade, on the other hand, allows nations to specialize according to their comparative advantages, boosting productivity and efficiency (Kartal, 2022). As such, these factors often act as control variables in examining the intricate relationship between energy security and economic growth.

This study aims to explore the dynamic linkages between energy security and economic growth, with a specific focus on understanding both the short-term and long-term effects. Utilizing a Panel OLS (Ordinary Least Squares) model, the analysis also incorporates globalization and trade as control variables to provide a comprehensive view of the factors driving economic performance. By examining these interactions across different countries (Argentina, Brazil, Mexico, Türkiye), this research contributes to the literature on sustainable growth strategies and offers insights for policymakers seeking to balance energy needs with economic objectives.

The reason for selecting these three countries together with Turkey is the similarities in the economic growth processes and economic problems that these countries have experienced (Dogruel & Dogruel, 2018).

2. LITERATURE REVIEW

The literature contains studies on economic growth and energy security across many countries. Four assumptions are typically proposed regarding the relationship between economic growth and energy in these research. The hypothesis asserts that energy security impacts economic growth. The concept positing that economic growth influences energy security. The bidirectional hypothesis posits a reciprocal relationship between growth and energy security. The neutrality hypothesis posits an absence of correlation between growth and energy security (Le & Nguyen, 2019). Table 1 displays research from the literature that provide four distinct hypothesis outcomes.

Table 1: Researchs concerning the correlation between energy security and economic development.

Author(s)	Sample Countries	Method of Analysis	Relationship
Apergis and Payne (2010)	20 OECD Countries	Panel OLS	There is bidirectional causality.
Balitskiy et.al. (2014)	26 EU Countries	Panel OLS	Growth affects energy security
Belloumi and Alshehry (2015)	Suudi Arabia	Johansen	Energy security affects economic growth.

Bhattacharya, et. al. (2016)	38 Countries	Panel OLS	Energy security affects economic growth
Le, (2016)	15 African Countries	Panel OLS	There is no relationship between growth and energy security.
Ahmed and Du, (2017)	Iran	Panel ARDL	Energy security affects economic growth
Mahmood and Ayaz, (2024)	Pakistan	The Error Correction Model	Energy security affects economic growth

Empirical research has shown that energy availability and stability are crucial for sustaining consistent economic growth, especially in energy-intensive sectors. Stern (2011) underscored the significance of energy as a factor of economic activity, observing that disruptions in energy supplies can result in diminished output and decelerated growth rates. Lee and Chang (2008) also identified a positive and statistically significant correlation between energy consumption and GDP growth, indicating that energy security is an essential prerequisite for economic progress.

The discourse surrounding energy consumption and its influence on economic growth is complex, with several experts contending that an overdependence on fossil fuels could impede sustainable development. Apergis and Payne (2010) underscore the simultaneous problems of maintaining energy security while shifting to cleaner energy sources, noting that the energy-growth nexus is intricate and contingent upon a nation's development level and energy policy. This viewpoint corresponds with Sadorsky's (2012) research, which examined the relationship between renewable energy adoption and economic growth, highlighting the advantages of diversifying energy portfolios to reduce risks linked to fossil fuel use.

The influence of globalization and commerce on the energy-growth link has been extensively examined in the literature. Frankel and Romer (2017) shown that nations with greater trade openness generally experience accelerated growth, which they ascribe to enhanced access to resources, technology, and global markets. Globalization has facilitated countries' more effective integration into the global economy, influencing their economic frameworks as well as their energy consumption patterns and security. Research conducted by Choi and Kim (2020) demonstrates that globalization, although facilitating economic integration, simultaneously creates vulnerabilities within energy supply chains, hence rendering energy security an essential component of national policy agendas.

Despite extensive research on these subjects, a gap persists in comprehending the intricate short-term and long-term impacts of energy security on economic growth, particularly on the moderating influences of globalization and trade. Current research frequently concentrates on certain locations or timeframes, failing to provide a thorough analysis that encompasses several countries and employs sophisticated econometric techniques such as the Panel OLS method. This study aims to fill these gaps by analyzing

a varied array of countries and integrating both dynamic and static elements in the examination, so providing a more comprehensive perspective on the energy-growth nexus.

3. RESEARCH METHODOLOGY

To analyze the relationship between energy security and economic growth, this study employs a multi-step econometric approach, incorporating unit root tests, Granger causality tests, and Panel Ordinary Least Squares (Panel OLS) regression analysis. These methods are chosen to systematically investigate both the short-term and long-term dynamics of the variables in the study, while also addressing the potential endogeneity and causality issues.

3.1. The Data and Descriptive Statistic

The analysis utilized in this survey coat annual time series of 1980 to 2018 in Argentina, Brazil, Mexico and Türkiye. Variables and descriptive statistics are shown in Table 2.

Table 2: Model variables and descriptive statistics

Variable	Short Name	OBS.	MIN.	MAX.	ST.DEV.	Data Source
Economic Growth (Per Capita Income constant 2017)	EG	156	3.594553	4.152297	.123337	World Development Index (WDI)
Energy Security Index	ES	156	2.783524	3.102627	.0800307	Global Energy Security Index (2020)
Globalization	GL	156	3.702246	1.607865	.0736563	KOF
Trade	TRD	156	1.062419	1.904243	.1979094	WDI

3.2. Empirical Analysis

3.2.1. Test For Unit roots

At this stage, it is essential to assess the stationarity of the primary variables and ascertain the sequence of their integration for each variable. To accomplish this goal, we employ stationary tests, specifically the Harris and Tzavalis (1999) methods. The Harris and Tzavalis (1999) test posit that all units have an identical autoregressive parameter, akin to the Levin, Lin, and Chu test. In contrast to the Levin, Lin, and Chu test, it posits that the time dimension is limited while N approaches infinity (Harris and Tzavalis,1999). The results of the unit root test are presented in Table 3.

Table 3: Test for Unit Root Harris and Tzavalis (1999)

Variables	Stat.noc	Stat. noc (1. Dif)
EG	0.9949	-0.1143***
ES	0.9012	-0.0644***
GL	0.8113	-0.0896***
TRD	0.8873	-0.0577***
The results show that the variables are stationary at the level values and when their first differences are taken, it is determined that they are stationary at the first difference at the *** 1% level.		

According to the test results, we ascertain that the variables are either integrated of order zero, I(0), or order one, I(1), which are essential criteria for doing the analysis. The unit root test findings indicate that all our variables are stationary at the first degree.

3.2.2. Granger Causality Test

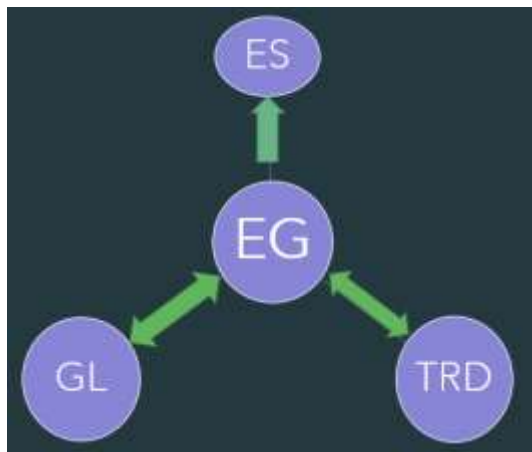
To explore the directional causality between energy security, economic growth, globalization, and trade, we employ Granger causality tests within the panel data framework. The Granger causality test helps to determine whether changes in one variable can be used to forecast changes in another, indicating a predictive relationship. The test involves regressing the dependent variable, economic growth (EG), on its own past values and the past values of the explanatory variables, such as energy security (ES), globalization (GL), and trade (TRD).

Table 4: Granger Causality Tests Results.

Causality	w-bar	Prob.
ES → EG	0.3495	0.3576
EG → ES	3.4923	0.0004
GL → EG	6.3562	0.0000
EG → GL	3.9483	0.0000
TRD → EG	7.3949	0.0000
EG → TRD	2.2224	0.0839

Connection study indicates a unidirectional connection from economic growth to energy security. Globalization and economic growth have bidirectional causality. There exists a bidirectional correlation between commerce and economic growth.

Shape 1: Causality Results.



3.2.3. Regression Analysis Results

The model used economic growth as a dependent variable. Table 5 below presents the findings of the Panel OLS analysis.

Table 5: Panel OLS Results

Variables	Coefficients	t-stat	Std.err.	p-value
ES	.3553655	4.94	.071947	0.000
GL	1.25076	12.26	.1020017	0.000
TRD	-.1725204	-3.24	.0532542	0.001
C	.9260678	3.62	.2560292	0.000
R^2	0.6974			

While energy security and globalization positively and significantly affect economic growth, trade negatively affects it.

4. CONCLUSION

A favorable and statistically significant correlation exists between energy security and economic growth. This outcome suggests that enhancing energy security can facilitate economic growth. The Granger causality test results indicate that energy security does not have a direct impact on economic growth. Economic growth influences energy security via Granger causality. This suggests that enhancements in energy security may indirectly influence economic growth.

Globalization exerts a significant and beneficial influence on economic growth. A bidirectional causal link exists. The volume of trade adversely affects economic growth. This may suggest that trade could adversely affect growth due to specific structural issues or imbalances. The influence of growth on commerce is diminished.

Given the indirect influence of energy security on economic growth, enhancing energy security ought to be a long-term strategic objective, alongside initiatives to stimulate growth. Integrating energy investments with growth-centric strategies can establish enduring economic growth. In this context, efforts include diversifying energy supply, enhancing investments in renewable energy sources, and augmenting energy efficiency should be implemented. Furthermore, initiatives aimed at diminishing external reliance for energy supply security, such as promoting local energy generation, can positively impact economic growth.

Globalization exerts a causal and significant influence on economic growth; thus, growth will escalate with heightened economic integration.

The adverse effects of trade on growth indicate that the foreign trade framework requires revision. Import-driven growth models may negatively impact domestic production and jobs. Consequently, measures aimed at diminishing imports, enhancing exports, and fortifying indigenous industry should be enacted. Furthermore, structural reforms aimed at trade balance, measures to enhance the value-added of exports, and incentives for technological advancements can alleviate this adverse effect. Given that trade substantially influences growth, policies to rectify trade imbalances should be executed. Incentives must be implemented to enhance domestic production and exports, while trade policies should be synchronized with technology and innovation-driven growth goals.

REFERENCES

- Ahmad, N., Du, L., (2017). "Effects of energy production and CO2 emissions on economic growth in Iran: ARDL approach." *Energy* 123, 521–537.
- Apergis, N., Payne, J. E. (2010). "Renewable energy consumption and growth in Eurasia." *Energy economics*, 32(6), 1392-1397.
- Balitskiy, S., Bilan, Y., Strielkowski, W. (2014). "Energy security and economic growth in the European Union." *Journal of Security & Sustainability Issues*, 4(2).
- Belloumi, M., Saad Alshehry, A. (2015). "Sustainable energy development in Saudi Arabia." *Sustainability*, 7(5), 5153-5170.
- Bhattacharya, M., Paramati, S. R., Ozturk, I., Bhattacharya, S. (2016). "The effect of renewable energy consumption on economic growth: Evidence from top 38 countries." *Applied energy*, 162, 733-741.
- Cherp, A., Jewell, J. (2010). "Measuring energy security: From universal indicators to contextualized frameworks." In *The Routledge handbook of energy security*. Routledge. 330-355.
- Choi, Y., Kim, Y. (2020). "Deconstructing neoliberalism in global citizenship discourses: an analysis of Korean social studies textbooks." *Critical Studies in Education*, 61(4), 464-479.
- Dogrueel, F., Dogrueel S., (2018), "Growth and Stability on a Knife Edge", Istanbul Bilgi University Publications, 2nd edition.
- E.C., (2000), "Communication From The Commission", Commission Of The European Communities.
- Engle, R. F., Granger C. W. (1987), "Cointegration and Error Correction: Representation, Estimation and Testing," *Econometrica*, 55, 251-276.
- Feinstein, C., (2002), "The relationship between energy security and economic growth has been analyzed in countries with similar economic development", *Energy & Mining Sector Board Discussion Paper Series*, 28086 (3).
- Frankel, J. A., Romer, D. (2017). "Does trade cause growth?" In *Global trade*, Routledge, 255-276.
- Harris, R. D. F., E. Tzavalis. (1999). "Inference for unit roots in dynamic panels where the time dimension is fixed." *Journal of Econometrics* 91: 201–226.
- Kartal, G., (2022). "Are the effects of energy security on economic growth symmetric or asymmetric in Turkey? An application of non-linear ARDL." *Ege Academic Review*, 22(4), 487-502.

- Kusumawardani, D., Agusti, K. S. (2024). "The effect of energy security on economic growth in ASEAN during 2000-2020." *International Journal of Energy Economics and Policy*, 14(2), 447-459.
- Le, T. H., (2016). "Dynamics between energy, output, openness and financial development in sub-Saharan African countries." *Appl. Econ.* 48, 914–933.
- Le, T. H., Nguyen, C. P. (2019). Is energy security a driver for economic growth? Evidence from a global sample. *Energy policy*, 129, 436-451.
- Lee, C. C., Chang, C. P. (2008). "Energy consumption and economic growth in Asian economies: a more comprehensive analysis using panel data." *Resource and Energy Economics*, 30(1), 50-65.
- Mahmood, T., Ayaz, M.T., (2018). "Energy security and economic growth in Pakistan." *Pakistan J. Appl. Econ.* 28, 47–64.
- Narula, K., (2014). "Is sustainable energy security of India increasing or decreasing?" *International Journal of Sustainable Energy*, 33(6), 1054-1075.
- Ojeaga, P., Odejimi, D., George, E., Azuh, D. (2014). "Energy and economic growth, is there a connection? Energy supply threats revisited." *Open Journal of Energy Efficiency*, 3(3), 64-76.
- Sadorsky, P. (2012). "Energy consumption, output and trade in South America." *Energy Economics*, 34(2), 476-488.
- Sovacool, B. K., Mukherjee, I. (2011). "Conceptualizing and measuring energy security: A synthesized approach." *Energy*, 36(8), 5343-5355.
- Staff, I. M. F. (2001). "Global trade liberalization and the developing countries." *International Monetary Fund*. Washington DC: IMF.
- Stern, D. I., (2011). "The role of energy in economic growth." *Annals of the New York Academy of Sciences*, 1219(1), 26-51.
- Yergin, D., (2006), "Ensuring energy security." *Foreign Affairs*, 85(2), 69-82.

Methodological approaches to improving the assessment of inter-budgetary relations using a system of indicative and integral indicators

L.M. Sembiyeva¹²⁵, A.B. Alibekova¹²⁶, D.D. Kerimkulova¹²⁷

Abstract

The article examines and proposes methodological approaches to improving the assessment of interbudgetary relations using a system of indicative and integral indicators. The methodology of state audit is associated with the use of a set of methods by which scientific approaches are developed, including a system of necessary conditions, techniques and mechanisms, fundamental provisions. This situation is due to the fact that the methodological approaches to improving the state audit process available in the scientific literature, although based on the general basic principles of state audit, are at the same time differentiated depending on the various emphases of the state audit process.

Thus, in our opinion, the solution to the existing problem is the establishment of uniform universal standards, as well as criteria and principles for the efficiency of spending budget funds.

Under these conditions, it is necessary to develop a methodology of state audit based on the establishment of uniform universal standards, as well as criteria and principles for the efficiency of spending budget funds. Such a methodology will promote a uniform understanding of efficiency not only for the bodies authorized to conduct state audits, but also for all entities — recipients and administrators of budget funds, which will ultimately affect the quality of compliance with financial discipline in the implementation of the budget process, and will also become an effective mechanism for improving the quality of public administration in general. The current system of interbudgetary relations does not sufficiently motivate regional authorities and local governments to increase the level of mobilization of financial resources and expand their own revenue base. The proposed indicators can be used in the diagnosis and monitoring of local budgets, i.e. act as indicative management tools. However, this is only a small part of the system of budget analytical coefficients, and it can be significantly expanded.

Introduction: Performance audit is aimed at improving the activities of the subject of interbudgetary relations and improving the quality of management, through the development and implementation of recommendations developed on the basis of analysis and assessment of the effectiveness of the use of budget funds. When assessing the distribution of expenditure

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obligations between levels of government, it is necessary to distinguish three components of any expenditure obligation - legislative regulation, financing and administration. At the same time, regulation cannot be quantitatively assessed, and financing and administration, although they can be quantitatively determined, do not reflect the full set of actions of the authority to fulfill the expenditure obligation.

Aim: Provide new methodological approaches to improving the assessment of interbudgetary relations using a system of indicative and integral indicators. The indicators provided can be used in diagnosing and monitoring local budgets, i.e. they act as instruments of indicative management. However, this is only a small part of the system of budget analytical coefficients, and it can be significantly expanded.

Method: This study used general and special methods of economic research. Literature analysis and theoretical review. The study of existing theories, models and concepts related to audit of effectiveness. The method of analysis, synthesis, economic analysis and comparative analysis.

Findings: During the literature search, numerous published studies were found demonstrating the need for a state audit of inter-budgetary relations. As some scientists note, the development of state audit acts as an independent stage in the evolution of inter-budgetary relations. The importance of this stage requires clarification of the object of state audit, as well as the definition of its main types, which allow for an adequate assessment of various aspects of inter-budgetary relations.

Conclusion: We can say the findings will be important data source for policy makers to make decisions.

Originality and value: The analysis suggests that it had decent construct credibility and accuracy.

Key Words: The assessment of interbudgetary relations, indicative and integral indicators, government audit.

Jel Codes: H61, H72, H77

1. INTRODUCTION

The methodology of public audit is associated with the use of a set of methods by means of which scientific approaches are developed, including a system of necessary conditions, techniques and mechanisms, fundamental provisions. This situation is due to the fact that the methodological approaches to improving the process of public audit available in the scientific literature, although based on the general basic principles of public audit, are at the same time differentiated depending on the various emphases of the process of public audit.

Research shows that the redistribution of resources within the framework of the implementation of interbudgetary equalization is a natural process and an objective necessity, the main purpose of which must be indicated as the prevention of the effect of asymmetry in regional development (draft Law of the Republic of Kazakhstan).

The methodology and methodology of conducting performance audit in different countries have their own characteristics, but almost all systems of supreme financial control bodies of countries are built on the basis of international principles and standards (Alibekova and Sembiyeva, 2022).

The methodology of performance audit includes a certain set of procedures for obtaining evidence necessary to form a conclusion regarding the efficiency, productivity and effectiveness of the use of public funds. General audit principles in areas such as audit risk, contacts, skills, professional judgment, quality control, materiality and documentation are based on the principles of ISSAI 100 Fundamental Principles of Public Sector Auditing and explain how they are specifically applied in performance auditing (ISSAI 100).

At the same time, individual attempts are being made at the legislative level to consolidate methods for assessing appropriate budget expenditures.

2. AIM

In these conditions, it is necessary to develop a methodology for public audit based on the establishment of uniform universal standards, as well as criteria and principles for the efficiency of spending budget funds. Such a methodology will facilitate a uniform understanding of efficiency not only for the bodies authorized to carry out public audit, but also for all entities that are recipients and administrators of budget funds, which will ultimately affect the quality of compliance with financial discipline in the implementation of the budget process, and will also be an effective mechanism for improving the quality of public administration in general.

Today, the current legislation of the country needs to be amended, namely, to establish the possibility of creating territorial development funds for the transfer of state subsidies to local budgets for partial financing of investment programs (projects) for the development of territorially significant public infrastructure, as well as regional funds for co-financing social expenses for the transfer of funds to support the financing of priority socially significant expenses of local budgets.

3. METHOD

A similar scheme should be formed for the regions. Amendments to the Budget Code should allow the use of other forms of financial support for cities and regions, including various types of budget loans. The purpose of providing budget loans to regions is shown in Figure 1.

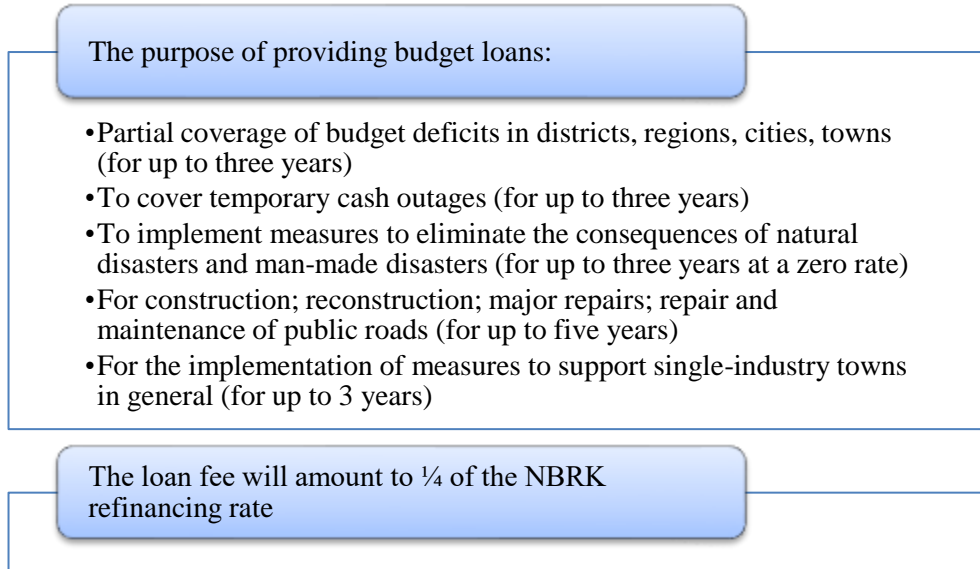


Figure 1. The purpose of providing budget loans to regions (source of deficit financing)

Direct distribution of funds through any of the funds should be carried out in accordance with a single method or on the basis of common criteria and conditions for all types of cities and regions, which should be established by law.

Regional funds for financial support of territories and local budgets are necessary for the provision of gratuitous financial assistance (grants), their use should be within the competence of the recipient, but comply with current legislation. This mechanism for the distribution of funds is aimed at providing financial resources to the relevant local budgets to resolve issues within the competence of local authorities of the corresponding levels of the budget system (Al-Makhzumi, 2019).

The issue of state subsidies also requires further development, namely, the consolidation of the possibility of delegating to higher-level entities the authority to provide subsidies to regions at the expense of the regional budget (Table 1).

Funds for the implementation of these delegated powers should be provided to higher-level organizations from the Regional Compensation Funds. This mechanism should be clearly defined in legislation. The primary goal of improving interbudgetary relations is to create incentives for territorial development, achieving the best balance of local budgets while maintaining a high level of interest and responsibility of regional authorities to maximize their own revenues and improve the efficiency of budget expenditures.

The current system of interbudgetary relations does not sufficiently motivate regional authorities and local governments to increase the level of mobilization of financial resources and expand their own revenue base.

Table 1: Comparison of subsidies for equalizing budget security with support measures that ensure the balance of regional budgets

Approval of the Law on the State Budget	Equalization grants	Grants to ensure balance
	The volumes as a whole and for each recipient of the region are approved	The total amount approved is distributed by the Government to the regions during the year
The degree of "transparency" of distribution methods by region	Significant (advantage)	Low (disadvantage)
The possibility of rapid response to the situation in the regions	Missing (disadvantage)	Available (advantage)

In order to improve interbudgetary relations in the regions and increase the efficiency of tax planning, it is essential to ensure:

- 1) a unified and transparent system of indicators for planning local budget revenues;
- 2) distribution of financial assistance between local entities taking into account the economic potential of the territory and the efficiency of its use;
- 3) creation of incentives for the development of the tax base of local authorities.

Analysis of the system of indicators for assessing the standard of living of the population and the socio-economic situation of territorial entities is the starting point for setting management goals, the basis for planning and forecasting, and the basis for management and regulation. The main purpose of such analysis, which is essential from the standpoint of focusing on optimizing financial management of regions and interbudgetary relations, is that the analysis of the system of indicators determines the degree and methods of support for territories, ensures finding the optimum for providing financial assistance that would stimulate territories to develop (Alibekova et al., 2021).

Findings: In this regard, it is advisable and necessary to comprehensively improve and widely introduce the method of indicative management into the practice of regional

management. In the process, we systematized a number of indicators that are appropriate to use in the analysis of the state of interbudgetary relations (Table 2).

Table 2: System of analytical indicators used in the analysis of the state of interbudgetary relations

Index	Calculation formula
Financial independence ratio, I_1	$I_1 = \frac{\sum Ro}{\sum Eb}$
Minimum Budget Provision Ratio, I_2	$I_2 = \frac{\sum Ro}{\sum Pmin}$
Coefficient of budgetary self-sufficiency of the territory, I_3	$I_3 = \frac{\sum Ro}{\sum Ch} - Pmin$
Subsidization coefficient of the region, I_4	$I_4 = \frac{\sum Slb}{\sum Rb}$
Coefficient of Tension in the Formation of Budget Potential, I_5	$I_5 = \frac{\sum Eb (fact)}{\sum Eb (plan)}$

The given indicators can be used in diagnostics and monitoring of local budgets, i.e. they act as instruments of indicative management. However, this is only a small part of the system of budget analytical coefficients, and it can be significantly expanded. At present, a system of regional statistics indicators that meets the needs of operational forecasting and planning has not yet been formed. In this regard, local government bodies cannot fully ensure the distribution of financial assistance to local budgets according to objective methods and criteria. In the scientific work, a special integral indicator was developed that meets these requirements, on the basis of which a methodology was developed for assessing the financial condition of regions and the possibility of financial incentives from the funds of a special fund to support effective local governments:

$$I_1 = \frac{Ro+G-Dm}{E} * I_2 \quad (1)$$

Ro - Own revenues of the territorial budget

G - Amount of grants, subsidies to the budget

Dm - Municipal debt

E - Budget expenditures for the period

I₂ - Minimum Budget Provision Ratio

The model of the process of financial support for effective local government bodies at the regional level is presented in Figure 2.

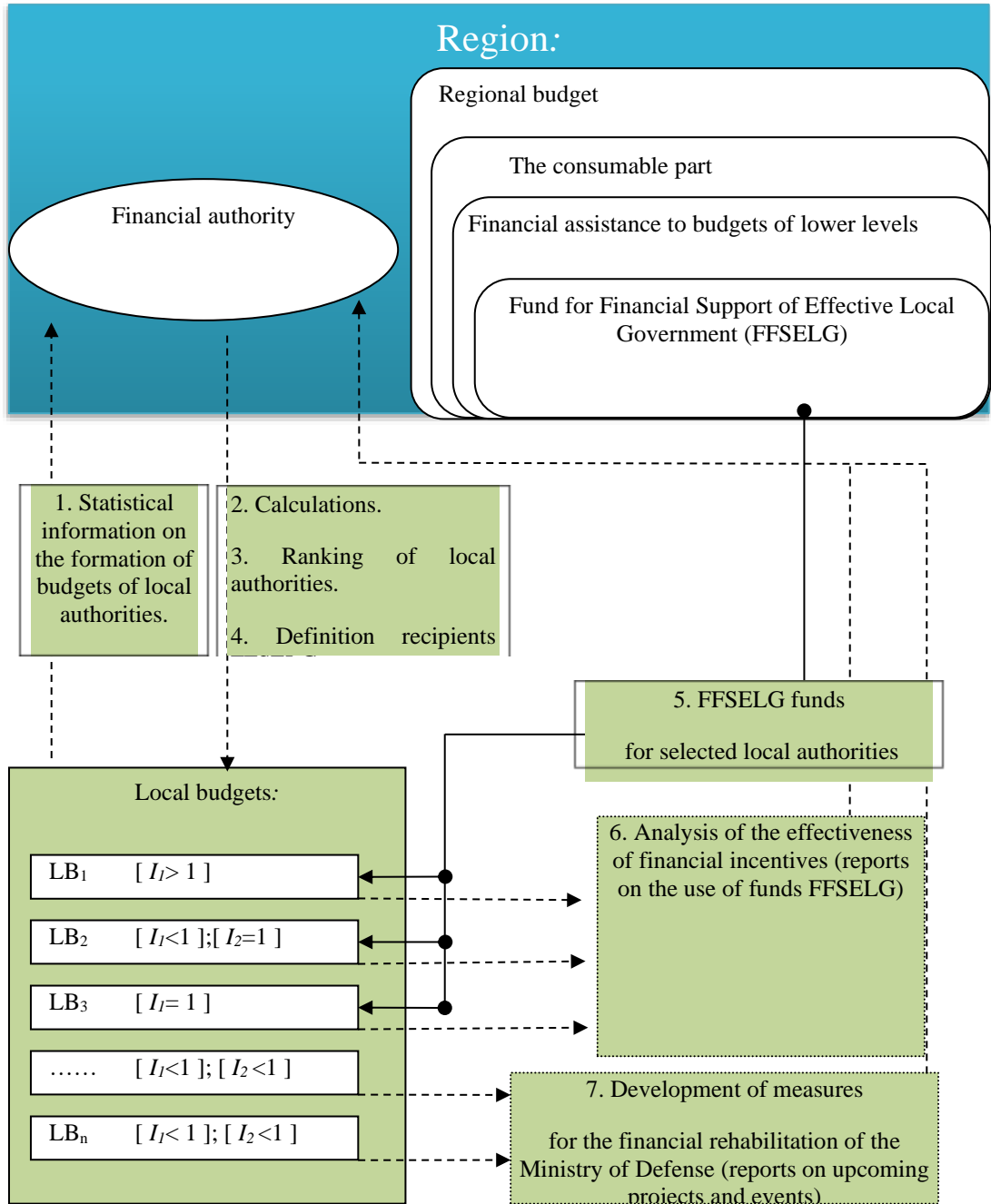


Figure 2. Model of the process of financial support for effective local governments at the regional level

Currently, the process of reforming relations between budgets of different levels is focused to a greater extent on the distribution of financial assistance between local budgets in terms of covering the difference between the estimate of budget revenues and the estimate of budget needs of local budgets for the planned year from the regional budget. This helps to reduce interest in mobilizing revenues in regional budgets. To stimulate budget security of regions, active methods can be used, which in foreign practice are based on the creation of specialized incentive funds, which will ensure the interest of regions in developing their own sector of the real economy and strengthening its financial independence (Vergun, 2014; Alibelova et al., 2020).

Thus, in addition to other goals, in the process of reforming budget decentralism, it seems necessary to move to a model in which regions will strive to increase their own revenue base and reduce interbudgetary flows, the volume of transfers allocated from the republican budget. Focusing on greater tax self-sufficiency, as practice shows, serves as a powerful incentive for regional authorities and local governments to develop the financial and economic potential of their territories.

Conclusion: In our opinion, the recommended method will reduce the number of subsidized areas, districts within a region and the volume of interbudgetary flows. As a result, the center will have an additional opportunity to work with those entities where, for objective reasons, the economic potential is insufficient. The process of financial stimulation of regions by creating FFSELG within a region should be considered as one of the most important components in reforming interbudgetary relations within a region.

In the developed model, the process of financial support for effective local governments in the regions is presented as an important element of the budget process at the regional level. The budget process is cyclical in nature, that is, its stages are repeated in each subsequent financial year and the submission of performance reports is not the final link in the process, but only completes the next budget cycle. In the next budget cycle (period), the above stages are also performed (calculations are made). A region that was part of the set in the previous period may again be included in it in the current period or, on the contrary, not be included. This may happen if the integral indicator of the financial condition has worsened. The opposite is also possible.

The main goal of improving interbudgetary relations - equalization of budgetary security - must be supplemented with an auxiliary goal, according to which financial incentives for local governments can only occur when the integral indicator of the financial condition of the local entity takes on a value of ≥ 1 . This condition will increase the degree of interest of local authorities in increasing the revenues of the local entity budget, therefore, based on the model, a methodology for the process of financial support for local entities in the region has been developed (Del Mello, 2000; Rye and Searle, 1997; Alibekova, et. al., 2022).

Thus, possible areas for increasing the revenue side of budgets may be:

- an increase in the number of "self-employed" citizens, the withdrawal of their income from the "shadow" economy sector and, as a result, an increase in tax revenues on professional income;

- a decrease in the informal employment sector and the unemployment rate;

- verification of information about real estate; – timely implementation of state cadastral valuation and introduction of real estate objects into tax circulation.

Originality and value: The analysis suggests that it had decent construct credibility and accuracy.

REFERENCES

Conclusion on the assessment of the draft Law of the Republic of Kazakhstan "On the Republican Budget for 2022-2024" on the main directions of its expenditures / Accounting Committee for Control over the Execution of the Republican Budget. – Nur Sultan, 2021, 276.

Alibekova A.B., Sembiyeva L.M. (2022), Foreign experience in auditing the effectiveness of inter-budgetary relations// Bulletin of the L.N. Gumilev ENU, 230-240.

ISSAI 100. Fundamental principles of auditing in the public sector// <https://www.eurosai.org/handle404?exporturi>. (Accessed: 04.05.2020).

Al-Makhzumi H.M.H. (2019), Financial and legal mechanism for improving the effectiveness of the quality of state audit in the system of inter-budgetary relations // Law: History and modernity, 4 (9), 104-110.

Alibekova A., SembyevaL., NurumovA. et al. (2021), Organisation problems and audit of the effectiveness of interbudgetary relations//Public police and administration Research journal, 20, Issue 5, 610-621.

Kolesnikov A.M. (2010), Improvement of inter-budgetary relations at the regional level: dis. ... Candidate of Economic Sciences: 08.00.10. – Tula, 2010, 184.

Vergun S.S. (2014), Problems of evaluating the effectiveness of inter-budgetary relations at the regional and local levels and ways to solve them// Economic sciences, 117, 140-142.

Alibekova A.B., Yerniyazova Z.N., Talapbayeva G.E. (2020), Changes and problems in budgetary system of the Republic of Kazakhstan //News of the National Academy of Sciences of the Republic of Kazakhstan, Vol. 1, Issue 323, 247-251.

De Mello L.R. (2000), Fiscal Decentralization and Intergovernmental Fiscal Relations: a Cross-country Analysis// World Development, Vol. 28, Issue 2, 365-380.

Rye C.R., Searle B. (1997), Expenditure Needs: Institutions and Data // In book: Financing Decentralized Expenditures: an international comparison of grants. – Cheltenham: Edward Elgar, 396.

Alibekova A.B., Sembiyeva L.M. (2022), Foreign experience in auditing the effectiveness of inter-budgetary relations// Bulletin of the L.N. Gumilev ENU, 2, 230-240.

Evaluation of Individuals' Body Perception on The Most Important Organ Preferences

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Abstract

Introduction: Individuals' perceptions of their bodies include their psychological and social evaluations of their bodies. Individual and social perceptions of the body are directly related to past illness experiences or society's view of illness.

Aim: In this study, it is aimed to determine the organs that individuals consider the most important for themselves and to determine the perceptions of individuals towards their bodies within this framework.

Method: Within the scope of the research, qualitative research method was preferred and data were collected from volunteer participants over the age of 18. Within the scope of the research, a structured question form was preferred. "According to me, my most important/valuable organ is Because..... ." data were collected from the participants through the form containing the questions. 162 voluntary participants participated in the study, 10 forms with meaningless expressions were excluded from the analysis, and content analysis was applied on the remaining 152 forms.

Findings: The content analysis revealed that 14 different organs were expressed: heart (58), eye (38), brain (22), hand (8), lung (7), kidney (6), foot (5), leg (4), ear (3), stomach (2), waist (1), skin (1), throat (1), tongue (1). When the justifications put forward for each selected organ were analysed, it was seen that for the heart; diseases, emotions, management, being a source of life and function (blood circulation); for the eye; diseases, business life, freedom (not being in need), emotions, function (vision); for the brain; thinking and management were expressed.

Conclusion : As a result of the research, it was determined that in the perceptions of individuals towards their organs and bodies, the heart, which is seen as an element of the continuation of life, the eye, which allows us to perceive life by seeing, and the brain, which controls the body in which we live and perceive our life, and the situations related to these organs came to the fore.

Originality and value: This research is important in terms of revealing the body perceptions of individuals in terms of social and psychological aspects.

Key Words: Body Perception, Sociology of Health, Organs

Jel Codes: I12, I19

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1. INTRODUCTION

According to the definition of the World Health Organization (WHO, 1946), health is not only the absence of disease or disability, but also a state of complete physical, mental and social well-being. Based on this definition, one of the important elements of an individual's state of health or well-being is physical health. The physical health in question refers to the individual's ability to perform activities such as moving, eating, and eliminating by using the physical characteristics of their body. In this context, it is important to emphasize the individual's perception of their body. The body is a phenomenon perceived as one of the ways an individual proves their physical existence (Böhme, 2010). For this reason, an individual will want to take good care of their body, which is the guarantee of their existence, and get to know it.

It consists of the interactions between the individual's perception of his/her body, the capacity to move, and the perception and interpretation of the senses. It also expresses the individual's attitude towards his/her own body and his/her comparisons with other people. This comparison helps the individual to decide whether he/she is healthy or unhealthy (Aslan, 2004). From this perspective, body perception is the image that the individual sees when he/she looks at himself/herself and the meaning of this image in his/her mind.

According to the approach that sees the existence of the individual together with the body, it gains meaning with the physical characteristics and the integrity of the organs (Abakay et al., 2017). A healthy body will be able to fully meet the physical and social needs. Therefore, the state of being healthy of a body passes through the physical elements that make up the body, namely the organs. The individual's perception of his organs will be the manifestation of his perception of his body.

In this study, it is aimed to determine the perceptions of individuals towards their bodies, the meanings they attribute to their organs and bodies by revealing how individuals look at their organs in their perceptions of their bodies and which organs they evaluate in which aspect. The sub-purpose of the research is to make sociological inferences about life and the body by starting from the concept of the most important organ.

2. RESEARCH METHODOLOGY

Within the scope of the research, the qualitative research method was preferred and a structured questionnaire was used within this scope. In this study, the structured interview form was preferred due to the size of the population from which the data would be collected and the fact that it provides uniform and easy categorization (Dömbekci and Erişen).

The questionnaire form included the questions "For me, my most important/valuable organ is Because" Data were collected from volunteer participants over the age of 18 who applied to a state hospital between May 6-10, 2024. 162 (97 Female / 65 Male) volunteer participants between the ages of 18-73 participated in the study, 10 forms containing meaningless expressions were excluded from the analysis,

the remaining 152 forms and the data obtained within this scope were transferred to the database created on the Excel program and the analysis was performed.

Within the scope of the analysis, the content analysis technique was preferred to provide numerical data related to the expressed organs, since it ensures that the data is objectively measurable and verifiable (Fiske, 1996) and allows the quantification of qualitative data (Tavşancıl and Aslan, 2001). Similarly, the categorical analysis technique, which is an analysis tool in content analysis, was used in this research.

3. FINDINGS

As a result of the content analysis conducted within the scope of the research, it was determined that 13 different organs were expressed. The table regarding the findings is given below.

Table 1: Most recurrent organs

	Organs	Frekans (f)	Percent (%)
1	Heart	58	36.94
2	Eye	38	24.20
3	Brain	22	14.01
4	Hand	8	5.73
5	Lung	7	4.46
6	Kidney	6	3.82
7	Foot	5	3.18
8	Leg	4	2.55
9	Ear	3	1.91
10	Stomach	2	1.27
11	Waist	1	0.64
12	Throat	1	0.64
13	Tongue	1	0.64
	Toplam	157	100

As a result of the content analysis conducted within the scope of the research, it was determined that the most important organ expressed by the participants was the heart (36.94%) with 58 times. Then, the other organ considered to be the most important was the eye (24.20%), expressed by 38 participants.

After the heart and eyes, the brain was the most prominent organ, mentioned by 22 participants. Apart from the first three organs; the hand was mentioned 8 times (5.73%), the lung 7 times (4.46%), the kidney 6 times (3.82%), the foot 5 times (3.18%), the leg 4 times (2.55%), the ear 3 times (1.91%) and the stomach 2 times (1.27%). The waist, throat and tongue were mentioned 1 time each (0.64%).

The reasons expressed by the participants for the organs identified within the scope of the research were examined and categorical analysis was applied by evaluating the reasons for choosing the organ in question. The findings obtained within this scope are given in the table below.

Table 2: Categorical distribution

Organs	Categories / Reasons
Heart (58)	Source of Life (32)
	Diseases (7)
	Management (6)
	Emotions (4)
	Functions (Blood Circulation) (4)
Eye (38)	Freedom (13)
	Diseases (9)
	Emotions (8)
	Functions (Sight) (5)
	Working Life (3)
Brain (22)	Governing Body (17)
	Thinking Skills (5)
Leg (4), Foot (5), Hand (8), Waist (1)	Diseases (7)
	Working Life (7)
	Functions (Movement) (5)
Lung (7)	Functions (Respiration) (7)
Kidney (6)	Diseases (4)
	Functions (blood purification) (2)
Stomach (2), Throat (1), Tongue (1)	Functions (Digestive) (4)
Ear (3)	Diseases (3)

When the reasons of the individuals regarding the organs they consider to be the most important organs were examined within the scope of the research, it was determined that the heart organ was the source of life and the diseases experienced with this organ came to the forefront. Similarly, for the eye, the sense of independence that this organ gave, the discomforts experienced and the ability to reflect emotions were emphasized. For the brain, the participants used expressions such as being the organ that governs the body and the ability to think.

For the other organs, it was determined that while the physical functions and areas of use in daily life of the relevant organ were generally emphasized, the diseases experienced with these organs were also mentioned.

4. CONCLUSION

According to the research findings; individuals have particularly emphasized the heart and brain organs due to their vital importance. In addition, the eye is one of the most emphasized organs due to being a window to the world and the desire to live independently. When evaluating their organs, individuals emphasize the function of the relevant organ. Another reason for organs to be seen as important is the diseases related to the relevant organ. Therefore, the important element of individuals' body perception is the ability of their organs to fulfill their functions. Similarly, individuals focus on the diseases that the body can catch when perceiving their bodies. In this context, individuals perceive their bodies positively when they are healthy and able to fulfill their functions.

As a result of the research, it is evaluated that individuals see the heart and eye organs as the most important organs as a reflection of the desire to continue life and perceive the world visually. Similarly, the situation where the brain is expressed less than the heart and eye organs; It has been determined that individuals give importance to concrete elements and physical characteristics rather than mental emotions, logic, intelligence and comprehension skills. Similarly, the basic element of individuals' body perception is to have healthy organs. The healthy perception of the body is possible by having organs that can fulfill their functions. This situation is seen in the emphasis of the participants on diseases and functions.

Organs that can meet physical needs shape body perception in a positive way. In this context, it is recommended that psychological support studies be carried out so that individuals with physical disabilities or those struggling with chronic diseases can develop a positive body perception and reintegrate into society.

REFERENCES

- Abakay, U., Alıncak, F., & Ay, S. (2017). Üniversite öğrencilerinin beden algısı ve atılganlık düzeylerinin incelenmesi. *Uluslararası Türk Eğitim Bilimleri Dergisi*, 2017(9), 12-18.
- Akdemir, A. B., & Kılıç, A. (2021). Nitel makalelerin yöntem analizi. *Muğla Sıtkı Koçman Üniversitesi Eğitim Fakültesi Dergisi*, 8(2), 486-502.
- Aslan, D. (2004). Beden algısı ile ilgili sorunların yaratabileceği beslenme sorunları. *Sürekli Tıp Eğitimi Dergisi*, 13(9), 326-329.
- Böhme, G. (2010). The concept of body as the nature we ourselves are. *journal of speculative philosophy*, 24(3), 224-238.
- Dömbekci, H. A., & Erişen, M. A. (2022). Nitel araştırmalarda görüşme tekniği. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 22(Özel Sayı 2), 141-160.,
- Fiske, J. (1996). İletişim çalışmalarına giriş. (S. İrvan, Çev.). Ankara: Bilim ve Sanat Yayınları.

Tavşancıl, E. ve Aslan, E. A. (2001). Sözel, yazılı ve diğer materyaller için içerik analizi ve uygulama örnekleri. İstanbul: Epsilon.

World Health Organisation (WHO). (1946). Constitution of the WHO. In: Basic documents (37th edn), Geneva.

Has Digital Transformation Changed or Improved the Labor Market?

Bilsen Bilgili¹³⁰

Abstract

Introduction: With the innovation and change brought about by industrial revolutions, the quality and quantity of labor force needs are also changing rapidly. The recent decrease in work commitment of new generation employees, who are in close interaction with the digitalization process, has been the subject of many studies.

Aim: It is aimed to reveal the effect of digitalization on the decrease in job loyalty of employees, called internal customers. It is aimed to reveal whether digitalization in the labor market causes a change or development.

Method: In the research, secondary sources on digitalization and labor market were used. By performing content analysis on the data obtained, the positive and negative aspects of the impact of digitalization on the labor market were determined.

Findings: The findings show that the effects of digitalization on the labor market are not just a change. It has been determined that the effect of digitalization is in a direction of development that forces it to meet the need for qualified employees in the labor market.

Conclusion : It has been concluded that the decrease in employee loyalty is due to the lack of overlap in the quality expectations between the company and the employee. Based on this, suggestions are presented for training qualified workforce in the digitalizing world.

Originality and value: Contrary to most criticisms, it is claimed that the impact of digitalization on the labor market is not a negative change but an improvement.

Key Words: Digital labor Market, Labor Productivity, Internal Customer.

Jel Codes: M31, M54, E24.

1. INTRODUCTION

Digitalization, which has spread rapidly in all areas of society in recent years, can be expressed as a result of the processes of industrial revolutions, not a situation that emerged suddenly (Kagermann et al., 2013; Dombrowski & Wagner, 2014; Pereira et al., 2020; Carayannis et al., 2021; Chang et al., 2021). The concept of development refers to a process in which a series of changes involve continuity. Development is expressed as the product at the end of this process. On the other hand, change refers to the transition from one situation to another, planned or unplanned (Erözkan, 2007). Considered in this context, digital transformation has emerged as a result of the process of successive

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industrial revolutions. In other words, it refers to development rather than change, which means a sudden transition from one state to another. When we consider digital transformation as a product that emerges as a result of a process, it can be expressed as a development, not a change.

In today's world where digitalization brought about by technological innovations is intense, this transformation has created different effects in every aspect of society. Digitalization has had a significant multifaceted impact on the labor market, which is the subject of this research. While digitalization provides benefits by affecting the level of employment, it has also replaced some business areas and eliminated the workforce in those areas (Petropoulos, 2018; Spencer et al. 2021). This situation has been critically discussed in many studies that digitalization negatively affects the labor market. On the other hand, although digitalization has replaced the workforce in some business areas, it has been found beneficial because it positively affects business productivity. Therefore, it is clear that the impact of digitalization on the labor market causes development and/or change. It is important to examine the positive and negative aspects of the differentiation that has occurred in the labor market due to the impact of digitalization.

Based on this, this research examined how the digital transformation that took place with the industrial revolutions caused a differentiation in the labor market. It has been examined whether the differentiation in the labor market is a change or a transformation. Based on the findings, various suggestions have been presented.

2. LITERATURE REVIEW

In the literature review section, the research topic was examined under two headings. In the first part, differentiation in the labor market is defined within the framework of industrial revolutions. In the second part, the differences in the concepts of development and change, which are the subject of the research, and the differentiation in the labor market are defined in this context.

2.1. Industrial Revolutions, Digitalization and Labor Market

In the process from the existence of humanity to the present day, changes and developments have occurred in many socio-cultural, economic and technological aspects. In ancient times, there was a hunting/gathering system in which individuals met the basic needs of themselves and their immediate families, such as nutrition and shelter. Along with the agricultural production system, humanity also transitioned to settled life. From this period onwards, the social production and consumption period brought with it trade. The roles of employee and employer were also defined along with trade, and the roles of these two parties continued to change and develop with the social development process (Aktan and Tunç, 1998).

The first industrial revolution took place at the end of the eighteenth century, when steam power and mechanical production systems dominated. The second industrial revolution took place at the end of the nineteenth century with the use of electricity in

production systems. With the use of electronics and information technologies in production systems, the third industrial revolution, also called the digital age, took place in the 1970s. In the 2000s, with the fourth industrial age, in which elements such as big data, cyber-physical systems, internet of things IoT, smart applications, augmented reality, artificial intelligence and robots, which are an outcome of the digital age, are effectively used, digitalization has begun to spread rapidly in all areas of society. Industrial revolutions and digitalization that took place over a period of more than two centuries have caused significant changes in the structure of the labor market (Çark, 2020). As qualified labor becomes increasingly important and physical labor is replaced by digital systems, the sought-after characteristics in the labor market have also begun to change. This change can be expressed as a development that occurs as a result of a development, as it involves a sequential process (Erözkan, 2007).

As emphasized by Öcal & Altıntaş (2018), it is known that the new technological structure of the current period and machine production techniques provide an increase in raw material inputs and increase product efficiency. Whether this change in the industrial structure and digitalization causes a development or a change in the labor market is an important issue that is discussed.

2.2. Concept of Development and Change

The concepts of development and change are different concepts and these two concepts can be used in the wrong sense. Development basically refers to the change of an organism, starting from fertilization, with certain conditions in terms of physical, mental, linguistic, emotional and social aspects, and progressing continuously until it reaches its final stage (Senemoğlu, 2018). In other words, it covers the continuous quantitative and qualitative changes in the process from the starting point to the end point of a phenomenon (Aral, et al., 2000; Trawick-Swith, 2013). Quantitative change includes concrete, observable elements, while qualitative change refers to changes occurring in cognitive, social and skill-based areas. Both development and change are continuous concepts. While development includes change in its content, not all change is development. According to Senemoğlu (2018), development occurs through the interaction of growth, maturation and learning. In particular, in order to talk about developmental change, there must be an interaction between maturation and learning. Development is a progressive, sequential formation that follows a similar pattern across generations. It also has a circular feature. The previous process feeds the next process. In short, development is a process that includes continuity and changes. Although the concepts of development and development are related to each other, their meanings are different. Although development is a process, development is the product of this process (Erözkan, 2007). The concept of change refers to moving from one situation to another. In other words, it means to differentiate. Change is the planned and/or unplanned transition of a system from one state to another within a period of time.

3. RESEARCH METHODOLOGY

In this research, it is aimed to evaluate the differentiation in the structure of the labor market along with digital transformation in terms of the concepts of change and development. Conceptual differences were revealed with secondary sources, differentiation in the labor market was considered as a case and discussed in terms of these concepts. Based on the findings of the research, it is aimed to present various suggestions for the development of today's labor markets.

3.1. Purpose, Scope and Limits of the Research

In this research, it is aimed to explain the differences in labor markets resulting from the impact of digitalization along with industrial revolutions, in terms of the concepts of development and change. Secondary source data was used in the research. The scope of the research is limited to the differences in the labor market caused by the effect of digitalization throughout the industrial revolutions and the theory of the concepts of development and change. The labor market has been evaluated within the framework of this literature.

3.2. Findings and Discussion

The first industrial revolution, in which production was carried out with steam power and mechanical systems, took place at the end of the 18th century. The second industrial revolution, which took place at the end of the 19th century with the use of electricity in production systems, continued until the 1970s. During these two industrial ages, physical strength was at the forefront in the workforce and many jobs were carried out with human physical strength. The third industrial revolution, which took place with the introduction of electronic and information technologies into the production system, is referred to as the digital age. During this period, human physical power was replaced by human mental power and mind-based abilities in production systems. This process, in which piles of information are formed together with information technologies and digital data technologies, emerged in the 2000s as the fourth industrial revolution, which includes many innovations such as smart applications in production systems, robots, IoT-internet of things, cyber physical systems, augmented reality, cloud computing, big data. Industry 4.0 has been realized (Srivastava, 2015). Today, with digitalization, information technologies and smart applications, we are experiencing a period in which physical strength has largely lost its importance in the workforce and human mental strength has come to the fore. It is possible to express the evolution of human resource quality in the four industrial ages with Figure 1.

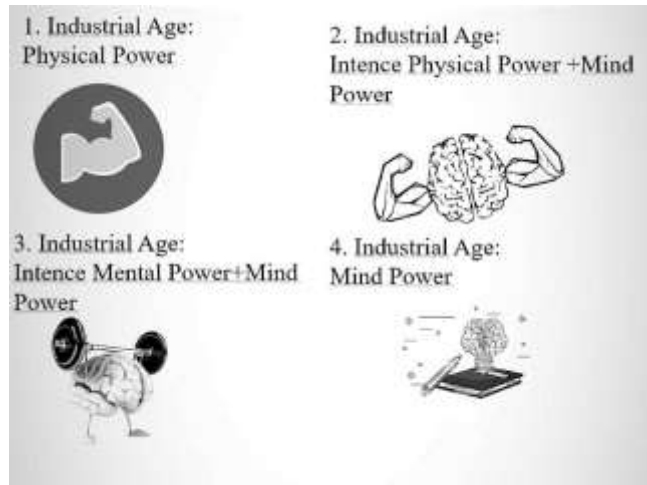


Figure.1 Evolution of Human Resource Quality

Digitalization aims to create a difference that will positively transform the quality of work and speed of doing business through the management of information by using digital technologies in ecosystems. In order to adapt to the momentum of transformation, it is necessary to create new experiences for customers. The concept of "Digital Transformation", expressed with Industry 4.0, human-oriented Society 5.0 and/or similar concepts, refers to new generation digital technologies and the system in which these technologies are included (Çark, 2020). The employment impact of digitalization relates to the volume of business in quantity, the quality of the workforce in terms of quality, or a combination of both. On the other hand, digitalization is also effective in terms of the task profiles and related skill requirements required by changing jobs and professions in the labor market. It is fully or partially linked to business models regarding the way activities are structured and organized, such as innovation, internationalization and collaboration/supply chain (Yağmur, et al., 2022).

In order to gain competitive advantage in the intense competitive environment brought by globalization, companies need to read technological transformations well and develop strategies that can create global value (Karabegović, 2017). Based on this, the phenomenon of digitalization clearly reveals the necessity of making radical changes in the labor market and the need to develop a new perspective on employment (Murat & Aykaç, 2020). Industry 4.0 will undoubtedly make its effects felt as a revolution that will increase unemployment. The need for blue-collar workers in production facilities that will work with robots will decrease, in the new period; People who can design programs, use these programs and make robots will be employed (Eğilmez, 2018).

In particular, artificial intelligence technology has reached advanced levels, causing many professions to succumb to automation, while new business lines are expected to open. It is expected that human actions, behavioral patterns and social norms will be redefined with developing technology. It is not easy to predict how this process will

progress (Öcal & Altıntaş, 2018). In the service industry such as tourism, it is claimed that the human factor will continue to be effective even if digital applications become widespread in production systems (Bilgili & Özkul, 2019). While skill requirements in digitalised organizations indicate good labor market prospects, especially for highly skilled white-collar workers, workers in occupations with highly routine tasks, especially in sectors such as automotive, machinery and consumer goods manufacturing, are likely to face employment challenges. This situation raises concerns about increasing labor market polarization (Işık & Topkaya, 2022). To move forward with digitalization, companies must be equipped with the financial resources necessary to develop or purchase and maintain digital solutions. Additionally, companies need staff with the skills to design and work with these digital solutions. This can be difficult for small businesses and young businesses, both of which have limited resources.

The role of the human in Industry 4.0 has been treated in four different ways. The first one is “Complex Systems communicating with Humans”. A machine is a device that consists of a number of technical components. (Kramer & Zimolong, 2005). Within a machine, there are a number of interfaces designed to provide the communication of the control signals between all components such as control lines, sensor signals, or the commands of a computer-based control system. A more complex machine or the combination of machines can be called a system. This system communicates with the human being(s) by means of a user interface. This may consist of gauges and control lights, or more likely today, a computer screen. In return, the human controlling such a system enters commands by pressing buttons or using keyboards and control sticks. Timpe, et al., include the component “human” into a technical system and call this component “sociotechnical component” (Timpe, et al., 2002). Secondly, human is a system user(s). As a user, humans are included in the system either individually or as a group. The skills of each individual are important for an effective system utilization (Helander, 2006). Third, there is a human factor as the system designer engineers and software designers. Finally, there are humans as clients and society. Marketing and business development specialists evaluate the expectations and requirements of the clients and report these back to the manufacturing place. In the case of the complex Industry 4.0 concept, this covers a large sector of our lives. The efficiency of giving the customer a personalized product or service by an analysis of the information gained with large databases is a matter of debate (Kinzel, 2017; Bilgili & Özkul, 2019).

Considering the roles of people in the digital system, the distribution of roles in the labor market in terms of change and development concepts is shown in Table 1.

Table.1 Distribution of the Roles of the Workforce in the Digital System in Terms of Change and Development

Workforce Roles	Change		Development
	UNCONSCIOUS	CONSCIOUS	CONSCIOUS/PLANNED
Complex Systems communicating with Humans System User/s System Designer Client/Society	Exposed, reluctant, UNHAPPY	Exposed and willing, ROUTINE-COMPATIBLE-NEUTRAL	Aware of the need for change, willing, planned, conscious COMPATIBLE DEVELOPMENT CREATIVE HAPPY
LOYALTY-CONFLICT	-Difference in Employer/Employee Expectations and Performance Perceptions -Those Who Are Reluctant to Change -Low Loyalty -Planned Development-High Loyalty		

As seen in Table 1, effectiveness and efficiency can be achieved at the highest level if the process of adapting the workforce to the changes in the digitalization process is carried out consciously and in a planned manner within the framework of the concept of "Development". Within the framework of the concept of "change", it is seen that the individual will be exposed to a harmonious and neutral harmony when the workforce is consciously transferred from one dimension to another. Finally, an unconscious transition within the framework of the concept of "Change" will cause unhappy and reluctant individuals. While individuals' loyalty levels may be high within the framework of development, individuals' loyalty levels are expected to be low within the framework of unconscious Change. Considering that digitalization is not a change but a development, it may be healthier to plan the adaptation of the employee market to the system based on development.

With digitalization, all these issues emphasized show that the dependence on labor on a global scale will decrease and that the labor force must definitely adapt to the new era. This transition period is not an easy process and requires some complex measures to be taken. In this process, international organizations, governments, private enterprises and other actors should take an active role and prevent labor from entering the new era at a disadvantage. In this regard, the steps to be followed in the report titled Eight Futures of Work prepared by the World Economic Forum are grouped under 10 headings (World Economic Forum, 2018). These topics include providing new skills to the labor force, reforming the education system, increasing digital access, fast and secure network system, promotion of job security, encouragement of smart job creation, supporting entrepreneurship, governance of online platform work, labor mobility management,

participation. are listed as incentives. As emphasized here, the way to harmonize the workforce with the digital transformation process in a healthy way is to carry it out as a planned "development" process. In particular, it is important to reform the education system and plan all other equipment to ensure willing participation.

4. CONCLUSION

The question of this research is "Is the impact of digital transformation on labor markets change or development?" It is understood that the answer to the question is largely in the direction of "Development". Considering that development is a long process and its output is "Development" (Senemoğlu, 2018), it can be said that digital transformation is the cumulative outcome of industrial revolutions over approximately 200 years. Development requires change everywhere in its sphere of influence. One of these areas of influence is labor markets. From a change perspective, it is predicted that adapting labor markets to digital transformation may lead to low efficiency and low effectiveness. However, instead of "Change", which is expressed as a transition from one state to another due to people's roles in the digital system (Kinzel, 2017), it seems more appropriate to approach it with the philosophy of "Development", which requires a planned and process. It is understood that digital transformation does not trivialize the human factor in the labor market, on the contrary, it creates the need for new structures and developments. It is clear that there is a need for a total development process to train new professional fields and qualified manpower. It is seen that the human factor will take part in the system as an element with high added value, equipped with different abilities and skills (Murat & Aykaç, 2020). This situation requires research to determine the professions created by the digital transformation process and the abilities and skills needed for these professions. It seems that there is a need for systematic planning and all-out regular and sequential practices, starting from the very beginning of the workforce training process, that is, from the training phase. This result supports the recommendations presented in the World Economic Forum (2018). Therefore, it is possible to say that digital transformation creates a "Development" in the labor market and that "Changes" occur within the scope of development.

REFERENCES

- Aktan, C. C. & Tunç, M. (1998). 21. Yüzyıla girerken bilgi toplumu ve Türkiye. *Yeni Türkiye Dergisi*, (19), 134.
- Aral, N., Baran, G., Bulut, Ş., & Çimen, S. (2000). *Eğitimde drama*. İstanbul: Ya-Pa.
- Bilgili, B., & Özkul, E., (2019). Industry 4.0 Tourism 4.0 and Human Factor : Voice of Customer. *The European Proceedings of Social Behavioural Sciences*, 655-667.

Carayannis, E.G., Draper, J. ve Bhaneja, B. (2021), “Towards Fusion Energy in the Industry 5.0 and Society 5.0 Context: Call for a Global Commission for Urgent Action on Fusion Energy” , *Journal of the Knowledge Economy* , 12.4, 1891-1904.

Çark, Ö. (2020). “Dijital Dönüşümün İşgücü ve Meslekler Üzerindeki Etkileri”. *International Journal Entrepreneurship and Management Inquiries Dergisi*, 4 (1), 19-34.

Chang, V., Xu, Y.K., Zhang, J., Xu, Q. (2021), “Research on Intelligent Manufacturing Development Approach for China’ s Local Valve Industry” , *Smart and Sustainable Built Environment*, 10(2), 293-321.

Dombrowski, U. ve Wagner, T. (2014), “Mental Strain as Field of Action in the 4th Industrial Revolution” , *Procedia Cirp*, 17, 100-105.

Eğilmez, M. (2018). *Değişim sürecinde Türkiye* (Cilt 1). İstanbul: Remzi Kitabevi.

Erözkan, A.(2007). Eğitim Psikolojisi, Editörler: Ersanlı, K., Uzman, E., Lisans Yayıncılık, 1. Baskı, İstanbul.

Helander, M. (2006). *A Guide to human factors and ergonomics*. New York: Taylor & Francis Group.

Işık, Ş., & Topkaya, Ö. (2022). Dijitalleşme ve emek piyasasında istihdam hizmetlerinin uyum süreci üzerine bir analiz: İşkur örneği. *Bilge İktisadi ve İdari Bilimler Fakültesi Dergisi*, 3(3):126-139.

Kagermann, H., Helbig, J., Hellinger, A. ve Wahlster, W. (2013), *Recommendations for Implementing the Sstrategic Initiative INDUSTRIE 4.0: Securing the Future of German Manufacturing Industry; Final Report of the Industrie 4.0 Working Group*, Forschungsunion.

Karabegović, I. (2017), The Role of Industrial and Service Robots in Fourth Industrial Revolution with Focus on China, *Journal of Engineering and Architecture*, 5(2), 110-117.

Kinzel, H. (2016). Industry 4.0 – where does this leave the human factor?, *27th Annual Conference of Human Dignity and Humiliation Studies 'Cities at Risk - From Humiliation to Dignity*, 19-23 September, Dubrovnik, Croatia. Retrieved from https://www.researchgate.net/publication/308614137_Industry_40_-_Where_does_this_leave_the_Human_Factor.

Murat, G. ve Aykaç, M. (2020), Covid-19 ve Emek Piyasaları: Etkiler ve Muhtemel Yönelişler, *Trakya Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(1), 91-122.

Öcal, F. M. ve Altıntaş, K. (2018). Dördüncü sanayi devriminin emek piyasaları üzerindeki olası etkilerinin incelenmesi ve çözüm önerileri. *OPUS–Uluslararası Toplum Araştırmaları Dergisi*, 8(15), 2066-2092. DOI: 10.26466/opus.439952.

Pereira, A.G, Lima, T.M, ve Charrua-Santos, F. (2020), “Industry 4.0 and Society 5.0: Opportunities and Threats”, *International Journal of Recent Technology and Engineering*, 8(5), 3305-3308.

Petropoulos, G. (2018), “The Impact of Artificial Intelligence on Employment” , Max Neufeind, Jacqueline O Reilly ve Florian Ranft (ed.), in *Praise for Work in the Digital Age Challenges of the Fourth Industrial Revolution*, 119-132.

Senemoğlu, N. (2018). *Gelişim, Öğrenme ve Öğretim*. Ankara: Anı Yayıncılık.

Spencer, D., Cole, M., Joyce, S., Whittaker, X. ve Stuart, M (2021), European Parliament, European Parliamentary Research Service, & Scientific Foresight Unit, Digital Automation and the Future of Work, EPRS | European Parliamentary Research Service,

[http://www.europarl.europa.eu/RegData/etudes/STUD/2021/656311/EPRS_STU\(2021\)656311_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2021/656311/EPRS_STU(2021)656311_EN.pdf)

Srivastava, S.K. (2015). Industry 4.0, Invited Paper for Souvenir, BHU Engineer’s Alumni, Lucknow, November(15): 23-24.

Timpe, K. P., H. Kolrep und T. Jürgensohn (2002). Mensch-Maschine-Systemtechnik – Konzepte, Modellierung, Gestaltung, Evaluation. Symposium Publishing GmbH, Düsseldorf

Trawick-Swith, J. (2013). *Erken çocukluk döneminde gelişim*. Akman,B. (Çev.ED.) Ankara: Nobel.

World Economic Forum. (2018). *Eight futures of work*. Cenevre. http://www3.weforum.org/docs/WEF_FOW_Eight_Futures.pdf

Yağmur, A., Gürsoy, S., & Durmaz, Ş. (2022). Dijitalleşme sürecinde istihdam olgusunun çok boyutlu analizi. Bibliyometrik ve içerik analizi. *Maliye Dergisi*, Temmuz-Aralık (183): 172-195.

The Importance of Individual Differences in Language Learning

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Abstract

Introduction: The importance of individual differences in learning process has long been known. Extensive experimental studies initiated by scientists and carried out to the present day have increased our knowledge of individual differences and their importance in language teaching and learning and have shown that their existence and importance are a matter of general acceptance.

Aim: In the study, we aimed to determine the importance of individual differences in language learning through literature review.

Method: We preferred Literature Review as the method of the study. Since Literature Review is one of the most fundamental elements in all scientific research, an effective literature review should reveal the rationale of the research, the problem status, and the importance of the research. Thus, a comprehensive literature review provides the opportunity to justify the originality of the research and the important gaps it will fill in the literature based on evidence.

Findings: Literature review of individual differences in language learning suggest that personal factors, student attitudes towards teachers and teaching materials, learning techniques, age, intelligence and dexterity and cognitive-style are very important in language learning.

Conclusion: In the arrangement of instructions for learning a second language, it should be considered a necessity as an effort to examine each difference possessed by each individual. The uniqueness that exists in each individual will differentiate the way of thinking, feeling, and acting.

Originality and value: We believe that the structure of the study we conducted through literature review is reasonably reliable and accurate.

Key Words: Language learning, Individual differences, Life-long learning, Educational management

1. INTRODUCTION

There are many variables that create differences in the learning process. The learning environment, the teacher's knowledge and skills, the curriculum followed, and the materials used can be listed as some of them. One of the most important of these variables, perhaps the most important, is the learner's contribution to the process. At this point, many parameters such as who the learner is, what kind of learning needs he/she has, learning styles, motivation, strategies used while learning, and personality traits are the main factors that cause academic success differences among learners, and it is of great importance for teachers who plan and organize the learning process most closely

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and control learning outcomes to be aware of these strong individual differences and to be able to use them in favor of the learner in a way that will develop the student's learning potential.

Learners have different ways to adapt and understand instructions especially in language learning. Each individual can be classified or composed of cognitive and affective and conative, where cognitive abilities such as intelligence, language learning talent, or memory capacity or speed, differ from affective abilities such as fear, motivation, and emotion of one individual (Robinson 2002) .

Snow (1987) states that research can be seen from the interaction or relationship of these two aspects in human beings and also in the context of learning where natural individual understanding of an instruction can be identified properly. In the setting of instruction on second language learning it can be considered a necessity as an effort to examine any differences that are owned by each individual. The uniqueness that exists in each individual will distinguish the way of thinking, feeling, and acting. No individual is the same as another individual, even identical twins.

2. INDIVIDUAL DIFFERENCES

Every individual has different characteristics. Differences are generally caused by two factors, namely innate factors and environmental factors. Innate factors are biological factors that are passed down through genetic inheritance by parents. Environmental factors that cause individual differences are avoided, because there is almost nothing in common that humans have except the differences themselves. The extent to which different individuals will manifest the quality of their differences or a combination of various elements of these differences. Every person, whether he is a child or an adult, and whether he is in a group or alone, he is called an individual. Individuals show a person's position as an individual. Individual traits are those related to individuals. The characteristics and traits of one person are different from those of another. This difference is called individual differences. So the "difference" in "individual differences" concerns the variations that occur, both variations in physical and psychological aspects. In the educational environment, quite a lot of individual differences in students are found, all of which are characteristics of the student's personality as an individual. Seeing the personality of students includes physical, religious, intellectual, social, ethical, and aesthetic aspects.

Individual differences between students are something that cannot be avoided, because there is almost nothing in common that humans have except the differences themselves. The extent to which different individuals will manifest the quality of their differences or combinations of various elements of these differences. , Every person, whether he is a child or an adult, and whether he is in a group or alone, he is called an individual. Individuals show a person's position as an individual. The characteristics and traits of one person are different from another. This difference is called individual differences.

Individual differences in second language learning can be seen from various scopes, such as intelligence, personality, and so on. The characteristics of second language learners include age, intelligence, personality, emotions, learner's attitude, motivation, and talent. Below is an explanation of the distribution of these characteristics.

2.1. Age

The difference in the age of second language learners will also differentiate the process of learning the second language. Brown (2000) divides the ages of second or foreign language learners into three age groups, namely children, adolescents and adults. He stated that the difference between children and adults is the period of puberty, while he categorizes the youth group as a transitional period from childhood to adulthood.

2.1.1. Children

In relation to learning a foreign language, there is an interesting debate about at what age one should learn a foreign language in order to achieve optimal results. Many argue that children are the right period because there is a critical period during childhood (Kayalar, 2023). Teachers need to pay attention that children at the age of 11 years are still in a developmental phase, which is called the concrete operation period, so rules, explanations, and other talks regarding abstract language must be given very carefully. Children are very context-centered here and now, namely paying attention to the functional purpose of language. They are not like adults who are very concerned about correctness, and they are also not yet able to understand the metalanguage used by adults in describing and explaining linguistic concepts. Children are indeed innovative in language learning, but they still encounter obstacles in the process. Compared to adults, children are usually more sensitive to their peers. This is because their ego is still being formed, so certain ways of delivering can be interpreted negatively. The task of a teacher is to help students overcome these obstacles, for example by being patient and supportive in building student self-esteem, and as much as possible to explore oral participation from students, especially students who are quiet.

2.1.2. Teenager

Adolescence is a transitional age from childhood to adulthood. At the age of 12 years, intellectual capacity is also enriched with operational thinking skills, so that complex problems can be solved with logical thinking, so theoretically, metalanguage linguistic material can be given. Attention span increases as a result of intellectual maturity, but with many diversions in adolescent life, this range can easily decrease again. A variety of sensory inputs is still important, but increasing abstraction abilities diminish the natural essence of the five senses. Factors such as ego, self-image, and self-esteem, are at the top. Adolescents become very sensitive to other people's perspectives regarding their changes both physically and emotionally, so a teacher must be able to maintain their self-esteem including avoiding embarrassing students, appreciating the talents and strengths of each student, tolerating mistakes and faults, reducing competition between

classmates, and encourage cooperation in small groups. Middle-grade students are certainly more adult-like in their ability to transform state diversions from the here and now into a communicative context in discussing grammar rules or applying vocabulary.

2.1.3. Mature

Adults are better able to deal with rules and abstract concepts. However, too many abstract generalizations regarding usage, as well as a lack of real language can also be a turn off for adults. Adults have a higher attention span even when they are dealing with things they are not intrinsically comfortable. However, efforts to keep class activities fun should also be carried out when teaching adults. Sensory input in adults does not always have to be diverse, however, one of the secrets of living adult classes is their appeal to multiple senses.

Brown (2008) stated that the acquisition of a child's first language cannot be compared to the acquisition of a second language in adults. In this scope,

- For the first and second language acquisition in children (A1 and A2), the age factor is constant, people change language variables. However, it is important to remember that 2-year-olds and 11-year-olds display enormous cognitive, affective, and physical differences.
- For the second language acquisition in children and adults (A2, D2), the second language factor is constant, this comparison is the most productive in language teaching.
- The acquisition of the first language in children and the acquisition of the second language in adults (A1, D2) are things that have big differences between the cognitive, affective, and physical children and adults.

These three age groups certainly have different levels of acquisition, especially in learning a second or foreign language. In acquiring a second or foreign language, children excel in mastering pronunciation and intonation. This is because at that age they have much spontaneity and are not afraid to make mistakes. On the other hand, adults tend to pronounce and choose words carefully to avoid mistakes.

2.2. Intelligence

Intelligence or level of intelligence is a basic ability possessed by humans. There is an assumption that children with high intelligence must be more successful in acquiring their second language. This assumption seems inappropriate, because according to Gardner (1983) a person's intelligence or IQ is divided into several divisions. The division includes language; thinking logically and mathematically; spatial (the ability to find one's way in an environment, the ability to form a thick image of reality and can quickly be transformed); musical (the ability to pronounce and the ability to receive certain tones and rhythmic patterns); bodily-kinaesthetic (skill in athletics, dance); interpersonal (ability to understand others, how to be considerate); intrapersonal (the ability to introspect, see oneself, develop what is called a sense of identity).

In relation to the ability to acquire a second language, Gardner's classification is very helpful. A person's linguistic potential can at least be observed from his linguistic intelligence as his main input. Carroll (1993) developed a theory about four abilities that influence second language learning intelligence. The four abilities include (1) *Phonetic Coding Ability*, which relates to the ability to analyse sound differences, connect a symbol with a certain sound, and master this relationship, (2) *Grammatical Sensitivity*, which is the ability to understand the grammatical functions of language elements such as words and phrases in a sentence without training or learning, (3) *Rote Learning Ability*, which is the ability to learn the relationship between words in a foreign language and their meaning, (4) *Inductive Learning Ability*, which is the ability to induce or prove certain rules or formulas in the grammatical structure of a language.

Language intelligence can be said to include a person's ability to use language and words which are innate both orally and in writing. Each individual has a language intelligence capacity that is different from other individuals so that it will result in different second language acquisition results. This is also related to the opinion of Gardner who classifies human intelligence into 7 types, namely musical intelligence, kinesthetic body, spatial mathematical logic, interpersonal, and intrapersonal. Gardner added that the composition of the seven intelligences is very different in one individual. The most prominent intelligence will dominate other intelligences in solving a problem.

2.3. Talent

Although the terms talent and intelligence are often used interchangeably, talent is only one aspect of intelligence. Talent is a condition or set of characteristics that are considered to be a manifestation of an individual's ability to acquire through practice some knowledge, skill, or set of responses, such as language skills, musical abilities, etc. There are two distinct parts to human personality, both physical and mental, as conditions that change a person toward perfection. For an individual who learn foreign language, language skill, language intelligence or language talent are of great importance. One's talent will be very helpful in success in the field he likes. However, even without talent someone is able to succeed in achieving what is expected in a particular field, as long as that person has a high interest in that field. People who have an interest in learning a second language but don't have talent, the ability to acquire a second language can of course be the same as someone who has talent, it's just that they have to study harder to learn the language.

2.4. Personality

Personality is a determining factor in the results of learning a second language, because different personalities have different learning outcomes. In general, people assume that people who have an open personality will be faster in acquiring their second language. A person's personality is divided into two types, namely people with closed personalities (introverts) and people with open personalities (extroverts).

Introvert means that his personality is more influenced by the subjective world, his orientation is inward. People who have introverted personality are easier to manage and educate, more self-discipline to study well, prefer to do detailed tasks, have the ability to concentrate, and work with things rather than people, and tend to be alone in their room or only have one or two friends.

Extrovert means a personality that is more influenced by the objective world, its orientation is mainly directed to the outside. Thoughts, feelings, and actions are more determined by the environment. Extrovert individuals usually do a better job when it comes to other people, are lack of self-discipline, more popular in school and they are usually voted on as leaders.

Compared to introverted learners, learners with extroverted personalities will acquire more of their second language because they socialize and interact more.

2.5. Attitude

Every second language learner has a different attitude towards the second language he learns. There are students who have a positive attitude towards a language, there are also those who have a negative attitude. Learner attitude is a common approach used in language learning. Usually, students will use the same method as when studying other fields. Some researchers argue that the method of learning a second language can also be used in the same way. The four main methods used in second language learning are: (1) *analytical vs global*; (2) *audio, visual vs kinesthetic*, (3) *intuitive or random vs concrete or sequential learning*, and (4) *closed vs open orientation*.

2.6. Motivation

Motivation is defined as the effort made by the learner in learning a second language as a desire to learn it (Ellis, 1994). Gardner (1985) when defining motivation according to the context of second language learning states it as the stage in which a person works and tries to learn the language because of his own will. According to Gardner and MacIntyre (1993), motivation consists of three components: 'the desire to achieve the goal, the effort to achieve the goal, and the satisfaction of completing the task'. Motivation is considered a key to success in language learning (Gardner, 1985; Dornyei, 1990; Nunan, 1999). Highly motivated students use more practice strategies by paying attention to language relationships structurally such as analyzing language, comparing first and second languages, and seeing language patterns, while average learners are less interested in memorization, effort, and structured language acquisition.

Psychological differences in students include differences in interest, motivation, and personality. These three psychological factors are positively correlated with the learning outcomes achieved. In conditions of great interest in the lesson, high motivation to learn, and maximum memory capacity, the learning outcomes achieved will also be maximized. These psychological differences can be utilized by teachers in classroom management, especially in placing children in seats and grouping. Children who have

low interest and motivation should be put into groups of children who have high interest and motivation so that children who are less motivated become more motivated.

In relation to the acquisition of a second language, Finegan (2004) divides the motivation for learning a second language, namely integrative and instrumental motivation.

3. CONCLUSION

Each learner has a different way of adapting and understanding instructions, especially in language learning. As we know that each individual has their own uniqueness. The uniqueness that exists in each individual will distinguish the way of thinking, feeling, and acting. No individual is the same as another individual, even identical twins. Basically, the uniqueness of an individual refers to differences. Each of these differences makes the individual achieve different results. In learning, especially language learning, each individual has their own way to achieve maximum results.

In an effort to learn a foreign language, at least someone must try hard to master it, which includes elements of new culture, new ways of thinking, and new ways of acting. For that, it is necessary to have the right way to teach foreign languages. Language teaching is a task or job in which intelligence, imagination, language knowledge training and experience as well as a number of other knowledge are components that play a very important role and even have a very high value.

REFERENCES

- Brown, D. H. (1993). *Prinsip Pembelajaran dan Pengajaran Bahasa*. Pearson Education Inc. Carroll, New York.
- Brown, D. H. (2000). *Principles of Language Learning and Teaching*. Longman, New York.
- Dornyei, Z. (1990). Conceptualizing Motivation in Foreign Language Learning. *Language Learning*, 40, 45-78.
- Ellis, R. (1994). *The Study of Second Language Acquisition*. Oxford University Press, Oxford.
- Finegan, E. (2004). *Language In the USA: Themes for the Twenty-First Century*. Cambridge: Cambridge University Press.
- Gardner, H. (1983). *Frames of Mind: The theory of multiple intelligences*. Basic Books, New York
- Gardner, R. (1985). *Social psychology and second language learning. The role of attitudes and motivation*. London
- Kayalar, F. (2023). *Individual Differences in Second and Foreign Language Learning*. Proceedings of IAC 2023 in Vienna.
- MacIntyre, P. (1992). A student's contributions to second language learning. Part I: Cognitive variables. *Language Teaching* 25(04)

- Nunan, D. (1999). *Second Language Teaching and Learning*. Heinle&Heinle Publishers, Boston
- Robinson, P. (2002). *Individual Differences and Instructed Language Learning*. John Benjamins Publishing Company Snow, Amsterdam.

Impact of Government Consumption on Economic Growth

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Abstract

Introduction: This paper investigates the factors influencing GDP growth in Western Balkans countries including Albania, Bosnia Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia, particularly focusing on how various fiscal variables affect economic growth.

Aim: The aim of this paper is to analyze and quantify the impact of various fiscal and macroeconomic variables—such as government consumption, gross national expenditure, current account balance, debt servicing, and military expenditure—on GDP growth.

Method: By using OLS, fixed-effects and random effects regression model, the paper seeks to identify which factors play a statistically significant role in promoting economic growth and to assess the relative importance of government spending in shaping growth results. Data are gathered from World Bank data.

Findings: Using OLS, fixed-effects and random-effects regression approach, this research evaluates how various key factors, including government expenditure, gross national spending, the current account balance, debt servicing, and military spending, influence GDP growth. The analysis finds that an increase in government consumption is significantly associated with a reduction in GDP growth. On the other hand, factors like gross national expenditure, the current account balance, debt service, and military expenditure do not show statistically significant effects on growth in this study.

Conclusion: The study finds that higher government consumption has a negative effect on GDP growth, highlighting the importance of controlling such spending to encourage economic expansion. Other factors like gross national expenditure, current account balance, debt servicing, and military spending show no significant influence on growth. Effective fiscal policies should focus on making government spending more useful. Additionally, how governments allocate funds—whether wisely and transparently—can significantly impact economic outcomes. Smart and democratic decision-making in spending is key to ensuring a positive contribution to growth.

Originality and value: The analysis suggests that it had decent credibility.

Key Words: Government consumption, Economic growth, Fiscal policy, National defense

Jel Codes: O47, E62, H50

1. INTRODUCTION

This study explores the factors driving GDP growth in the Western Balkans from 2008 to 2023, concentrating on countries like Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia. It examines how fiscal variables, such as government spending, gross national expenditure, current account balance, debt servicing, and military expenditure, impact economic growth. Research by Afonso and

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Furceri (2010) shows the importance of fiscal policies in shaping growth, particularly the role of government consumption. Barro's (1991) analysis also highlights that government consumption may negatively impact economic performance, but growth is insignificantly related to the share of public investment.

Additionally in a study analyzing the impact of government size on economic growth in the Western Balkans from 2000 to 2017, Bajrami et al. (2022) found a complex relationship between these variables using econometric models such as fixed and random effects, OLS, and Hausman-Taylor IV. Their results indicate that a 1% increase in government size leads to a 0.29% rise in GDP per capita, while a 1% increase in government consumption is associated with a 0.69% decline in GDP per capita.

Qehaja et al. (2022) explore the relationship between government expenditure, economic growth, and tax revenue in six Western Balkan countries from 2000 to 2020. Their findings show a positive and statistically significant relationship between government spending and economic growth, indicating that increased government expenditure supports economic development in the region.

Additionally, studies by regional scholars such as Hadžić and Savanović (2021) who carried out a regression analysis to examine the effects of fiscal policies in Bosnia and Herzegovina. They modeled the impact of government expenditure on GDP growth over the next four years, predicting that a 10% annual increase in government spending would lead to a 31.9% rise in GDP

This paper aims to identify which fiscal factors have the most significant influence on GDP growth and evaluate how government spending can be managed effectively to promote growth.

Using OLS, fixed-effects, and random-effects regression models, the research assesses the relationship between various fiscal factors and GDP growth. The results show that increased government consumption is associated with slower economic growth, suggesting the need to carefully manage public spending. Other variables, such as gross national expenditure, current account balance, debt servicing, and military expenditure, do not have statistically significant impacts. This is consistent with findings by Gemmel et al. (2016), who noted that while productive government expenditure tends to drive growth, consumption-based spending may hinder it. Gemmel et al. (2016) also show that reallocating government spending on defense does not lead to positive long-term economic growth. In fact, shifting resources from productive areas like education and infrastructure to defense fails to produce beneficial output and may even deter growth. Moreover, Voka and Ruxho (2022) examine the impact of public investments on Albania's economic growth. Their findings highlight a strong positive correlation between public investment, particularly fixed capital formation, and economic growth. Though, when it comes to government consumption expenditures, the study identifies an inverse relationship, suggesting that higher government consumption may have a negative effect on economic growth.

In conclusion, this study highlights the importance of effective fiscal management, especially regarding government consumption, to promote economic growth in the

Western Balkans. The way public funds are allocated and managed is crucial to the region's economic health during the period analyzed.

2. LITERATURE REVIEW

Research consistently shows that government spending, particularly consumption-driven expenditures, has a complicated relationship with economic growth. When government consumption is excessive, it tends to slow growth, while investments in productive areas like infrastructure, education, and healthcare are more likely to boost economic performance. This pattern can be seen in both global studies (Barro, 1991; Kneller et al., 1999; Afonso & Furceri, 2010) and studies specific to the Western Balkans (Bajrami et al., 2022; Qehaja et al., 2022; Voka & Ruxho, 2022).

In transitioning economies such as those in the Western Balkans, the role of government spending becomes particularly important due to ongoing structural changes. Asimakopoulos and Karavias (2016) highlight that in economies shifting from state-controlled systems to market-based ones, the efficiency with which public resources are managed can either support or hinder growth.

Tenhofen, Wolff, and Heppke-Falk (2009) find that while government spending temporarily boosts output and consumption in Germany, the effects fade within three years. Public investments, particularly in infrastructure, have lasting positive effects, but other expenditures, like public employee compensation, are less impactful. Direct taxes significantly reduce output, while indirect taxes have minimal influence. Overall, only public investments show sustained benefits for economic growth.

Rexha et al. (2020) investigates the effects of fiscal policy on economic growth in Kosovo following its independence. Their findings reveal a strong and significant positive relationship between public spending and economic growth. However, while there is also a positive association between public revenue and growth, this link is not statistically significant.

Reinhart and Rogoff's (2010) global analysis found that once public debt exceeds a certain level, it significantly restricts economic growth. Also they found that relationship between public debt and growth is similar across emerging markets and advanced economies. This is not the case for inflation.

The composition of public expenditure is also a key area of research. Gemmill, Kneller, and Sanz (2016) found that government spending focused on education, healthcare, and infrastructure tends to positively influence long-term economic growth, while general consumption-based spending either has no effect or a negative one.

Shijaku and Gjokuta (2013), in their study on Albania, found that government revenue growth has a stronger positive impact on economic growth compared to government expenditure. Also they examined the influence of public debt on growth, concluding that higher levels of public debt are negatively correlated with the country's growth rate.

Another important theme in fiscal policy research is the relationship between the quality of institutions and the effectiveness of government spending. Rodrik (2000) stressed that good governance is essential in ensuring that fiscal policies lead to positive outcomes, particularly in developing economies.

3. RESEARCH METHODOLOGY

In this section, we develop an econometric model to examine how government spending, gross national expenditure, the current account balance, debt servicing, and military spending influence GDP growth in the Western Balkans, focusing on Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia. To explore these relationships, we apply pooled Ordinary Least Squares (OLS), fixed-effects, and random-effects approaches.

The empirical model we use is structured as follows:

$$y_{it} = c + \beta_1(\text{GDPgrowth}) + \beta_2(\text{GovernmentExp}) + \beta_3(\text{GrossNationalSpend}) + \beta_4(\text{CurrentAcc}) + \beta_5(\text{Debt}) + \beta_6(\text{Military}) + u_{it}$$

The model in this study looks at how key macroeconomic factors affect GDP growth in the Western Balkans, focusing on government spending, national expenditure, military spending, the current account balance, and debt service.

General government final consumption expenditure (% of GDP): This reflects all government spending on goods and services, including employee salaries and defense, but excludes military investments in capital. It's a common measure used to assess how government spending directly impacts economic growth.

Gross national expenditure (% of GDP): This combines household spending, government consumption, and investments, providing a broad view of domestic economic activity. It helps analyze how overall spending relates to GDP growth.

Military expenditure (% of GDP): This includes all defense-related costs such as personnel, operations, and procurement. Military spending can influence growth in different ways depending on the economic context, sometimes driving development and other times straining resources.

Current account balance (% of GDP): This metric sums up the net flow of goods, services, income, and transfers into and out of a country. A surplus suggests a country is lending more than it is borrowing, while a deficit may highlight economic vulnerabilities.

Total debt service (% of GNI): This indicates how much of a country's income is being used to repay debts. High debt service can limit investment in productive areas, slowing down economic growth.

The study uses econometric methods like OLS, fixed-effects, and random-effects regression models to explore the relationships between these variables and GDP growth.

This approach helps in understanding how these different factors contribute to the economic performance of the Western Balkans.

3.1. Data Analysis

3.1.1. Summary statistics

The table below provides an overview of key economic variables. On average, GDP growth is relatively modest at 2.75%. Montenegro experienced significant economic fluctuations, with GDP growth hitting a low of -15.3% in 2020, largely due to the impact of COVID-19 in certain countries. In 2021, growth recovered to a high of 13%, reflecting Montenegro's heavy dependence on tourism. Travel restrictions and supply chain disruptions during these two years contributed to the country's economic instability, which was the case also with other countries who all experienced negative growth in 2020. During the period covered in this study, Kosovo experienced the highest average growth rate, averaging 4.35% over the 16 years. The only exception was 2020, when growth was -5.34%, marking the country's only year of negative growth during that time. Government expenditure as a percentage of GDP averages around 16.5%, with Bosnia and Hercegovina remaining over 20% for majority of the years. Gross national expenditure quite high at 121% of GDP, with Kosovo average at 132% being the highest among the countries. Military spending is relatively low, averaging just 1.33% of GDP, knowing the history of the region this could be interesting to follow closely. Military spending in Serbia reaches 1.99% on average during the period, while the average of others if Serbia is excluded is 1.20%. The current account balance shows a negative trend, averaging -8.5%, indicating that most countries are running deficits. Finally, total debt service averages 9% of GNI, with substantial variation across countries, ranging from less than 1% to over 31%.

Table 1: Summary statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
GDP growth (annual %)	96	2.751532	3.614852	-15.30689	13.04346
General government consumption expenditure (% of GDP)	96	16.52739	3.936481	10.1252	23.46153
Gross national expenditure (% of GDP)	94	121.0545	9.059799	104.5041	153.3008

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Military expenditure (% of GDP)	90	1.328975	.4513075	.0163028	2.278999
Current account balance (% of GDP)	96	-8.509281	6.898979	-49.64724	.6722363
Total debt service (% of GNI)	90	9.004241	7.120432	.9744899	31.06252

In general, the data show significant economic diversity across the Western Balkans during the period taken into consideration for this study. While some countries, like Kosovo, have shown consistent growth, in periods countries have faced more evident economic instability, particularly due to external shocks like the COVID-19 pandemic. High government expenditure in certain countries, such as Bosnia and Herzegovina, and notable differences in military spending across the region reflect the unique economic priorities and challenges faced by each nation. This analysis highlights the varying economic trajectories within the region and underlines the importance of modified fiscal strategies to address growth opportunities.

3.1.2. Regression Analysis Results

In this section, we present the results gained from pooled Ordinary Least Squares (OLS), fixed effects, and random effects models. The dependent variable is GDP growth (annual %), which represents the annual percentage growth rate of GDP at market prices based on constant local currency. The independent variables include General government final consumption expenditure (% of GDP), Gross national expenditure (% of GDP), Military expenditure (% of GDP), Current account balance (% of GDP), and Total debt service (% of GNI).

Table 2. Regression result

Variables	OLS	Fixed effects	Random effects
General gov. consumption expenditure(%ofGDP)	-0.233795 s.e. 0.1144889 p 0.044**	-1.274593 s.e. 0.3591982 p 0.001***	-0.233795 s.e. 0.1144889 p 0.041**
Gross national expenditure (% of GDP)	-0.0148491 s.e. 0.0893924 p 0.868	0.1201592 s.e. 0.1511582 p 0.79	-0.0148491 s.e. 0.0893924 p 0.868
	-1.345191	0.2150566	-1.345191

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Military expenditure (% of GDP)	s.e. 1.409316 p 0.343	s.e. 2.184653 p 0.922	s.e. 1.409315 p 0.340
Current account balance (% of GDP)	-0.0356493 s.e. 0.1046931 p 0.734	0.0867524 s.e. 0.1733041 p 0.618	-0.0356493 s.e. 0.1046831 p 0.733
Total debt service (% of GNI)	0.0121777 s.e. 0.669862 p 0.856	-0.1043258 s.e. 0.1081269 p 0.338	0.012177 s.e. 0.669862 p 0.856

Notes: ***, **, and * indicate significance at the 1, 5 and 10 % levels, respectively.
Source: Author's calculation

The fixed effects model shows that government consumption expenditure has a significant negative impact on GDP growth, with a coefficient of -1.27 and a p-value of 0.001, indicating strong statistical significance. This means that for every 1% increase in government consumption as a share of GDP, GDP growth decreases by approximately 1.27%. This result suggests that higher levels of government spending, particularly on consumption, may be inefficient or crowd out more productive private investments, potentially slowing down economic growth. Our findings align with those of Nguyen and Bui (2022), who demonstrated that both government expenditure and corruption control have a negative effect on economic growth.

On the other hand, the fixed effects model estimates a positive coefficient of 0.12 for gross national expenditure, though the p-value (0.79) shows that this result is not statistically significant. This implies that while gross national expenditure does not have a significant impact on GDP growth in this model and for the period taken under consideration for this study, its positive coefficient suggests a possible but weak association with economic performance.

Military expenditure shows a positive coefficient (0.21) in the fixed effects model, but again, the result is not statistically significant ($p = 0.922$). This indicates that military spending in the region has no clear or strong effect on GDP growth, which may reflect the relatively low levels of military spending.

The coefficient for the current account balance is positive (0.087), suggesting a potential positive relationship with GDP growth. However, this result is not statistically significant ($p = 0.618$), indicating that changes in the current account balance do not have a reliable impact on GDP growth in this context.

Total debt service has a negative coefficient (-0.104) in the fixed effects model, though the p-value (0.338) indicates that this result is not statistically significant. While the negative sign suggests that higher debt servicing may reduce GDP growth—likely due to the financial weight it places on a country's resources—the lack of significance suggests that this effect is not strongly felt across the countries and years under study.

Overall, the fixed effects model highlights the strong and statistically significant negative impact of government consumption expenditure on GDP growth, while other variables like military spending, current account balance, and debt service do not show significant effects. This underscores the importance of managing government spending efficiently, particularly avoiding excessive consumption, to foster economic growth.

4. CONCLUSION

The findings of this study present insights into the economies of the Western Balkans countries, namely mentioning the high importance of opportunities for growth and challenges stemming from government spending and other macroeconomic variables. Throughout the period analyzed, GDP growth has remained at moderate levels, averaging 2.75%. The region faced significant disruptions during the COVID-19 pandemic, particularly in countries like Montenegro, which saw extreme economic fluctuations due to its dependence on tourism. Kosovo, on the other hand, showed economic strength with an average growth rate of 4.35%, outperforming other countries in the region.

The analysis of government spending reveals important understandings. The fixed effects model demonstrates that government consumption expenditure has a substantial negative impact on GDP growth, with a coefficient of -1.27. This suggests that high levels of government spending on consumption may not be efficiently utilized, potentially packing out private investment and hindering economic growth.

Gross national expenditure, while showing a positive coefficient of 0.12, did not significantly influence GDP growth within the study period. This suggests that while overall spending remains high, especially in countries like Kosovo (averaging 132% of GDP), it does not translate into significant economic performance improvements.

Military spending, though generally low in the region, showed no significant effect on GDP growth, aligning with the findings of Kovačević and Smiljanić (2017) on the economic impact of defense spending in Croatia. The lack of a significant relationship may indicate that military expenditure, while necessary, does not drive growth in the Western Balkans and remains a relatively minimal segment of GDP for most countries.

The current account balance and total debt service also did not show significant effects on GDP growth. While the current account balance has a slightly positive coefficient, the impact is weak, suggesting that the region's constant current account deficits have not played a major role in shaping growth patterns. Equally, total debt service, despite showing a negative association with GDP growth, lacks the statistical significance to confirm a strong relationship.

In summary, the study point out the need for efficient fiscal management in the Western Balkans. Governments must prioritize investment in productive areas, rather than excessive consumption, to enhance long-term economic growth. Fitted fiscal strategies that address inefficiencies in public spending, while maintaining sustainable levels of debt and external balances, are critical for future economic stability and development in the region.

REFERENCES

- Afonso, A., & Furceri, D. (2010). Government Size, Composition, Volatility and Economic Growth.
- Asimakopoulou, S., & Karavias, Y. (2016). The Impact of Government Size on Economic Growth: A Threshold Analysis.
- Bajrami, R., Gashi, A., Ukshini, K., & Rexha, D. (2022). Impact of the Government Size on Economic Growth in the Western Balkan Countries.
- Barro, R. J. (1991). Economic Growth in a Cross Section of Countries.
- Gemmell, N., Kneller, R., & Sanz, I. (2016). Does the Composition of Government Expenditure Matter for Long-run GDP Levels?.
- Hadžić, F., & Savanović, N. (2021). Fiscal Policy in Bosnia and Herzegovina - An Instrument for Faster Growth or Economic Stagnation?.
- Kneller, R., Bleaney, M. F., & Gemmell, N. (1999). Fiscal Policy and Growth: Evidence from OECD Countries.
- Kovačević, T., & Smiljanić, D. (2017). Causality Analysis Between GDP, Defence Expenditure, and the Number of Armed Forces Personnel: The Case of Croatia.
- Nguyen, M.-L. T., & Bui, N. T. (2022). Government Expenditure and Economic Growth: Does the Role of Corruption Control Matter?.
- Qehaja, D., Gara, A., & Qorraj, G. (2022). Allocation of Government Expenditures in Sectors and Their Impact on Economic Growth - Case Study: Western Balkan Countries.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a Time of Debt.
- Rexha, D. Sh., Bexheti, A., & Ukshini, K. (2020). Impact of the Fiscal Policy on Economic Growth: An Analytical Approach from the Republic of Kosovo.
- Rodrik, D. (2000). Institutions for High-Quality Growth: What They Are and How to Acquire Them. *Studies in Comparative International Development*, 35(3), 3-31.
- Shijaku, G., & Gjokuta, A. (2013). Fiscal Policy and Economic Growth: The Case of Albania.
- Tenhofen, J., Wolff, G. B., & Heppke-Falk, K. H. (2009). The Macroeconomic Effects of Exogenous Fiscal Policy Shocks in Germany: A Disaggregated SVAR Analysis.
- Voka, I., & Ruxho, F. (2022). The Impact of Public Investments on the Economic Growth of Albania.

A Comparative Linguistic and Cultural Study of Idiomatic Translation Between English and Albanian

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Abstract

Introduction: This research paper presents a comparative linguistic and cultural analysis of idiomatic translation between English and Albanian, focusing on the challenges idiomatic expressions pose during translation. Due to their figurative meanings and cultural specificity, idioms often resist direct translation, making them a complex area of study in translation.

Aim: The aim of this research is to explore the degree of equivalence between idiomatic expressions in English and Albanian, and to identify strategies translators use to navigate these challenges. The study highlights the difficulties of translating culturally bound idioms while retaining both meaning and cultural significance.

Findings: The analysis reveals that while some idioms show full equivalence between the two languages, many require creative strategies such as paraphrasing, cultural substitution, or omission to retain their meaning. The study also shows that idioms often reflect deep cultural contexts, making translation a cultural as well as linguistic challenge.

Conclusion: This research demonstrates that idiomatic translation between English and Albanian is influenced by both linguistic and cultural factors. Successful translation requires flexible and context-sensitive strategies that consider the cultural values embedded in idiomatic expressions. This study adds new insights into idiom translation between English and Albanian, offering practical strategies for translators.

Originality and value: It emphasizes the importance of cultural awareness in translation and shows that idioms serve as cultural bridges between languages.

Key Words: idiom translation, contrastive analysis, English, Albanian, linguistic equivalence, cultural context

Jel Codes: I20, I21

1. INTRODUCTION

Idioms form a unique and complex aspect of language, defying ordinary grammatical and semantic rules. Their figurative nature makes them challenging to understand and even more difficult to translate, particularly when attempting to maintain the cultural and contextual nuances between two languages. This research paper focuses on the translation of idioms between English and Albanian, investigating the intricate linguistic challenges that arise during this process. The primary goal of this study is to explore how

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idioms function in both languages and to determine the degree of equivalence in their translation.

Idioms often pose significant difficulties in translation because they cannot be interpreted literally. They are deeply embedded in the culture and everyday speech of native speakers, carrying meanings that extend beyond the sum of their individual words. Consequently, translating idioms requires an in-depth understanding of both the source and target languages, as well as their respective cultural contexts. In this study, we employ contrastive analysis as our primary methodology to compare the idiomatic expressions in both English and Albanian. Contrastive analysis enables us to systematically explore the similarities and differences between the two languages, especially in relation to idioms, which are often culturally specific.

This paper seeks to answer key questions related to the translation of idioms. What makes idioms so challenging to translate? What strategies can be employed to overcome these challenges? How do English idioms find their Albanian equivalents, and to what extent can they be accurately translated without losing their meaning or cultural relevance? By addressing these questions, the study aims to contribute to the broader field of translation studies, offering insights into the complexities of idiom translation between English and Albanian.

The methodology adopted in this research is contrastive analysis. This approach is particularly suited for examining idiomatic expressions because it allows for a detailed comparison between the two languages in question—English and Albanian. Through contrastive analysis, we systematically analyze idioms in both languages to identify full equivalences, partial equivalences, and non-equivalences. By doing so, the study reveals not only the linguistic disparities but also the cultural and contextual nuances that influence idiom translation.

The idioms analyzed in this study are drawn from a variety of sources, including bilingual dictionaries, scholarly works, and corpus data. Each idiom is examined for its linguistic structure and meaning in the source language (English) and then compared to its potential counterpart in the target language (Albanian). Where direct equivalents exist, they are noted. In cases where no equivalent exists, translation strategies such as paraphrasing, substitution, or omission are discussed.

By using contrastive analysis as our framework, we aim to provide a comprehensive understanding of idiom translation between English and Albanian, highlighting the linguistic and cultural factors that shape this process.

1.1 Research questions

This study aims to prove how English idioms translation are present and can be applied in Albanian language as well. Some questions we will try to answer are:

1. What are idioms and why do they represent such challenges in translation?

2. What are the problematics of idiom translation in English and Albanian?
3. To what extent idioms cannot be translated and are there any undisputable and errorless strategies to help the translator fulfil such translation?

2. LITERATURE REVIEW

The study of idioms and their translation has long been a focus of linguistic and translation research, owing to the complexity and cultural specificity of these expressions. Idioms are generally defined as fixed expressions whose meanings cannot be inferred from the individual words that comprise them (Makkai, 1972). These multiword units often present unique challenges in translation because they are deeply embedded in the culture and history of the source language (Shojaei, 2010). This literature review outlines the key theoretical and empirical contributions to the field, focusing on idiomatic translation between English and Albanian. One of the foundational texts in idiom research is Makkai's (1972) "Idiom Structure in English," which highlights the unpredictability of idiomatic meanings based on their component parts. According to Makkai, idioms cannot be understood or translated by analyzing individual words but should instead be treated as fixed expressions that require cultural and contextual interpretation. Similarly, Moon (1998) in her work "Fixed Expressions and Idioms in English: A Corpus-Based Approach," emphasizes that idioms are a type of multiword expression that resists literal interpretation and often varies in their degree of fixedness. This idea is further supported by the definitions of idioms in various dictionaries. The "Dictionary of the Modern Albanian Language" (1980) describes idioms as expressions with a rigid structure that convey a single, non-literal meaning. The Oxford Dictionary's definition aligns with this, stating that idioms are groups of words with meanings that differ from the sum of their individual components (Sieftring, 2004). These definitions are pivotal in understanding the difficulties posed by idiomatic expressions in translation. Several scholars have discussed the challenges of translating idioms and proposed strategies to deal with them. Shojaei (2010) provides a comprehensive overview of these strategies, which include paraphrasing, cultural substitution, and omission. Paraphrasing is often used when no direct equivalent exists in the target language, while cultural substitution involves finding a culturally appropriate idiom in the target language. Omission, though less desirable, is sometimes necessary when the idiom is too culturally bound to be effectively translated.

Moon (1998) also suggests that translation strategies should be adapted according to the context and cultural underpinnings of the languages involved. She notes that idioms often reflect culturally specific experiences, making literal translation not only impractical but sometimes misleading. For example, English idioms related to maritime history, such as "to be at sea," do not have direct Albanian equivalents due to the differing cultural and geographical contexts. In such cases, translators may choose to use a culturally relevant metaphor in the target language to convey the same idea.

The concept of contrastive analysis, as applied to translation studies, provides a systematic method for comparing idioms across languages. This approach allows for the identification of full, partial, or non-equivalence between idioms in different languages (Qesku, 2000). In cases of full equivalence, such as the English idiom "to kill two birds with one stone" and the Albanian equivalent "me një gur vras dy zogj," the translation is straightforward. However, partial and non-equivalent idioms require more nuanced strategies. Stefanllari (1998) offers examples of partial equivalence between English and Albanian idioms. For instance, "as fit as a fiddle" in English translates to "si kokërr molle" in Albanian, which literally means "healthy as an apple." While the meanings align, the cultural references differ, illustrating how partial equivalence still requires adaptation to the target language's cultural norms. Non-equivalent idioms, where no corresponding expression exists in the target language, pose the greatest challenge. In these cases, the translator must use creative solutions such as paraphrasing or cultural substitution. As Siefiring (2004) and Qesku (2000) emphasize, understanding both the linguistic and cultural dimensions of idiomatic expressions is crucial for producing translations that resonate with the target audience.

Culture plays a significant role in shaping idiomatic expressions, as many idioms are reflections of the unique historical and social experiences of a language's speakers. Moon (1998) and Shojaei (2010) both argue that idioms are deeply embedded in the cultural practices of a society, which makes their translation more than a purely linguistic task. For example, idioms that originate from specific historical events or cultural traditions may have no direct equivalent in another language, requiring translators to use culturally appropriate alternatives or risk losing the idiom's meaning altogether. In this context, the translation of idioms between English and Albanian provides a particularly rich field of study. English, as a language with a long history of seafaring and international commerce, contains many idiomatic expressions tied to nautical experiences. In contrast, Albanian idioms often reflect agrarian or regional life, making the direct translation of some English idioms impossible. This cultural divergence is a recurring theme in the literature, with scholars such as Stefanllari (1998) and Qesku (2000) noting the importance of cultural awareness in successful idiom translation.

3. Descriptive Analysis

Dictionaries usually give various definitions that vary somewhat slightly from one to another. The idiom is designated by Dictionary of the Modern Albanian Language (1980) as:

'Expressions with a special construction, completely or partially rigid, used in a language for a long time with a single meaning (which does not come directly from the sum of the meanings of the constituent words) and which cannot be translated literally into another language'.

Back-translated in English as 'an expression having a special construction, fully or partially fixed, that is used conventionally and with a unique meaning in a language (not derived directly from the meaning of component words) and that cannot be translated

into another language word-for-word.' The online Oxford dictionaries give the following idiom definition: A group of words that differ in meaning from the meanings of individual words. Scholars who study translation in general and that of idioms in particular provide different definitions. Idioms would not exist if a theorist had planned natural language, write the two well-known scholars, Cacciari and Tabossi, in the forward section of their book. This means that most of this section's languages sound irrational and arbitrary. The idioms are considered by Makkai (1972) as 'multiword expressions whose meaning from their constituent parts is not predictable. This is true, because: First, more than two lexical parts are composed of idioms. For instance: 'By and by' (pas kaluar gjatë, pas pak, së shpejti) consists of: preposition (by), conjunction (and), preposition (and), preposition (by), The 'by heart' idiom (përmendësh) consists of: a preposition (by) and a noun (heart) 'To turn one's nose up' (ngrej, ose mbaj hundën përpjetë) consists of: verb (to turn), pronoun (one, my, his, her, etc), noun (nose), adverb (to turn), pronoun (one, my, his, her, etc), noun (nose) (up). Second, usually, predicting their meaning is almost always impossible because the component words often do not imply a relationship to the meaning of the separate words. The same can be said for smelling (which is a simple act of emitting or inhaling an odor), or for roses, which are usually symbolic of beauty. The component parts, when taken as a whole, give a completely different meaning implied by the three of them: 'emerge from a situation with an intact reputation', which in Albanian language equivalent of the word is: nuk do e kuptoj askush (as the Oxford Dictionary describes the idioms meaning).

Countries vary by culture, so when we compare two languages, we cannot always find similar idioms or expressions. For naval terms, the following examples concern:

1- 'Jam tym (lëmsh), e kam kokën (mendjen) tym, lëmsh, jam fare I hutuar' to be (all) at sea. – I'm all over the sea. I have no idea how cars should be repaired (Stefanllari, p, 100);

2- 'nga bashi në kiç, nga fundi në krye' from stem to stern (Qesku, p, 75);

3- 'ujk deti' old salt (Qesku, p, 745);

Idioms have been widely studied as a linguistic phenomenon by many scholars with the aim of defining, discovering the relevant linguistic and grammatical characteristics, and finding the best ways to deal with this difficult part of a language, particularly with its translation from and into other languages. Scholars who study translation in general and that of idioms in particular provide different definitions.

The idioms are considered by Makkai (1972) as 'multiword terminologies' whose implication is not expected from their factor components. This is true, because: First, more than two lexical parts are composed of idioms. For instance: 'By and by' (pas kaluar gjatë, pas pak, së shpejti) consists of: preposition (by), conjunction (and), preposition (and), preposition (by), The 'by heart' idiom (përmendësh) consists of: a preposition (by) and a noun (heart) 'To turn one's nose up' (ngrej, ose mbaj hundën përpjetë) consists of:

verb (to turn), pronoun (one, my, his, her, etc), noun (nose), adverb (to turn), pronoun (one, my, his, her, etc), noun (nose) (up). Idiom is defined by Moon (1998) as: An indefinite term used in disagreeing ways. In general use, has two major meanings for idiom. Firstly, an idiom can express something that can characterize a person or a group.

3.1 Use of Idioms and Context

Idioms are used in everyday language basis and in many fields of human activity, different realities represent idioms. Thus, many of them originate and have different components from different sources and realities. Idioms are phenomena based upon culture. English idioms relating to the sea or sailing, for instance, are more numerous than in Albanian. We know from history that English people have sailed a lot throughout the world, bringing many terms and expressions of sailing into the vocabulary.

The Cambridge International Dictionary of Idioms (1998) sets out the following idiom-use list labels:

Informal: Idioms that are used in relaxed situations with friends and family, or people you know. 'Be barking up the wrong tree', Cambridge Dictionary (1998); 'Be fed up/sick to the back teeth', Cambridge Dictionary (1998); 'So long', Cambridge Dictionary (1998); 'Get lost', Cambridge Dictionary (1998); 'Losing our marbles', Cambridge Dictionary (1998); 'Do a moonlight flit', Cambridge Dictionary of Idioms (1998); 'Eat like a pig', Cambridge Dictionary (1998).

Formal: idioms which are used in a serious or polite manner, e.g. in trade documents, in serious newspapers and in books, in lectures, in news programmes, Cambridge Dictionary (1998).

Very informal - idioms that are used, often between members of a specific social group, in a very informal or not very polite way Cambridge Dictionary (1998). Examples: 'On your bike!' Cambridge Dictionary (1998); 'Be out of your brain' Cambridge Dictionary (1998); 'Bore the arse off' Cambridge Dictionary (1998); 'Drop dead!' Cambridge Dictionary (1998).

Old-fashioned - idioms that are still used but that sound old-fashioned (1998). For instance: 'An apple a day keeps the doctor away', Cambridge Dictionary (1998); 'Be as busy as a bee' Cambridge Dictionary (1998); 'Go through fire and water' (1998).

Taboo – idioms which are considered that are likely to offend people in formal situations and are not used. 'Kiss/lick sb's arse, Cambridge Dictionary (1998); 'Go piss up a rope!' Examples: 'Be in deep/shit' Cambridge Dictionary (1998).

Humorous - idioms aimed at making people laugh Cambridge Dictionary (1998). Examples: 'Teaching one's grandmother to suck eggs' Cambridge Dictionary (1998); 'Let sleeping dogs lie' (1998); 'Be pushing up (the) daisies' Cambridge Dictionary (1998); 'Be in seventh heaven', Cambridge Dictionary (1998); 'Snail mail', Cambridge Dictionary (1998); 'Wear the pants' Cambridge Dictionary (1998).

Ambiguity - In understanding the meaning of idioms, sometimes context is important. This explains the real intent of the speaker, or whether the phrase should be understood literally or figuratively. Usually, it may be ambiguous when an idiom has a literal counterpart, and Moon (1998; 177), says that 'homonym or ambiguity is sometimes considered an essential criterion for the pure idiom conceptual class.' Let us imagine that we are in a situation in the kitchen.

(A) Enes is in big distress.

(B) What do you mean in big distress? Why?

(C) Enes tried to make a cake for his girlfriend and failed, he burned his fingers. The owner harshly rebuked him. We do not understand why, from what we hear, probably it is because he literally burned his fingers or suffered other consequences.

3.2 Classification of Idioms

How do they classify idioms? Moon (1998), claims that 'idiom denotes a general term' whether semantically impervious or not 'for many kinds of multiple expressions. Idioms distinguish between three types:

Pure Idioms: 'a form of multiword conventionalized, non-literal expression' pure idioms are always non-literal, but they may either be unchanging or have little variation. Moreover, idioms are said to be impervious (Shojaei; 2010). There are Semi-idioms, Literal idioms, Proverbs, slang idioms, allusions.

3.3 Contrastive analysis of Idioms

When comparing between languages, idioms can be fully equivalent, partially or no equivalent. The paper has listed more fully equivalent than other idioms

English: I went to the dentist, and asked him to fill the molar, and remove the wisdom tooth at the same time. Kill two birds with one stone (Learn English animal idioms).

Albanian: Shkova tek dentisti dhe i kërkoja të më mbushte dhëmballën dhe njëkohësisht të më hiqte dhëmbin e pjekurisë. Kështu, me një gur vrisja dy zogj. The idiom to kill two birds with one stone has similar meaning as the Albanian idiom has me një gur vras dy zogj (Qesku, p, 25). 'Apple of discord', which at the same time is a borrowed one from the Greek mythology (Siefiring, p, 45) and in Albanian the same borrowed form 'mollë sherri' (Qesku, p, 55) is used. Similar examples include: Be frightened to death (Siefiring, p, 46) = 'Jam i trembur për vdekje' (Stefanllari, p, 66); Go downhill (Siefiring, 47) = 'Shkon tatëpjetë' (Stefanllari, p. 39) ; Take your hat off to (Siefiring, p, 74) = 'Heq kapelen dikujt' (Stefanllari, p, 75); You reap what you sow (Siefiring, p, 47) = 'Ç'të mbjellësh do të korrësh' (Qesku, p, 56); Reap the benefits (fruits) of (Siefiring, p, 47) = 'Korr fitimet e' (Stefanllari, p, 76); Free rein (Siefiring, p, 57) = 'Frerët e lira' (Qesku), The die is cast = 'Zaret u hodhën/ç'u bë u b'ë (Stefanllari, p, 70);

The die is cast - an event has happened or a decision has been taken that cannot be changed. The English expression is as snug as a rag bug, and to express almost the same idea, the Albanian expression *si veshka mes dhjemit*, (Qesku, p, 101) (literally like the kidney wrapped in fat) uses various lexical components. - For example: In English, it is used to say that a person is quite healthy, as fit as a fiddle, while in Albanian the equivalent version would be '*si kokërr molle*' (lit. healthy as an apple) (Stefanllari; 1998). Again, there is a similar meaning to both idioms and various lexical components.

3.4 Business idioms

English – Albanian: 'Keep one's eye on the ball' (Sieftring, p, 41) – *Mos ja ndaj syte* (Stefanllari, p, 90), which has the meaning of "to give something one's full attention and not lose focus, 2 – 'Learn the ropes' (Sieftring, p, 45), meaning 'Learn the basics of something', – 'Long shot' (Sieftring, p, 46) 'Something that has a very little possibility of happening', 'No-brainer' (Sieftring, p, 44), Something that is really obvious or easy. 'Mind your own business' (Sieftring, p, 45), which in Albanian means '*Kqyri punet e tua ose mos i fut hundet ku nuk duhet*', (Qesku, p, 20), Easy come, easy go – *E fituar belesh* (Something gained easily is also lost easily), (Stefanllari, p, 96), 'Same boat', (Sieftring, 41) - *jemi ne te njejten mesele*, (Stefanllari, p, 86), (To be in the same difficult situation as someone else), (Qesku, p, 19), 'Upper hand' (Sieftring, p, 45) – *Dora fituse* (Stefanllari, p, 98), (To have more power than anyone else and so have control) 'Pulling his stings' – *E perdori si vegël*, 'when the dust settled' (Sieftring, p, 33) – *Pasi te qetesohet stuhia*, (Qesku, p, 22), 'it is like talking to a wall (Sieftring, p, 45) – *Foli zenes foli stenes*' (Stefanllari, p, 98), Eyes on the prize (Sieftring, p, 45)– *Mendo vetem per te fituar*, (Stefanllari, p, 66). This means that you should keep your focus on achieving a positive end result.

You are digging your own grave. (Sieftring, p, 41) = '*I hap varrin vetes*' (Qesku, p, 20); Dog eat dog. (Sieftring, p, 44) = *Ha njeriu njerinë* (Stefanllari, p, 98); Wet behind the ears (Sieftring, p, 51) = '*I ka buicherët me qumësht*' (Stefanllari, p, 98); into the fire outside the frying pan (Sieftring, p, 55) = '*Nga shiu në breshër*'. (Stefanllari; p, 98); in the seventh sky. (Sieftring, p, 25) = '*Zë qiellin me dorë*' (Qesku, p, 65); Take root. (Sieftring, p, 44) = *Hedh rrënjë* (Stefanllari, p, 50).

4. DISCUSSION

The translation of idioms between English and Albanian presents a rich field for linguistic analysis, particularly due to the unique cultural and linguistic features that idioms embody. The findings of this study reveal that while some idiomatic expressions share close equivalences across both languages, others pose significant translation challenges, requiring creative strategies to preserve meaning and context.

A key observation in this research is that idioms in English and Albanian often have fully equivalent counterparts. For example, the idiom "to kill two birds with one stone"

in English has a direct counterpart in Albanian, "me një gur vras dy zogj." This equivalence is rooted in shared metaphoric imagery and cultural experiences, allowing for an easy transfer of meaning between the two languages. Such full equivalence indicates that certain idiomatic expressions are universal, crossing linguistic boundaries with little or no modification.

However, not all idioms exhibit this level of congruence. In many cases, partial equivalence is found, where the general meaning of an idiom is preserved, but the cultural or linguistic components differ. For instance, the English idiom "as fit as a fiddle" translates to "si kokërr molle" in Albanian, meaning "healthy as an apple." While both idioms express the concept of good health, they rely on different metaphors—one referring to a musical instrument, the other to fruit. These instances of partial equivalence illustrate how idioms reflect cultural differences, even when they convey similar ideas.

One of the most significant challenges identified in this study is the lack of direct equivalents for certain idioms. English idioms, particularly those tied to specific cultural or historical references, often do not have ready-made counterparts in Albanian. For example, idioms relating to naval or nautical terms, such as "to be at sea" (meaning to be confused), have no Albanian equivalent due to the differing maritime histories of the two countries. In these cases, translators must rely on strategies such as paraphrasing or finding culturally appropriate substitutions that convey the intended meaning without losing the idiom's original flavor.

Moreover, some idioms carry cultural connotations that are difficult to translate. For example, the English idiom "to pull someone's leg" (to tease someone) may not resonate as strongly in Albanian, where teasing might be expressed through different metaphors. This requires translators to strike a balance between literal translation and cultural adaptation, ensuring that the idiom's meaning is effectively communicated to the target audience without distorting its original tone.

The analysis highlights the need for a range of strategies to address the complexities of idiom translation. Among these strategies, paraphrasing plays a crucial role, particularly when an idiom lacks an equivalent in the target language. Paraphrasing allows the translator to convey the underlying meaning of the idiom, even if the exact linguistic form cannot be replicated. While this approach can sometimes dilute the idiomatic expression's impact, it ensures that the core message is not lost.

Another common strategy is the use of substitutions, where a culturally appropriate idiom or expression in the target language is employed in place of the original idiom. This approach maintains the idiomatic nature of the expression while adapting it to fit the target culture. However, it requires a deep understanding of both languages and cultures, as the chosen substitute must align with the context and intent of the original idiom.

In some cases, omission is the most practical solution, particularly when the idiom in the source language is so deeply rooted in its cultural context that any attempt at translation would result in confusion or loss of meaning. While omission should be used

sparingly, it can be an effective way to avoid misunderstandings, particularly when the idiom does not contribute significantly to the overall message.

One of the most striking findings of this study is the influence of culture on idiomatic expressions. Idioms are not just linguistic units; they are cultural artifacts that encapsulate the values, experiences, and histories of the people who use them. For instance, many English idioms are tied to historical events, literary references, or cultural practices that may not have direct counterparts in Albanian. This cultural specificity poses challenges for translators, who must not only convey the literal meaning of the idiom but also its cultural resonance.

In contrast, some idioms are more universal in nature, reflecting common human experiences rather than specific cultural contexts. For example, idioms related to health, success, or failure often find parallels across languages, as they reflect shared aspects of human life. These universal idioms are generally easier to translate, as their meanings transcend cultural boundaries.

5. CONCLUSIONS

This study has undertaken a comprehensive contrastive analysis of idiomatic expressions between English and Albanian, shedding light on the inherent challenges that arise in translating these complex linguistic units. Idioms, characterized by their figurative meanings and cultural specificity, often resist direct translation, making them one of the most difficult aspects of cross-linguistic interpretation. The findings of this research underscore that while full equivalence between English and Albanian idioms can sometimes be achieved, it is far from universal. A key takeaway from this analysis is the variability of idiomatic equivalence. Some idioms, particularly those rooted in shared human experiences or universal concepts, exhibit direct equivalents between the two languages. In these cases, the idioms maintain both their figurative meaning and cultural resonance across linguistic boundaries. However, idiomatic expressions tied to specific cultural, historical, or geographical contexts present significant translation challenges. For these, translators must adopt creative strategies such as paraphrasing, cultural substitution, or in extreme cases, omission. These techniques are employed not only to preserve the original meaning but also to ensure that the idiom remains intelligible and impactful in the target language.

Moreover, this study highlights the critical role that culture plays in shaping idiomatic expressions. Idioms often encapsulate the unique experiences, values, and worldviews of a language's speakers, making them culturally bound phenomena. This cultural specificity can lead to significant disparities between languages, as seen in many of the English idioms that have no direct equivalent in Albanian. In such cases, achieving an accurate translation that captures the idiom's essence requires deep cultural insight and linguistic dexterity. The methodology of contrastive analysis employed in this study has proven effective in systematically identifying the degrees of equivalence and non-equivalence between idioms in English and Albanian. By focusing on both fully equivalent and culturally divergent idioms, this research contributes valuable insights to

the field of translation studies. The study underscores the importance of adopting flexible and context-sensitive approaches to idiom translation, recognizing that a one-size-fits-all solution is neither feasible nor desirable.

In conclusion, the translation of idiomatic expressions between English and Albanian exemplifies the broader challenges inherent in cross-linguistic translation. Idioms are not merely linguistic entities; they are carriers of cultural identity and meaning. Thus, the translator's task is not only to convey the literal meaning of an idiom but also to preserve its cultural and contextual richness. This study offers a significant contribution to the understanding of idiom translation and sets the stage for further research in this area. Future studies could expand on this work by exploring idiomatic translation across different language pairs or by examining how idioms evolve within bilingual or multilingual contexts. This ongoing inquiry is essential for advancing both the theory and practice of translation in our increasingly interconnected world. This paper was an attempt to address just a few of the issues we face during the study of idioms and, in particular, their translation. We aim to prove that it is possible to translate English idioms into Albanian. We have shown that idioms are peculiar modes of expression that do not usually comply with the rules of logic and grammar. The fact that English is a highly idiomatic language used in many fields and levels of linguistics is a well-known fact. Because idioms are regarded as fixed expressions of a kind. On the basis of the works of distinguished researchers, in particular, Moon and Siefring, who directly studied the translation of idioms and other researchers, translation mostly is metaphorical and should be translated as a whole or as a unit. As they are culturally based, they are often heard being used by the people in everyday conversations. Nonetheless, sometimes it is difficult for people themselves to define the meaning, to explain how or why people use them. Since idioms are well-thought-out to be fixed expressions of a kind, they allow little or no shape variation. As Moon (1998) suggests: the translation of idioms can be done, by a general term, by a more neutral and less dramatic word, by traditional replacement, by paraphrase, by omission, by illustration. Moon (1998), a publication of her first book, revises such strategies, thus confirming that the issue of idioms still continues, and in addition, the strategies are molded according to the languages under study. Nonetheless, this edition is a focus of further future research.

REFERENCES

- Cambridge Dictionary (1998), The Pitt Building, Trumpington Street, Cambridge, United Kingdom, Cambridge University Press
- Makkai A. (1972) *Idiom Structure in English*, The Hague Mouton,
- Moon, R. (1998) *Fixed Expressions and Idioms in English: A Corpus-Based Approach*. Oxford: Clarendon Press,
- Qesku, P. (2000), *Fjalor Anglisht - Shqip*, Tiranë, Botimet TOENA

- Shojaei, A. (2010), Translation of Idioms and Fixed Expressions: Strategies and Difficulties, *Theory and Practice in Language Studies*, Vol. 2, No. 6, pp. 1220-1229, June, 2012; <http://www.academypublication.com/issues/past/tpls/vol02/06/18.pdf>
- Siefring, J. (2004), *Oxford Dictionary of idioms*, Second Edition, Oxford University Press
- Stefanllari, I. (1998), *Fjalor frazeologjik anglisht-shqip*, Shtëpia Botuese Enciklopedike, Tiranë.

Credit Risk Management and Financial Performance of Deposit Money Banks in Nigeria

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Abstract

Introduction: Credit creation is a primary function of Deposit Money Banks (DMBs). In view of this, DMBs strive to satisfy the legitimate credit demands of their customers. In the process of granting loans to customers, DMBs have been confronted with the risk of loan defaults. This, therefore, calls for strategic approach to lessen the impact of loan defaults on their profitability.

Aim: This study explores how credit risk management influences the financial performance of DMBs in Nigeria. This study, specifically, investigates how credit risk management is used by DMBs to lessen risks related to non-performing loan ratio (NPLR), the capital adequacy ratio (CADR), and risk asset ratio (RAR) in Nigeria.

Method: This study used descriptive research design. Secondary data were collected from the annual reports of 11 listed DMBs on Nigerian Exchange Group (NGX). The 11 DMBs were purposively selected based on availability of data up until the second half of 2024. Descriptive and inferential statistics were used to analyse the data from 2015 to 2023, while 2024 half year data were analysed using descriptive statistics.

Findings: This study revealed that CADR has positively and significantly impacted (coefficient = 0.3020, p-value = 0.0017) the performance of the DMBs. This implies that capital adequacy of DMBs in Nigeria is directly linked to their profitability. In contrast, the loan to deposit ratio (LTDR) has negatively and significantly impacted (coefficient = -0.8270, p-value = 0.0001) the financial performance of the DMBs. This implies that the higher the loan given out by the DMBs, the better their profitability. Furthermore, NPLR has negatively and significantly impacted (-0.2650, p-value = 0.0027) the return on assets (ROA) of the DMBs. RAR of the DMBs shows a positive and significant (coefficient = 1.0270, p-value = 0.001) impact on return on assets (ROA).

Conclusion: This study highlights the importance of effective credit risk management on the profitability of DMBs in Nigeria. DMBs in Nigeria should strengthen their capital base, lessen non-performing loans by assessing the repayment capacity of debtors before giving out future loans.

Originality: This study provides original insights into the impact of credit risk management on the performance of DMBs in Nigeria by highlighting its role on their financial performance from 2015 to 2023 as well as the 2024 half year.

Keywords: Credit risk management, financial performance, return on asset, loans and advances, non-performing loan.

JEL Classification: G21, G32

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1. INTRODUCTION

Credit creation is a primary function of Deposit Money Banks (DMBs). In view of this, DMBs continuously strive to satisfy the legitimate credit demands of their customers. To make credit available, DMBs accept deposits and lend part of them to creditors (Xiong & Wang, 2017; Khalfaoui & Derbali, 2021). These financial operations are the main sources of generating revenue for the DMBs via interests charged on loans lent out to creditors. In the light of this, DMBs have always been confronted with the risk of loan defaults and as such have been devising credit risk management strategies to ensure that the risks inherent in their lending activities do not impact on their profitability negatively. In Nigeria, non-performing loans have been a major concern for the DMBs' profitability (Ihemeje et al., 2023). Despite these risks that are inherent in granting loans to customers, management of DMBs continuously try to strike a balance between potential risks and returns.

There are various risks inherent in DMBs operations, which include credit risk, operational risk, compliance risk, cybercrime threat, environmental risk, liquidity risk and so on (Tamakloe et al., 2023). Of all these risks, DMBs tend to focus more on credit risk (Hamza, 2017; Kwashie et al., 2022). This is because loan advancement is a main determinant of the profitability for DMBs. Besides this, poor credit risk management has tended to jeopardise the profitability and subsequent sustainability of DMBs. According to Anderson and Thompson (2020), effective credit risk management in DMBs is important for its continuity as well as the expansion of the economic globalisation wave. In this regard, extant studies on the impact of credit risk on the performance of DMBs in Nigeria have documented that non-performing loans are posing significant threat to the survival of these banks (Gabriel et al., 2019; Natufe & Evbayiro-Osagie, 2023).

In June 2024, however, the Central Bank of Nigeria (CBN) released a report stating that the profitability of DMBs in Nigeria has significantly improved (Tokede, 2024). In addition, the report stated that non-performing loan (NPL) of DMBs had decreased from 4.8% to 3.9%, due to the policies by the CBN. In the 2024 half year (H1) financial report, Ecobank reported ₦443.5 billion profit before tax (PBT) compared to the year 2023 H1 report of ₦150.3 billion PBT. FBN holdings reported ₦411.99 billion PBT compared to 2023 H1 report of ₦205.05 billion PBT. Furthermore, FCMB reported ₦64.21 billion PBT as against 2023 38.23 billion PBT. GTCO topped the list in the profitability report form all the DMBs in Nigeria with a sum of ₦1.003 trillion PBT reported in the first half of 2024 as against 2023 H1 report of ₦327.4 billion (Nigerian Exchange Group, NGX, 2024). Thus, the overall DMBs' H1 financial reports reflect a significant increase in their profitability. Based on this observation, this study delves into investigating how credit risk management impacts the financial performance of DMBs in Nigeria and the extent to which their risk management has impacted their profitability.

2. LITERATURE REVIEW

Credit risk in the banking sector implies the prospective financial losses that banks suffer because of unforeseen changes in a counterparty's credit quality or default on obligations (Ptak-Chmielewska & Kopciuszewski, 2022; Spuchl'áková et al., 2022). To mitigate risk in the financial sector, effective risk management is crucial because of the important roles financial institutions play in the economy. In view of this, banks guide against adverse effects that may arise from credit risk. Empirical evidence has shown that financial performance of DMBs depends on how credit risk is managed (Abubakar, et al., 2019; Cheng et al., 2020). According to Duffie and Singleton (2012), effective credit risk management includes measurement, hedging, and strategic monitoring to mitigate potential losses. A significant number of extant literatures have examined how credit risk management impacts the financial performance of banks in many countries around the world.

In Sri Lanka, the study by Kodithuwakku (2019) explores how credit management impacts the performance of eight DMBs for a five-year period from 2013 to 2018. The study found that non-performing loans have negatively impacted the financial performance of the examined DMBs. Similarly, Muriithi et al. (2019) conclude that credit risk has negatively impacted the profitability of 43 Kenyan DMBs, using both the fixed effects estimation and generalised method of moments (GMM) techniques.

In Nigeria, a few studies have examined this phenomenon. Kurawa and Garba (2019) documented how credit risk management impacted the financial performance of six DMBs in Nigeria for the period 2009 to 2018. Using default rate and cost per loan asset to proxy credit risk, the study found that credit risk has positively impacted the profitability of these Nigerian DMBs.

Furthermore, credit risk has been consistently shown to have negatively impacted the financial performance of DMBs in Nigeria. Multiple studies have found a significant inverse relationship between credit risk indicators and bank profitability, measured by ROA (Kayode et al., 2015; Afolabi et al., 2020; Apochi & Baffa, 2022). Non-performing loans have been identified as a key factor, which has negatively affected bank performance (Afolabi et al., 2020). Using Jordanian companies' data from 2005 to 2013, Alshatti (2019) investigated how CRM (Credit Risk Management) impacts the financial performance of 13 Jordanian companies. The study employed two independent variables return on earnings (ROE) and return on asset (ROA) to proxy the performance of the companies. The study concludes that CRM proxies have significantly impacted the performance of companies. Similarly, Natufe and Evbayiro-Osagie (2023) examine the impact of CRM on return on equity of 12 DMBs in Nigeria, using company data extracted from their annual reports spanning through 12 years (2010-2021). The study used CAR, LQR, LDR, RAR, NPLR as proxies for financial performance of the DMBs, while ROE was used to proxy the financial performance. The study discovered that DMBs in Nigeria rely on external borrowing to create risk asset.

The study by Kayode et al. (2015) shows how CRM impacts the performance of DMBs in Nigeria, using data spanning through 2000 to 2013. The study used random data estimation technique to analyse the variables stated in the model and found that

credit risk (CR) has negatively impacted the performance of DMBs in Nigeria. This means that credit risk is negatively and significantly related to the performance of these DMBs in Nigeria as measured by ROA.

Studies on this phenomenon have been conflicting as some studies have shown positive results while others have shown negative results. Also, a recent report has shown that the non-performing loans in Nigerian DMBs have reduced, due to the recent policies by the CBN. In view of this, this study explores how credit risk management has impacted the performance of DMBs in Nigeria.

3. METHODOLOGY

This study used descriptive research design. Secondary data were collected from the annual reports of 11 listed Deposit Money Banks (DMBs) on the Nigerian Exchange Group (NGX). The 11 banks were purposively selected based on the availability of data up until the second half of 2024. Descriptive and inferential statistics were used to analyse the data from 2015 to 2023, while only descriptive statistics were used to analyse 2024 half year data. Inferential analysis was not conducted for half year 2024, due to the small sample size of data collected for the period. Capital adequacy ratio (CADR), loan to deposit ratio (LTDR), non-performing loan ratio (NPLR), and risk asset ratio (RAR) were used to measure the credit risk management of the banks. Furthermore, return on assets (ROA) was used to proxy the performance of the banks.

Model Specification

The general model for this study is

$$ROA = \beta_0 + \beta_1 CADR_{it} + \beta_2 LTDR_{it} + \beta_3 NPLR_{it} + \beta_4 RAR_{it} + \beta_5 Size_{it} + \mu$$

Where CADR represents Capital Adequacy Ratio of the banks, LTDR stands for Loan to Deposit Ratio, NPLR means Non-performing Loan Ratio, size stands for the log of total assets of the firms.

Table 1 Measurement of Variables

Variable	Measurement
Capital Adequacy Ratio (CADR)	$\frac{\text{Shareholder's Fund}}{\text{Risk Weighted Assets}}$
Loan to Deposit Ratio (LTDR)	$\frac{\text{Shareholder's Fund}}{\text{Risk Weighted Assets}}$
Non-Performing Loan Ratio (NPLR)	$\frac{\text{Non – performing Loans}}{\text{Total Loans \& Advances}}$
Size	$\text{Log of Total Assets}$
Risk Asset Ratio (RAR)	$\frac{\text{Bank's Capital}}{\text{Risk Weighted Assets}}$

4. DISCUSSION OF FINDINGS

Table 2 presents the descriptive statistics for all the study variables. The mean ROA for the examined DMBs from 2015 to 2023 is 2.46%. The maximum ROA is 5.62% while the minimum is 0.47%. The standard deviation of 1.49% is relatively small and indicates that most values are close to the mean. This implies that the ROA of the DMBs is not volatile. The mean of CADR is 19.35%. The CADR is 4.35% higher than the statutory percentage (15%) mandated by the CBN for DMBs in Nigeria. This result reveals that the examined DMBs complied with the minimum capital requirements that make them to withstand the financial challenges which may arise from the impact of non- performing loans.

LTDR showed a mean of 51.99%. The minimum value is 29.50% and the maximum is 68.86%. The mean value implies that customers' deposits constitute 51.99% of the loans advanced by the DMBs. The mean value of 51.99% by the DMBs is lower than the stipulated loan-to-deposit ratio (65%) by the CBN in 2023. The standard deviation of 11.46% is moderate, signifying the DMBs' latitude for creating risk assets. NPLR of the DMBs displayed a mean of 20.62%, maximum value of 28.51 and minimum values of 0.17%. The standard deviation of 6.41% also signifies moderate volatility in the management of risk by the DMBs. The DMBs RAR displayed a mean value of 44.96%, maximum value of 50% and minimum value of 39.52%. The standard deviation for RAR of the DMBs is 3.47%. This implies a moderate volatility of exposure to risks assets.

Lastly, the size of the DMBs presented a mean value of 31.39. The values range from the maximum of 35.29 to minimum value of 27.50. The standard deviation of 0.81 implies that the DMBs examined are strong financially.

Table 2. Descriptive Statistics of variables (2015-2023)

	ROA	CADR	LTDR	NPLR	RAR	Size
Mean	2.46	19.35	51.99	20.62	44.96	31.39
Median	2.62	18.50	50.50	21.53	45.00	30.15
Maximum	5.62	28.30	68.86	28.51	50.00	35.29
Minimum	0.47	12.30	29.50	0.17	39.52	27.50
Std. Dev.	1.49	5.19	11.46	6.41	3.47	0.81

The impact of credit risk management on performance of DMBs (2015 -2023)

The regression analysis conducted investigates if the credit risk management of the DMBs has impacted their financial performance, which revealed that CADR has a positive and significant impact (coefficient = 0.3020, p-value = 0.0017) on the performance of the DMBs. This implies that the capital adequacy of the DMBs is directly linked to their profitability. This perhaps is why CBN has constantly been increasing the capital adequacy requirements for the DMBs to provide buffer for losses and ensure their stability. This result finds support in the studies of Abubakar et al. (2019).

The regression results for LTDR indicate a negative and significant impact (coefficient = -0.8270, p-value = 0.0001) on the financial performance of the examined DMBs. This implies that the higher the loan given out by the DMBs the lower their profitability. This is because the DMBs majorly depend on interest on loans as their source of revenue and loan defaults can pose significant risk to their profitability. This is consistent with the study of Alshatti (2019). Furthermore, NPLR displayed a negative and significant impact (-0.2650, p-value = 0.0027) on the return on assets of the DMBs. This implies that NPLR reduces the profitability of the DMBs, and they should strive to minimise the percentage of their non-performing loans. This is because increased level of NPLR suggests poor asset quality and can severely impact the DMBs' financial health and increase risk exposure. This finding is in accordance with the study of Natufe (2023). RAR of the DMBs show a positive and significant (coefficient = 1.0270, p-value = 0.001) effect on the ROA of the DMBs. This implies that the examined DMBs in this study are effectively managing their risks relative to their assets such that it doesn't impact their profitability negatively.

Table 3 Impact of Credit risk management on the performance of DMBs (2015 -2023)

Variable	Coefficient	t-statistics	Probability
CADR	0.3020	1.386	0.0017
LTDR	-0.8270	-4.184	0.0001
NPLR	-0.2650	-3.108	0.0027
RAR	1.0270	3.788	0.001
Size	10.2053	3.429	0.001

Descriptive Statistics of variables (2024 Half Year)

Table 4 presents the results of the descriptive statistics for all the study variables. The mean ROA for the examined DMBs in the first half of 2024 is 2.39%. The maximum ROA is 4.40% while the minimum is 0.81%. The standard deviation of 1.16% is relatively small and indicates that most values are close to the mean. This implies that the ROA of the DMBs is not volatile.

The mean CADR is 18.80%. The CADR is 3.80% higher than the statutory percentage (15%) mandated by the CBN for DMBs in Nigeria. This result reveals that the examined DMBs complied with the minimum capital requirements and can withstand financial challenges which may arise from the impact of non- performing loans. LTDR showed a mean of 53.45%. The minimum value is 29.50% and maximum is 65.86%. The mean value implies that customers deposits constitute 53.45% of the loans granted to customers by the DMBs. The mean value of 53.45% by the DMBs is higher than the new stipulated loan-to-deposit ratio (50%) by the CBN. The new stipulated loan-to-deposit ratio (50%) was announced by the CBN on the 17th of April 2024 in a letter addressed to the DMBs informing them of the reduction of the statutory loan-to-deposit ratio (LTDR) by 15 percentage points from 65% to 50%. The standard deviation of 11.26% is moderate, signifying the DMBs’ latitude for creating risk assets.

NPLR of the DMBs displayed a mean of 4.10%, maximum value of 6.18 and minimum of 3.10%. The standard deviation of 0.85% suggests moderate volatility in the management of risk by the DMBs. The RAR of the DMBs displayed a mean value of 44.68%, maximum value of 52.28% and minimum value of 38.22%. The standard deviation for RAR of the firms is 3.81%. This implies a moderate volatility of exposure to risks assets.

Lastly, the size of the DMBs presented a mean value of 26.51. The values range from the maximum of 40.00 to the minimum value of 20.00. The standard deviation of 5.81 implies that the DMBs are strong financially.

Table 4 Descriptive statistics of variables (2024 Half Year)

	ROA	CADR	LTDR	NPLR	RAR	Size
Mean	2.39	18.80	53.45	4.10	44.68	26.51
Median	2.27	16.50	55.50	4.20	44.90	25.60
Std. Deviation	1.16	4.50	11.26	0.85	3.81	5.81
Minimum	0.81	15.00	29.50	3.10	38.22	20.00
Maximum	4.40	28.30	65.86	6.18	52.28	40.00

5. CONCLUSION

This study found that the capital adequacy ratio of the DMBs has positively impacted their profitability. This shows the importance of managing risk effectively in banking operation as a higher risk could cause the profit of the DMBs to nosedive and eventually affect the economy. Also, the study revealed that loan to deposit ratio has negatively impacted the performance of the DMBs. Also, non-performing loans have a negative impact on the ROA of the DMBs. Risk asset ratio has a positive impact on ROA. These findings highlight the importance of effective credit risk management in enhancing bank profitability. Therefore, the study recommends that DMBs in Nigeria should strengthen their capital base, lessen non-performing loans by assessing the repayment capacity of debtors before granting loans.

REFERENCES

- Afolabi, T. S., Obamuyi, T. M., & Egbetunde, T. (2020). Credit risk and financial performance: Evidence from microfinance banks in Nigeria. *IOSR Journal of Economics and Finance* 11, 8–15. <https://api.semanticscholar.org/CorpusID:214607606>
- Alshatti, A. S. (2019). The effect of credit risk management on the financial performance of commercial banks in Jordan. *International Journal of Business and Social Science*, 10(5), 73-79. https://www.businessperspectives.org/images/pdf/applications/publishing/template/article/assets/6515/Iimfi_en_2015_01cont_2_Alshatti.pdf
- Apache, J. G., & Baffa, A. M. (2022). Credit risk and financial performance of deposit money banks in Nigeria: Moderating role of risk management committee. *European Journal of Accounting, Auditing and Finance Research*.
- Cheng, L, Nsiah, T. K., Ofori, C., & Ayisid, A. L. (2020). Credit risk, operational risk, liquidity risk on profitability. A study on South Africa commercial banks: A PLS-SEM analysis. *Revista Argentina de Clínica Psicológica* 29(5).
- Duffie, D. & Singleton, K. J. (2003) Credit risk: pricing, measurement, and management. *Princeton University Press, Princeton*

- Gabriel, O., Victor, I. E. & Innocent, I. O. (2019). Effect of non-performing loans on the financial performance of commercial banks in Nigeria. *American International Journal of Business and Management Studies*, 1(2), 1–9. <https://doi.org/10.46545/ajibms.v1i2.115>
- Hamza, S. M. (2017). Impact of credit risk management on banks performance: A case study in Pakistan banks. *European Journal of Business and Management*, 19(1). <https://core.ac.uk/download/pdf/234627678.pdf>
- Ihemeje. J. C., Obinne, U. G., & Okon, E. U. (2022). Non-performing loans and banks' profitability in Nigeria. *Indo-Asian Journal of Finance and Accounting*, 3(2), 97-116. <https://doi.org/10.47509/IAJFA.2022.v03i02.03>
- Kayode, O. F., Obamuyi, T. M., AyodeleOwoputi, J., & AdemolaAdeyefa, F. (2015). Credit risk and bank performance in Nigeria.
- [Khalfaoui, H.](#), & [Derbali, A.](#) (2021). Money creation process, banking performance and economic policy uncertainty: Evidence from Tunisian listed banks, *International Journal of Social Economics*, 48(8). 1175-1190. <https://doi.org/10.1108/IJSE-12-2020-0784>
- Kodithuawakku, S. (2019). Relationship between credit management and the performance of commercial banks in Sri Lanka. *Journal of Business and Financial Affairs*, 8(1), 28-35.
- Kurawa, J. M., & Garba, S. (2019). Effect of credit risk management on the financial performance of Nigerian banks. *Journal of Finance and Banking Studies*, 8(3), 45-57.
- Kwashie, A. A., Baidoo, S. T., & Ayesu, E. K. (2022). Investigating the impact of credit risk on financial performance of commercial banks in Ghana. *Cogent Economics & Finance*, 10(1). <https://doi.org/10.1080/23322039.2022.2109281>
- Muriithi, J. G., Waweru, K. M., & Muturi, W. M. (2019). Relationship between credit risk and profitability of commercial banks in Kenya. *African Journal of Business Management*, 13(2), 58-67.
- Natufe, O. K., & Evbayiro-Osagie, E. I. (2023). Credit risk management and the financial performance of deposit money banks: Some new evidence. *Journal of Risk and Financial Management*. 16(7):302. <https://doi.org/10.3390/jrfm16070302>
- Ptak-Chmielewska, A., & Kopciuszewski, P. (2022). New definition of default—recalibration of credit risk models using Bayesian Approach. *Risks* 10(16). <https://doi.org/10.3390/risks10010016> Academic Editors: Krzysztof
- Spuchl'áková, E., Valašková, K., & Adamko, P. (2015). The credit risk and its measurement, hedging and monitoring. *Procedia Economics and Finance*, 24. [https://doi.org/10.1016/S2212-5671\(15\)00671-1](https://doi.org/10.1016/S2212-5671(15)00671-1).
- Tamakloe, B. V., Boateng, A., Mensah, E. T., & Maposa, D. (2023). Impact of risk management on the performance of commercial banks in Ghana: A panel regression approach. *Journal of Risk and Financial Management*. 16(7), 322; <https://doi.org/10.3390/jrfm16070322>
- Tokede, K. (2024, August 19). Six banks surpass 2023 performance, generated N979.19bn profit in H1 2024. *This Day Newspaper*. <https://www.thisdaylive.com/index.php/2024/08/19/six->

VIII. International Applied Social Sciences Congress - C-iasoS 2024
Peja –Kosovo, 2-5 October 2024

[banks-surpass-2023-performance-generated-n979-19bn-profit-in-h1-2024/#google_vignette](#)

Wanting Xiong, Han Fu, Yougui Wang, Money creation and circulation in a credit economy, *Physica A: Statistical mechanics and its applications*, 465, 2017, 425-437, ISSN 0378-371. <https://doi.org/10.1016/j.physa.2016.08.023>

Military expenditure and its effect on economic growth in OECD countries: A panel data analysis

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Abstract

Introduction: This study investigates the relationship between defense spending and GDP growth in a panel data, study takes into consideration data from OECD countries, from 1990-2022.

Aim: Purpose of this research paper is to analyze the impact of various defense-related expenditures on economic growth, focusing on Military expenditure (% of GDP), Military expenditure (% of general government expenditure), Arms exports, and Arms imports as key independent variables. The study investigates how these factors influence GDP growth through a broad regression analysis.

Method: By using OLS, fixed-effects, and random-effects regression models, in this study we aim to determine which factors related to military expenditure and arms trade impact economic growth. This study evaluates the statistical significance of these variables across different models and measures their relative importance in driving economic growth.

Findings: The analysis finds that an increase in military spending as a percentage of GDP has a negative impact on GDP growth. Specifically, a 1% increase in military expenditure as a share of GDP results in a 0.455% decrease in GDP growth. Also, study finds that there is a positive relationship between general government military expenditure and GDP growth. This suggests that higher government spending on military as part of the overall budget contributes positively to economic growth. On the other hand, arms exports have a negative impact on GDP growth, indicating that countries focused on arms exports might face slower economic growth. Arms imports do not show a significant relationship with GDP growth in this analysis, indicating that the influence of arms imports on economic performance is unclear.

Conclusion: Findings highlight the complication of military expenditure's role in the economy and the significance of balancing defense spending with investments in development.

Originality and value: The analysis suggests that it has credibility and accuracy.

Key Words: Defense spending, Military expenditure, Economic growth

Jel Codes: O47, H56

1. INTRODUCTION

The focus on military spending and its economic effects started in the 1970s and 1980s. However, following the end of the Cold War in the early 1990s research on military expenditures had a reduced amount of attention among academics. Collier & Hoeffler (2002) seem to capture the collective decrease in military spending that

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followed the end of the Cold War. Benoit (1973, 1978), a pioneer in the study of military expenditure and growth, empirically examined their relationship and found a positive link. While his research sparked considerable debate and critique among other scholars, it remains important. Deger and Sen (1983) examined the strategic reasons and economic benefits of military spending in less developed countries, challenging the common belief that defense expenditures significantly contribute to technological progress, R&D, skill development, and effective demand—all of which are seen as beneficial for development. Deger (1986) also contradicts Benoit and others' findings about the positive impact of defense spending on growth. Lately mostly the defence expenditures is part of political debate, since 2014 NATO Heads of State and Government agreed to commit 2% of their national GDP to defense spending, to help ensure the Alliance's continued military readiness. This decision was taken in response to Russia's illegal annexation of Crimea, and amid broader instability in the world, which only worsened during the years from that time. In 2024, 23 Allies are expected to meet or exceed the target of investing at least 2% of GDP in defence, compared to only three Allies in 2014. The focus of our research are countries which are members of the Organisation for Economic Co-operation and Development (OECD) which is an international organisation that works to build better policies for better lives, worth mentioning that most of the members are also members of NATO.

Having in mind the recent global developments, such as the annexation of Crimea, the war in Ukraine, and instability in the Middle East, we believe there is a strong interest in studying the impact of military expenditure on economic growth. Researchers have focused a lot on how government spending is allocated, and it is clear that investments in infrastructure, education, and capital tend to have positive effects. Military spending, on the other hand, has shown mixed results depending on the study and approach. With the recent increase in military budgets, it's worth exploring the impact of military spending on economic growth over the period from 1990 to 2022, on OECD countries.

2. LITERATURE REVIEW

There are two main theories that frame the discussion around military spending and its impact on economic growth: Military Keynesianism and the opportunity cost theory. Military Keynesianism suggests that defense spending can help boost economic growth by increasing demand, creating jobs, and fostering technological innovation (Hartley & Sandler, 1995). On the flip side, the opportunity cost theory argues that military spending diverts resources from more productive areas like education, infrastructure, and healthcare, which could hurt long-term economic growth (Dunne, 2011).

Many studies support the opportunity cost perspective, showing a negative correlation between higher military spending and economic growth. For instance, research by Heo (2010) and Collier & Hoeffler (2002) found that increased military budgets often coincide with slower economic growth. Dunne, Nikolaidou, and Smith (2002), in their analysis of OECD countries, also concluded that military spending had

either no effect or a slightly negative one on economic growth, depending on the nation and period in question.

A common finding across many studies is that higher military spending as a percentage of GDP tends to slow economic growth. Knight, Loayza, and Villanueva (1996) showed that in developing countries, heavy military budgets drained public funds away from sectors more likely to drive long-term growth.

However, not all studies align with this view. The current research finds a positive link between overall government military spending and GDP growth. This suggests that when military spending is effectively integrated into the broader national budget, it can have a positive effect. Scholars like Hartley (2012) argue that well-managed defense spending, particularly when it's part of broader fiscal policies, can lead to economic stability and technological progress, especially in more developed nations.

In their paper, Francisco Jose Callado Muñoz et al. (2022) explore the relationship between arms exports, labor productivity, and economic growth. Using a network theory-based approach to measure spillover effects, they find that shocks from arms exports have direct spillovers on labor productivity and GDP growth, but the reverse effect is not observed in the data. In their study, Becker and Dunne (2021) take a closer look at how different parts of military spending, like personnel, equipment, infrastructure, and operational costs, impact economic growth. Using data from NATO and the EU for 34 countries over nearly 50 years, they find that the economic effects vary depending on the spending category. Their research reveals that the negative link between military spending and growth seen in other studies is mostly due to spending on personnel and operations, while spending on equipment and infrastructure has different, less clear effects.

Azam (2021) investigates the impact of military spending on economic growth in 35 non-OECD countries from 1988 to 2019. Using multivariate regression models and the panel ARDL/PMG technique, along with robust estimators, the study finds that military expenditure has a negative effect on economic growth. The analysis also shows a two-way causal relationship between military spending and economic growth. Azam concludes that military expenditure is detrimental to economic development and suggests that policymakers should reconsider military budgets to promote economic growth and enhance social welfare. Chary (2023) examines whether arms imports are truly harmful to economic growth. While military production and trade have significant economic impacts, the effects of arms imports are less understood. Using a pooled mean group approach, analyzes data from 25 of the world's top arms importers between 2000 and 2021. The study finds that both arms imports and military spending negatively affect GDP per capita in the short term, but military spending has positive long-term effects. Additionally, a unidirectional causal link was found from military spending to arms imports, and from GDP per capita to military expenditure.

Saeed (2023) addresses the issue of endogeneity in estimating the impact of military spending on economic growth by using two instruments: the value of arms imports during peacetime and the number of neighboring countries experiencing interstate

violence. These instruments, which are closely related to military expenditures but not directly influenced by economic growth. Using panel data from 133 countries between 1960 and 2012, findings suggest that a 1% increase in military spending as a percentage of GDP leads to a 1.10% reduction in economic growth, underscoring the negative impact of military expenditures on growth.

In contrast, the link between arms imports and economic growth remains unclear. The current study finds no significant relationship, which mirrors previous research that shows the effects of arms imports vary widely.

3. RESEARCH METHODOLOGY

In this section, we develop an econometric model to analyze how GDP growth (annual %) is influenced by military expenditure (% of GDP), military expenditure (% of general government expenditure), arms exports (SIPRI trend indicator values), and arms imports (SIPRI trend indicator values). To investigate these relationships, we utilize pooled Ordinary Least Squares (OLS), as well as fixed-effects and random-effects models.

The empirical model we use is structured as follows:

$$\text{GDP Growth}_{it} = \beta_0 + \beta_1 \text{Military Expenditure}_{it}(\%) + \beta_2 \text{Military Expenditure}_{it}(\text{Gov Expenditure } \%) + \beta_3 \text{Arms Exports}_{it} + \beta_4 \text{Arms Imports}_{it} + u_{it}$$

Our data comes from the World Bank database, which explains military expenditures as follows: SIPRI's military expenditure figures align with the NATO definition, covering all current and capital spending on armed forces. This includes expenses for peacekeeping, defense ministries, and military-related government agencies, as well as personnel costs (like salaries, pensions, and social services), operation and maintenance, procurement, research and development, and military aid from donor countries. However, it does not include civil defense or expenses associated with past military activities, such as veterans' benefits and demobilization.

Arms exports and imports involve the transfer of military weapons through various means, including sales, aid, gifts, and manufacturing licenses. The data focuses on significant conventional weapons, such as aircraft, armored vehicles, artillery, radar systems, missiles, and ships intended for military purposes.

This study employs econometric techniques, including OLS, fixed-effects, and random-effects regression models, to examine the relationships between these variables and GDP growth. By utilizing these methodologies, we aim to provide deeper insights into how various factors influence economic expansion, thereby improving our understanding of growth dynamics in different contexts.

3.1. Data Analysis

3.1.1. Summary statistics

GDP Growth (Annual %): With 1,247 observations, the mean annual GDP growth is 2.53%, indicating moderate economic growth on average for the OECD countries during the period of time from 1990-2022. However, the substantial standard deviation of 3.808 highlights significant variability in growth rates, with values ranging from a low of -32.118% of Latvia in 1992 to a high of 24.475% Ireland in 2015. This suggests that some economies experience extreme fluctuations in growth.

Military Expenditure (% of GDP): The mean military expenditure is 1.838%, with 1,172 observations. The standard deviation of 1.278 indicates notable differences across countries, with military spending as a percentage of GDP ranging from 0.225% Ireland in 2022, to 15.586% of Israel in 1991. This wide range suggests varying national priorities regarding defense, as we would expect.

Table 1: Summary statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
GDP growth (annual %)	1247	2.530	3.808	-32.118	24.475
Military expenditure (% of GDP)	1172	1.838	1.278	0.225	15.586
Military expenditure (% of general government expenditure)	1084	4.335	3.105	0.858	20.306
Arms exports (SIPRI trend indicator values)	785	8.075	0.908	6	10.196
Arms imports (SIPRI trend indicator values)	1087	7.984	0.772	6	9.468

Military Expenditure (% of General Government Expenditure): The average military expenditure represents 4.335% of total government spending, based on 1,084 observations. The higher standard deviation of 3.105 points to significant differences among governments in their allocation of resources to military activities, with values spanning from 0.858% of Luxembourg in 2012 to 20.306% Rep. Korea.

Arms Exports (SIPRI Trend Indicator Values): The average arms export value is 8.075 (on the SIPRI scale), based on 785 observations. The standard deviation of 0.908 indicates moderate variability, with exports ranging from 6 to 10.196. This suggests a concentration of arms exports among a few countries.

Arms Imports (SIPRI Trend Indicator Values): With 1,087 observations, the average arms import value is 7.984, showing a slight decrease in variability (standard deviation of 0.772) compared to arms exports. Import values range from 6 to 9.468, indicating a relatively stable arms import market across the countries in the dataset.

3.1.2. Regression Analysis Results

In this section, we present the results obtained from pooled Ordinary Least Squares (OLS), fixed effects, and random effects models. The dependent variable is GDP growth (annual %), reflecting the annual percentage change in GDP at market prices, measured in constant local currency. The independent variables include Military expenditure (% of GDP), Military expenditure (% of general government expenditure), Arms exports (SIPRI trend indicator values), Arms imports (SIPRI trend indicator values).

Table 2. Regression result

Variables	OLS	Fixed effects	Random effects
Military expenditure (% of GDP)	-0.455 s.e. 0.199 0.023**	-2.288 s.e. 0.439 0.000***	-1.270 s.e. 0.321 0.000***
Military expenditure (% of general government expenditure)	0.319 s.e. 0.063 0.000***	1.006 s.e. 0.179 0.000***	0.529 s.e. 0.107 0.000***
Arms exports (SIPRI trend indicator values)	-0.433 s.e. 0.132 0.001***	-0.142 s.e. 0.239 0.552	-0.261 s.e. 0.193 0.176
Arms imports (SIPRI trend indicator values)	0.130 s.e. 0.172 0.448	0.300 s.e. 0.222 0.178	0.206 s.e. 0.203 0.310

Notes: ***, **, and * indicate significance at the 1, 5 and 10 % levels, respectively.

Source: Author's calculation

Military Expenditure (% of GDP), the coefficient is -0.455, indicating a significant negative relationship with the dependent variable (p-value = 0.023). Military Expenditure (% of General Government Expenditure): The coefficient is 0.319, reflecting a strong positive relationship, statistically significant at the 1% level (p-value = 0.000). Arms Exports (SIPRI Trend Indicator Values): The coefficient is -0.433, suggesting a significant negative relationship (p-value = 0.001). Arms Imports (SIPRI Trend Indicator Values): The coefficient is 0.130, but this relationship is not statistically significant (p-value = 0.448). In general models suggest that military expenditure as a percentage of GDP and general government expenditure have significant effects on the dependent variable, while arms exports and imports do not show consistent significant relationships. The fixed effects model often yields stronger results for military expenditure, highlighting the importance of controlling for unobserved heterogeneity in this context. The lack of significance in arms trade variables across models suggests these factors may not have a robust influence on GDP growth in the specified context.

4. CONCLUSION

This study investigates the impact of military expenditure and arms trade on GDP growth among OECD countries from 1990 to 2022. The results from the OLS regression indicate a significant negative relationship between military expenditure as a percentage of GDP (coefficient = -0.455, p-value = 0.023) and GDP growth, suggesting that increased military spending in this context may detract from economic performance. On the other hand, military expenditure as a percentage of general government expenditure shows a strong positive relationship (coefficient = 0.319, p-value = 0.000), indicating that when military spending is viewed within the broader framework of government budgets, it can have beneficial effects.

The analysis of arms trade reveals a significant negative association with arms exports (coefficient = -0.433, p-value = 0.001), whereas arms imports do not demonstrate a statistically significant relationship with GDP growth (coefficient = 0.130, p-value = 0.448). This inconsistency suggests that while arms exports may cause negative repercussions for economic performance, the effects of arms imports remain ambiguous and require further examination.

The fixed effects model strengthens the findings related to military expenditure, underscoring the importance of controlling for unobserved heterogeneity in understanding these dynamics. Overall, the results highlight the complex interplay between military spending and economic growth, emphasizing that policy considerations in OECD countries should account for the nuanced effects of military expenditure and the limited impact of arms trade on economic outcomes. Future research should delve deeper into the mechanisms at play and explore the implications for defense and economic policy in the context of sustainable economic growth.

Given the current unstable geopolitical landscape, particularly with the ongoing conflict in Ukraine and persistent tensions in the Middle East, future research should

explore how these crises influence military expenditure and arms trade dynamics. The escalation of military commitments may lead countries to reassess their defense budgets and priorities, potentially changing the relationships observed in this study. Investigating the short- and long-term economic impacts of increased military spending in response to these conflicts could provide crucial insights into the trade-offs faced by nations.

REFERENCES

- Deger, S. and Sen, S. (1983). Military expenditure, spin-off and economic development.
- Deger, S. (1986). Economic development and defense expenditure.
- Benoit, E. (1973). Defence and Economic Growth in Developing Countries.
- Benoit, E. (1978). Growth and defense in developing countries.
- Ådne Cappelen, Nils Petter Gleditsch, Olav Bjerkholt (1984). Military Spending and Economic Growth in the OECD Countries.
- North Atlantic Treaty Organization,
<https://www.nato.int/cps/en/natohq/organisation.htm>
- Collier, P., & Hoeffler, A. (2002). "Military expenditure: Threats, aid, and arms races." Oxford University Press.
- Dunne, J. P. (2011). "Military spending and economic growth in Sub-Saharan Africa." *Defence and Peace Economics*, 22(4), 357-372.
- Dunne, J. P., Nikolaidou, E., & Smith, R. P. (2002). "Military spending, investment, and economic growth in small industrialized economies." *The European Journal of Political Economy*, 17(2), 361-379.
- Dunne, J. P., & Tian, N. (2016). "Military spending, conflict, and economic growth." *Defence and Peace Economics*, 27(2), 211-217.
- Hartley, K., & Sandler, T. (1995). "The Economics of Defence." Cambridge University Press.
- Hartley, K. (2012). "Defence economics and the industrial base." *Journal of Economic Perspectives*, 26(4), 145-166.
- Heo, U. (2010). "The relationship between defense spending and economic growth in the United States." *Political Research Quarterly*, 63(4), 760-770.
- Knight, M., Loayza, N., & Villanueva, D. (1996). "The peace dividend: Military spending cuts and economic growth." *IMF Staff Papers*, 43(1), 1-37.

Callado Muñoz, F. J., Hromcová, J., Laborda Herrero, R., & Utrero González, N. (2022). "The impact of arms exports on labor productivity and economic growth: A network spillover approach." *Journal of Economic Dynamics & Control*, 134, 104345.

Becker, J., & Dunne, J. P. (2021). Military Spending Composition and Economic Growth. *Defence and Peace Economics*, 32(3), 259-271.

Azam, M. (2021). Does military spending stifle economic growth? The empirical evidence from non-OECD countries. *Defence and Peace Economics*, 32(5), 519-539. <https://doi.org/10.1080/10242694.2020.1833114>

Saeed, L. (2023). The Impact of Military Expenditures on Economic Growth: A New Instrumental Variables Approach.

The Effect of Financial Literacy on Emotional Intelligence: Case of Businesses in North Macedonia

Artina Zeqiri¹⁴²

Abstract

Introduction: Changes are inevitable during business, managers are on the daily front of making decisions based on the information provided, communication, cooperation and confrontation with employees, motivating them towards effectiveness. A deeper understanding of our and others' behavior and how it can be used to achieve desired outcomes is necessary for optimal performance in an organization. This is the reason why Emotional Intelligence is now seen as an important asset of the organization or as an ability of managers for making decisions.

Aim: This paper will explore the emotional intelligence of managers as well as the relationship between financial knowledge, financial literacy and emotional intelligence in managers. Financial decision-making in today's complex landscape requires more than just technical prowess, it demands a combination of intellectual awareness and emotional intelligence.

Method: The data are collected by using convenient sampling technique through a 5-point Likert scale questionnaire from a sample of 120 managers from different companies in all regions of North Macedonia.

Findings: Our results showed a positive relationship between Financial Literacy and Emotional Intelligence, a significant relationship between Motivation and Empathy as Emotional Intelligence dimensions in Financial Literacy and Financial Awareness. From the results it's found that managers who are more literate about finance tend to have higher EI.

Conclusion :The paper emphasizes the extraordinary importance of Financial Literacy, which enables managers to analyze data, interpret financial statements, and grasp the implications of their decision, and on the other hand shows the importance of EI as an ability to identify, consider and control emotions in oneself and to recognize them in others, brought on by a combination of self-awareness, self-management, social awareness and relationship management.

Keywords: financial literacy, financial knowledge, emotional intelligence, managers, decision making

Jel Codes: D90, D91, G4, G53

1. INTRODUCTION

Changes are inevitable during business, managers are on the daily basis of making decisions based on the information provided, communication, cooperation and confrontation with employees, motivating them towards effectiveness. A deeper understanding of our and others' behavior and how it can be used to achieve desired

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outcomes is necessary for optimal performance in an organization. This is the reason why Emotional Intelligence is now seen as an important asset of the organization or as an ability of managers for making decisions.

2. LITERATURE REVIEW

2.1. Emotional Intelligence

The last twenty-five years research have consistently pointed to a set of competencies – some purely cognitive but most emotional – such as self-confidence, initiative and teamwork as making a significant difference in the performance of individuals. These competencies represent what is called emotional intelligence and are believed to be predictive of superior performance in work roles (Cherniss, 2001)

The first who introduced the concept of Emotional Intelligence were (Mayor & Salovey, 1995) who defined it as the capability to identify feelings and to transform them to actions. Mayer, Caruso, and Salovey prove that emotional intelligence is a systematic mental phenomenon, and this capability is a kind of intelligence.

Mayer & Salovey categorize emotional intelligence into emotional orientation, emotional involvement, and emotional expertise. Later, Goleman categorizes them into four more elements such as self-awareness, self-management, social awareness, and relationship management. Self-awareness is the ability to understand the emotions that are disturbing our thoughts and subconscious in mind and lead us to think in some directions (Quinn & Wilemon, 2009). Self-management is the ability to control one's emotions and prevent one's self from acting on coercion without taking into account thought and emotional reaction (Quinn & Wilemon, 2009) Social awareness is the ability to have knowledge of people from different experiences or from different cultures (Barling, Slater, & Kelloway, 2000). Relationship management is the management of other people's emotions.

Relating to categories of emotions, they play an important role in the liking of things for an individual (Leary, Reilly, & Brown, 2009). So better management of one's emotion leads one's path towards successful decision making. (Hadi, 2017).

2.2 Financial Literacy

People spend so much time making money, budgeting and spending it. Even though people always will need more money even if they work hard for the salary they get. This reason is that financial success highly depends on three key factors: financial literacy, financial behavior and financial intelligence. These topics like Financial Literacy, Financial Behavior or Financial Knowledge have become increasingly popular topics ranking among top priorities in education. The conclusion is proved by various researchers for example (Miečinskienė, et al., 2023) (Khan, Rothwell, Cherney, & Sussman, 2017), (Kamil, Musa, & Sahak, 2014). Financial literacy affects a person's financial behavior (Khan, Rothwell, Cherney, & Sussman, 2017) in this way individuals

protects themselves from financial problems due to availability of relevant financial knowledge. According to (Artavanis, & Karra, 2021) students with lower levels of financial literacy are more vulnerable to adverse shocks to their payment-to-income ratios, which can impair their future creditworthiness and undermine their ability to service debt post-graduation. A financial literate person can make better and more appropriate financial decisions (Miečinskienė, et al., 2023).

2.3 Financial literacy in North Macedonia

Financial literacy among adult population in Republic of North Macedonia performed by National Bank as research in three components as integral part of the financial literacy: financial knowledge, financial behavior and financial attitude, is a relatively lower level compared to the average. Thus, 45% of the respondents showed solid knowledge of the basic financial concepts, which contributes to well-founded financial decisions. Also, 42% of the respondents have positive financial behavior, among other things expressed through the regularity in the payment of household bills and consideration of several options when choosing a particular financial service. (Strategy for Financial Education and Financial Inclusion of the Republic of North Macedonia , 2021-2025).

Referring to the importance of Emotional Intelligence in business, in the other side the role of financial literacy on individuals, we would like to see the correlation of EI and FL in businesses in North Macedonia.

It has been analyzed that financial literacy moderates the relationship of emotional intelligence and investment decisions and it strengthens both links. Emotions are considered a tool to solve problems in decision making as they influence decisions (Van de Laar & De Neubourg, 2006). Individuals who are self-aware can make effective decisions than others (Hess & Bacigalupo, 2011). So investitures who are literate to financial markets will also have the ability to control their own emotions, and consequently make effective decision making. Like other frameworks, emotional intelligence is also a major determinant of making optimal financial and investment decisions.

3. RESEARCH METHODOLOGY

Our research has collected primary data by conducting a survey and sharing it to directors and managers of businesses in all regions of North Macedonia. Our target group have been the highest level of leadership of businesses in North Macedonia so we can analyse their respond to EI and FL. Communication with respondents is made in such a way that the target groups could express their opinion for emotional intelligence in all dimensions and financial literacy. All this is done while maintaining anonymity by their choice. The questionnaire was sent to private and public enterprises in RNM. From the released questionnaires, we managed to have 135 respondents, 65% males and 35%

females, from which 57% have graduated, 23% have a master degree, 10% have doctoral degree; and 9% have finished high school and have not continued University studies. The questionnaires were multiple-response questionnaire that response is measured on 5-point Likert-type scales and range from “Strongly Disagree” to “Strongly Agree”. **Variables of EI:** Self-Awareness; Organizational Awareness; Social Awareness; Relationship Management; **Variables of Financial Literacy:** Financial Knowledge, Financial Experience, Financial Awareness

3.1 Regression Analysis Results

We have been using the 2-dimensional PCA, we can observe by adding the 2 dimensions (32.6 + 13.9) approximately half of the total information. Though we can observe that financial awareness and Financial Experience are highly and positively correlated to EI, we can have the intuition that some variables of EI are more related to FI such as Self-management and Motivation.

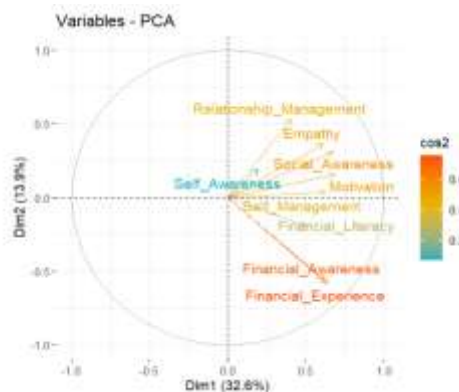


Figure 1- Correlation between EI and FL Variables

We have been using Linear Regression to predict the relationship between dimensions of Emotional Intelligence and components of Financial Literacy by testing different models like the influence of Self-Management to Financial Literacy, Self-management to Financial Literacy and Financial Experience, Social Awareness to Financial Awareness. All these models showed a positive correlation between EI and FI by higher P value <0.001.

```
lm(formula = Self_Management ~ Financial_Experience, data = data)
Residuals:
    Min       1Q   Median       3Q      Max
-3.2393 -0.2393  0.0704  0.4511  1.6896
Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    3.00084    0.27724   10.824 < 2e-16 ***
Financial_Experience 0.30960    0.06868    4.508 1.22e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7385 on 168 degrees of freedom
Multiple R-squared:  0.1079,    Adjusted R-squared:  0.1026
F-statistic: 20.32 on 1 and 168 DF,  p-value: 1.224e-05
```

Figure 2- Model 1

This model has P_value under 0,0001 which means Financial Experience has significantly an impact on Self-management.

```
lm(formula = Self_Management ~ Financial_Literacy + Financial_Experience,
    data = data)
Residuals:
    Min       1Q   Median       3Q      Max
-3.1785 -0.2889  0.0000  0.5513  1.6321
Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    2.76652    0.30524    9.063 3.3e-16 ***
Financial_Literacy 0.11038    0.06194    1.782 0.076554 .
Financial_Experience 0.27020    0.07173    3.767 0.000229 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7338 on 167 degrees of freedom
Multiple R-squared:  0.1246,    Adjusted R-squared:  0.1141
F-statistic: 11.88 on 2 and 167 DF,  p-value: 1.501e-05
```

Figure 3-Model 2

We can see that Financial Experience P-value is still under 0.0001 and we have include Financial Literacy which is still significant here with a P value of 0.076554. However, in order to decide which one of the two models is the best we can use one of the most famous criteria: the Adjusted R-squared. More this value is close to 1, more the linear

regression prediction is the best. And here, we can see that the Adjusted R-squared is higher on the second model 0.1141 vs 0.1026 on the previous one.

4. CONCLUSION

The main aim of our research was to analyze the significance of emotional intelligence and financial literacy. We have tested different models and our hypothesis that FL has an impact on EI has been accepted.

We have seen a strong relationship between Self-Management, Social Awareness, Empathy, Motivation as dimensions of EI with Financial Knowledge, Financial Awareness and Financial Experience as components of Financial Literacy.

This means that people who have initial financial literacy and who invest in financial literacy have better approach to better investment decisions resulting in high returns (Jappelli & Padula, 2013), and have higher emotional intelligence. One of the main reasons of the acceptance of our hypothesis is that the financial literacy of investor enlarges the ability of an individual to control and manage his emotions and lead him towards successful investment decision making. However financial literacy could only increase the intensity of emotional intelligence and behavior, but it can't completely change the attitude of the manager or investiture towards investment decision. That's why financial knowledge is crucial thing to financial management as an individual awareness toward financial concepts. But on the other side financial knowledge of financial market will also have the ability to control his own emotions, better management of one's emotion leads one's path towards successful decision making.

REFERENCES

- Artavanis,, N., & Karra, S. (2021). *Financial Literacy and Responsible Finance in the FinTech Era*. Routledge.
- Barling, ., J., Slater, ., F., & Kelloway, E. K. (2000). Transformational leadership and emotional intelligence: An exploratory study. *Leadership & Organization Development Journal*, 21(3), 157-161.
- Cherniss, C. (2001). *The Emotionally Intelligent Workplace*. Jossey-Bass.
- Hadi, F. (2017). Effect of emotional intelligence on investment decision making with a moderating role of financial literacy. *China-USA Business Review*, 16(2), , 53-62.
- Hess, J., & Bacigalupo, A. (2011). Enhancing decisions and decision-making processes through the application of emotional intelligence skills. *Management decision*, 49(5), 710-721.

Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, 37(8), 2779-2792.

Kamil, N., Musa, R., & Sahak, S. (2014). Examining the role of financial intelligence quotient (FiQ) in explaining credit card usage behavior: A conceptual framework. *Procedia-Social and Behavioral Sciences*, 130, 568-576.

Khan, M., Rothwell, D., Cherney, K., & Sussman, T. (2017). Understanding the financial knowledge gap: A new dimension of inequality in later life. *Journal of gerontological social work*, 60(6-7), 487-503.

Leary, M., Reilly, M., & Brown, F. (2009). A study of personality preferences and emotional intelligence. *Leadership & Organization Development Journal*, 421-434.

Mayor, J., & Salovey, P. (1995). Emotional intelligence and the construction and regulation of feelings. *Applied and Preventive Psychology*, 197-208.

Miečinskienė, A., Stankevičienė, J., Jurevičienė, D., Taujanskaite, K., Danilevičienė, I., & Gudelytė-Žilinskienė, L. (2023). The role of financial intelligence quotient and financial literacy for paving a path towards financial well-being. *Journal of Business Economics and Management*, 24(5), 901-922.

Quinn, J., & Wilemon, D. (2009). Emotional intelligence as a facilitator of project leader effectiveness. *PICMET'09-2009 Portland International Conference on Management of Engineering & Technology*, (pp. 1267-1275).

(2021-2025). *Strategy for Financial Education and Financial Inclusion of the Republic of North Macedonia*. Body of the Financial Regulators for Financial Education and Financial Inclusion, RNM.

Van de Laar, M., & De Neubourg, C. (2006). Emotions and foreign direct investment: a theoretical and empirical exploration. *MIR: Management International Review*, 207-233.

Advanced Analysis of Socio-Economic Inequality in the Republic of Moldova Through the Lens of Lorenz and Weidlich Models

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Abstract

Introduction: Socio-economic inequality remains a critical challenge in many developing economies, including the Republic of Moldova. Understanding and addressing these disparities require robust analytical tools to explore income distribution and population dynamics comprehensively.

Aim: The aim of this study was to analyse socio-economic inequality in the Republic of Moldova using advanced applications of the Lorenz and Weidlich models, offering actionable insights for policy formulation aimed at reducing disparities and fostering sustainable development.

Method: The research employed the Lorenz model to assess income inequality through the construction and analysis of Lorenz curves and Gini coefficients. Additionally, the Weidlich model was applied to study economic dynamics, focusing on key variables such as productivity growth rates in the industrial and agricultural sectors, as well as labour migration trends. Data from national and international sources, including the National Bank of Moldova, were used for parameter estimation and projection.

Findings: The study revealed a high level of income inequality in Moldova, with a Gini coefficient of 0.41 in 2022. It highlighted that 21% of the population accounted for 50% of national income. The Weidlich model projections indicated a modest growth in GDP and GDP per capita by 2032, emphasizing the structural challenges of low productivity and uneven sectoral contributions. Policy recommendations, such as investment in education, infrastructure improvement, and tax reforms for low-income groups, were identified as potential measures to address these disparities.

Conclusion: The research underscores the utility of integrating the Lorenz and Weidlich models in analysing socio-economic inequalities and dynamics. The findings provide a valuable foundation for policymakers to design and implement strategies aimed at reducing inequality and supporting economic sustainability.

Originality and value: By combining the Lorenz and Weidlich models in the Moldovan context, this study offers a novel and comprehensive approach to understanding socio-economic challenges. The results contribute to the literature on economic modelling and policy development in transitional economies.

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Keywords: Socio-economic Inequality, Lorenz Model, Weidlich Model, Sustainable Development.

JEL Codes: C63, D63, O15.

1. INTRODUCTION

The Lorenz and Weidlich models are essential mathematical tools for analysing and understanding social and economic phenomena. Developed by economist Max Lorenz, the Lorenz model quantifies inequality in the distribution of income or wealth within a society. The Lorenz curves provide a visual representation of the degree of inequality, with their concavity reflecting social disparities (Drucker, 2006).

The Weidlich model, developed by physicist Wolfgang Weidlich, analyses population dynamics and social behaviour. By defining the forces of attraction and repulsion among individuals, the model explores the formation of social groups, the diffusion of ideas, and the evolution of public opinion.

Both models provide a robust theoretical framework for the research and analysis of the complexities inherent in social phenomena. They enable the investigation and anticipation of changes in the distribution of economic resources and the dynamics of social interactions, thereby contributing to the development of informed strategies for addressing issues such as inequality and social cohesion.

The Weidlich model, developed by physicist Wolfgang Weidlich, analyzes population dynamics and social behaviour. By defining the forces of attraction and repulsion among individuals, the model explores the formation of social groups, the diffusion of ideas, and the evolution of public opinion.

Both models provide a robust theoretical framework for the research and analysis of the complexities inherent in social phenomena. They enable the investigation and anticipation of changes in the distribution of economic resources and the dynamics of social interactions, thereby contributing to the development of informed strategies for addressing issues such as inequality and social cohesion.

2. LITERATURE REVIEW

The analysis of socio-economic inequality and economic dynamics has been extensively explored through various models and frameworks. The Lorenz Model, developed by Max Lorenz, is widely utilized to measure income and wealth inequality, providing a graphical representation of disparities within a population, as emphasized by Milanovic (2016) in the context of global inequality. Additionally, the Weidlich Model, conceptualized by Wolfgang Weidlich, offers a robust framework for studying population dynamics and social behavior, highlighting the interplay between attraction and rejection forces within societal groups. Scholars such as Galbraith (2012) and Stiglitz (2012) have underscored the role of income distribution in fostering economic stability and social cohesion. Drucker (2006) and Munteanu (2015) further illustrate the importance of innovation, education, and institutional development in addressing

inequality and promoting sustainable growth. These theoretical underpinnings provide a foundation for employing the Lorenz and Weidlich models in analyzing Moldova's socio-economic challenges, enabling the identification of actionable policy interventions.

3. RESEARCH METHODOLOGY

This paper examines income distribution in the Republic of Moldova through the Lorenz Model and analyses the economic dynamics through the Weidlich Model. For Lorenz, a statistical survey was conducted, representing data on a Lorenz curve and an analysis of the parametric distribution.

For Weidlich, key variables were identified to estimate the rate of productivity growth in the industrial and agricultural sectors and estimate the GDP and per capita evolution. These methods provided a comprehensive scientific understanding of income distribution and economic dynamics in Moldova, employing established mathematical models.

4. DATA ANALYSIS

The Lorenz model is a mathematical model that is used to measure income or wealth inequality. The model was developed by the American economist Max Lorenz in 1905. The Lorenz model is built on a curve that represents the distribution of income or wealth in society. On the horizontal axis of the curve is the percentage of the population, and on the vertical axis is the percentage of income or wealth. A perfectly equal Lorenz curve would be a straight line passing through the point (0.0) and the point (1.1). This would mean that everyone in society has the same income or wealth. In reality, Lorenz curves are always concave, meaning they approach the horizontal axis, but never touch it. The more concave the curve, the greater the inequality of income or wealth (Milanovic, 2016).

The Lorenz model is an important tool for measuring income and wealth inequality. This model can be used to compare inequality in different countries or regions, as well as to track the evolution of inequality over time. Here is a brief description of how the Lorenz model works:

1. First of all, the percentage of the population holding a certain percentage of income or wealth must be determined. This can be done by conducting a statistical survey.

2. Then, this data must be plotted on a Lorenz curve;

3. Finally, one can determine the degree of inequality by comparing the curve.

Lorenz curve is represented by a straight line passing through the points (0,0) and (1,1).

The Lorenz model is a valuable tool for understanding income and wealth inequality. This model can be used to make policy decisions aimed at reducing inequality and promoting greater social justice (Galbraith, 2012).

According to the data of the National Bank of Moldova, the Gini coefficient for the Republic of Moldova in 2022 was 0.41. This coefficient indicates a high level of income inequality in Moldova.

In order to solve the Lorenz parametric model for the Republic of Moldova, we need to know the value of the elasticity coefficient of demand according to income. Unfortunately, there is no data available on this coefficient for the Republic of Moldova.

However, we can make an estimate of the value of the demand elasticity coefficient by income based on data from other countries. A common estimate is that the coefficient of elasticity of demand by income is about 0.5.

Therefore, we can use the following equation to solve the Lorenz parametric model for Moldova:

$$L(p) = 0,41 + (1 - 0,41) \times p^{0,5}$$

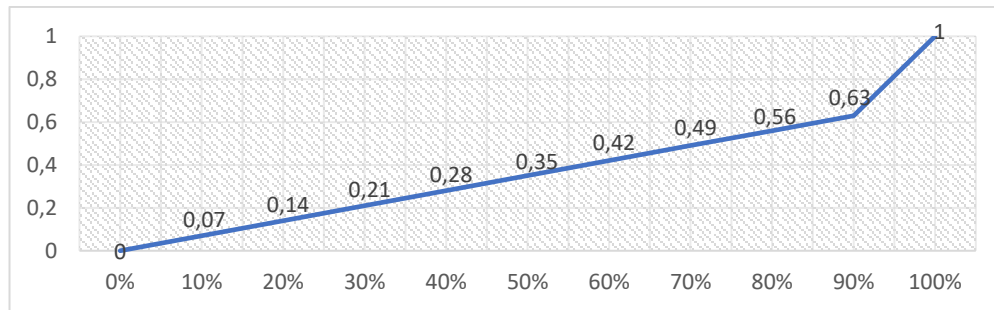


Figure 1. Parametric model Lorenz for the Republic of Moldova in 2022

Source: Elaborated by author's

The research results show that the income distribution in the Republic of Moldova is uneven. The Lorenz coefficient exceeds 0.4, which indicates a high level of income inequality.

Depending on the value of the elasticity coefficient of the demand depending on the income, the results of the analysis may vary. If the income-based demand elasticity coefficient is greater than 0.5, the income distribution will be more unequal. Conversely, if the income elasticity coefficient is less than 0.5, income distribution will be more equal.

To reduce income inequality, Moldovan authorities could implement economic policies aimed at increasing the income of low-income earners. These policies could include:

- reducing taxes for low-income earners;
- increase in minimum wages;
- investment in education and training;
- improving access to medical and social services.

These policies can help increase the income of low-income earners and bridge the gap between low-income and high-income income earners.

The results of the research findings indicate that in 2022, only 21% of the population of the Republic of Moldova possessed 50% of the national income. This suggests that a small segment of the population has benefited from a significant share of economic growth in recent years (Munteanu, 2015).

A comparison of revenue distribution in 2022 and 2023 shows that there is no significant change. The wealthiest 1% of the population still have a significant share of income, both in 2022 and in 2023. This suggests that the authorities have not taken effective measures to reduce income inequality in the Republic of Moldova.

The figure 2, illustrates the **Lorenz Curve** for income distribution in Moldova for the years 2023 and 2024, providing an overview of economic inequality. The Lorenz Curve is a visual tool used to compare the actual income distribution to a perfectly equal distribution, represented by the dashed line (Line of Equality). The curves for the two years allow for a comparative analysis of changes in income inequality, highlighting whether the population experiences a more equitable allocation of economic resources over time.

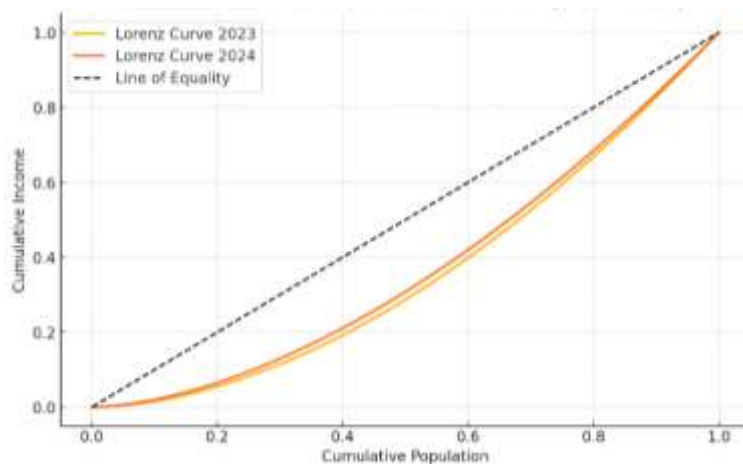


Figure 2. Comparative Lorenz Curves for Income Distribution in Moldova: 2023 vs 2024."

Source: Elaborated by author's

According to the analysis of the presented Lorenz Curve, the income distribution in Moldova shows a slight convergence toward the line of equality in 2024 compared to 2023, indicating a modest reduction in income inequality. This improvement may reflect the effects of economic or social policies implemented between the two years. However,

to confirm this trend and understand its underlying causes, a more detailed investigation into the factors driving this change would be necessary.

1. **The Weidlich** model is a mathematical model that is used to study population dynamics. The model was developed by German physicist Wolfgang Weidlich in 1971. The Weidlich model is based on the idea that population behavior is determined by two forces:

- ✓ the force of attraction, which determines the tendency of individuals to join groups that are similar to them;
- ✓ the force of rejection, which determines the tendency of individuals to move away from groups that are too different from them.

The Weidlich model can be used to study a variety of social phenomena, such as: the formation of social groups; the diffusion of ideas; the evolution of public opinions.

Here is a brief description of how the Weidlich model works:

1. First, the model defines two types of individuals: individuals belonging to a particular group and individuals not belonging to any group; and;
2. The model then defines two functions: an attraction function and a rejection function; and;
3. Finally, the model calculates the likelihood that an individual will join a particular group.

The probability that an individual will join a particular group is determined by the difference between the force of attraction and the force of rejection. If the force of attraction is greater than the force of rejection, then the individual is more likely to join the group.

The Weidlich model is a valuable tool for understanding population dynamics. The model can be used to make policy decisions that promote greater social cohesion.

Here are some examples of Weidlich model applications:

In the study of the formation of social groups, the Weidlich model can be used to predict how groups will form according to the characteristics of individuals.

In the study of the dissemination of ideas, the Weidlich model can be used to predict how an idea will spread in the population.

In the study of the evolution of public opinion, the Weidlich model can be used to predict how public opinion will change over time.

According to the data of the National Bank of Moldova, the gross domestic product (GDP) per capita of the Republic of Moldova in 2022 was 17 243 dollars. The population of the Republic of Moldova in 2022 was about 3.5 million inhabitants.

To solve the Weidlich model for the Republic of Moldova in 2022, we need to know the following values:

- A – rate of labour productivity growth in the industrial sector;
- B – growth rate of labor productivity in the agricultural sector;
- C – labour migration rate from the agricultural sector to the industrial sector.

Next we will use the following values for these variables:

- A = 0,04;
- B = 0,02;
- C = 0,01.

For a more detailed analysis, we use the following equation to solve the Weidlich model for the Republic of Moldova in 2022:

$$Y = \frac{Y_0}{P_0} \times P_t \times A_t \times (1 - C)^t$$

where:

- Y* – GDP in the year *t*;
- Y₀* – GDP in the year 0;
- P₀* – GDP per capita in the year 0;
- P_t* – GDP per capita in the year *t*;
- t* – period.

By replacing the known values in this equation, we can get the following equation:

$$Y = \left(\frac{13,2 \text{ mrlrd } \$ \text{ SUA}}{17\,243 \text{ mrlrd } \$ \text{ SUA}} \right) \times 17\,243 \$ \text{ SUA} \times 1,04^t \times (1 - 0,01)^t$$

In essence, the equation suggests that the Republic of Moldova is expected to experience an increase in GDP over time, with a higher growth rate in the industrial sector compared to the agricultural sector. This discrepancy in sectoral growth is explained by the significant differences in labour productivity between the two sectors.

With higher productivity, the industrial sector contributes more to GDP output per unit of labour than the agricultural sector. Consequently, an increase in the share of the industrial sector within the economy will enhance overall GDP growth.

The migration of labour from agriculture to industry contributes significantly to this upward trend. This transition is driven by the difference in labour productivity between the two sectors, with the agricultural sector's labour force having a lower productivity. Thus, this shift in the distribution of the labour force supports labour productivity growth in the industrial sector, thereby strengthening its contribution to GDP growth.

Using the Weidlich model for the Republic of Moldova in 2022, we can obtain the following results:

Table 1. Economic forecasts for the Republic of Moldova using the Weidlich model

Year	GDP (billion USD)	GDP per capita (USD)
2022	13,20	17 243,00
2023	13,65	17 547,85
2024	14,11	17 857,87
2025	14,58	18173,10
2026	15,06	18493,57

2027	15,56	18819,32
2028	16,06	19150,39
2029	16,06	19486,74
2030	17,11	19828,42
2031	17,65	20175,48
2032	18,21	20527,94

Source: Elaborated by the author's

Analysing the statistical data of 2022, based on the Weidlich model, we can note that the GDP of the Republic of Moldova will grow over time, but the growth rate will be lower than in other European countries. This is due to the fact that the Republic of Moldova has a smaller economy and less productive labor force.

In 2022, Moldova's GDP was 13.2 billion. According to Weidlich model projections, GDP will increase to 18.21 billion USD. USD in 2032, and this represents an increase of 38%.

The analysed GDP per capita is projected to increase from USD 17,243.00 in 2022 to USD 20,527.94 in 2032, representing a growth of 19.10%. The annual GDP growth rate is estimated to be approximately 2.18%, which is lower than the growth rate of developed countries, typically around 3% per annum.

Following the analysis, we can conclude that the Republic of Moldova could implement several policies to stimulate economic growth. These policies include attracting investments in education and vocational training, reducing bureaucracy, and improving infrastructure (Stiglitz, 2012). Such measures could enhance labour productivity and create new job opportunities.

5. CONCLUSION

In conclusion, this article examines two key mathematical models relevant to the economic and social fields: the Lorenz Model, which measures income or wealth inequality, and the Weidlich Model, which analyses population dynamics. Applying these models to Moldova's 2022 economic and social data yielded meaningful insights.

The Lorenz model revealed a high level of income inequality in the Republic of Moldova, with a Gini coefficient of 0.41. The analysis of income distribution highlighted that a small part of the population benefited from a significant proportion of economic growth, indicating the need for economic policies aimed at bridging the gap between the income of low-income and high-income earners. Policy proposals, such as reducing taxes for low-income earners and investing in education, could help mitigate inequalities and promote social justice.

On the other hand, the Weidlich Model was applied to analyse the economic evolution of the Republic of Moldova until 2032. Research has shown moderate GDP and GDP growth per capita, with a lower growth rate compared to developed European countries. This growth has been associated with a less productive workforce and a smaller

economy. Recommendations to stimulate economic growth included attracting investment in education, reducing bureaucracy and improving infrastructure.

Overall, this research highlights the importance of using mathematical models in the analysis of socio-economic data for understanding inequality issues and population dynamics. Policy proposals and future estimates provide a fundamental basis in making decisions and actions that can contribute to improving social and economic conditions in the Republic of Moldova.

REFERENCES

- Drucker, P. (2006), *Innovation and Entrepreneurship*, Harper Business, New York, 288p.
- Galbraith, J. K. (2012), *Inequality and Instability: A Study of the World Economy Just Before the Great Crisis*, Oxford University Press, 324p.
- Milanovic, B. (2016), *Global Inequality: A New Approach for the Age of Globalization*, Harvard University Press, 320p.
- Munteanu, C. (2015), *Economic Security Threats and Their Amplification in the Globalization Process*, *Metode Matematice și Tehnologii Informaționale în Economie*, Universitatea Națională „Iurii Fedkovič”, Cernăuți, Ucraina, pp. 3-4.
- Stiglitz, J. E. (2012), *The Price of Inequality: How Today's Divided Society Endangers Our Future*, W. W. Norton & Company, 560p.

Stock Price Volatility and Return: ARDL Bond Testing Approach

Ibrahim Erem Sahin¹⁴⁵, Humayun Humta¹⁴⁶

Abstract

Introduction: In an efficient capital market, asset prices change when investors modify their expectations regarding cash flows, returns, or a combination. Sometimes, the dividend price ratio varies through changes in expected return rather than expected cashflows, or even some research has documented that the dividend ratio may shift by changes in expected earnings. Stock prices rise and fall with the economy, demonstrating the marginal cost of fixed capital; however, the costs of investment goods, which comprise most of the new capital, defy the general trend.

Aim: This study investigates the relationship between stock price volatility and returns in Turkey.

Method: We employed an ARDL bond test approach to examine secondary data from 2000 to 2020 to determine co-integration between variables. Additionally, the article uses the error correction model to ascertain the rate at which explanatory variables adjust for the long-run equilibrium path.

Findings: The study's stable model reveals a short-term and long-term association between the study-focused variables. Findings indicate a negative and significant linkage between stock price volatility and stock market returns in the long and short run.

Conclusion: The study shows a negative correlation between return and earnings, and fluctuations lead to significant price volatility, highlighting the importance of financial decisions in stock market investment.

Originality and value: Profit is the most motivating and vital factor in stock markets, and stock price volatility impacts businesses' profitability. The study's findings support the need to ensure financial decisions to enhance investment profitability in stock markets.

Key Words: Stock Price Volatility, Stock Market Return, Error Correction Model, ARDL Model, Dividend Rate Ratio.

Jel Codes: M21, G11, G17, E3

1. INTRODUCTION

Many studies in economics and finance focus on volatility. Volatility is one of the truly notable features of financial markets. It influences business and personal investment decisions and is intently tied to market uncertainty. One of the fundamental concerns of modern financial research is the study of return volatility, which is often defined and measured by the rate of return variation (Bhowmik & Wang (2020)). Stock

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price volatility refers to how much a stock's price changes compared to its average value. Volatility characterizes stock risk, positing that a common stock's risk increases with its volatility. Investors must understand the factors that contribute to share price volatility because stocks that fluctuate by wider margins have a higher potential for gain and a higher potential for loss (Nguyen et al., 2020). Market volatility, or price swings, is a basic feature of the stock market. Leverage is a significant contributor to the market's decline and causes volatility, but other, more complex mechanisms are also at work. Typically, volatility will spike briefly following a market decrease before falling again (Li et al., 2022). The standard deviation of returns, the distinction between high and low stock prices, the Parkinson formula, and GARCH are some methods used to quantify volatility. The types of stock volatility are historical volatility, implied volatility, volatility index, and intraday volatility. The value of the stock could be changed through historical periods, along with the daily volume of trading. "The implied volatility is the opposite of historical. Implied volatility mentions certain stock price estimations. It stated by stock price certain percentage which have standard deviation shift over a year. Mostly, implied volatility is utilized to forecasting option prices" (Qammar & Zain-Ul-Abidin, 2019). Stock return is critical for investors since each investment activity is undoubtedly profit-oriented. Because of this, every investor should be able to evaluate various elements that affect stock price movements, including those that other investors consider when making informed predictions about stock price fluctuations (Maulana et al., 2023). The basic rule of finance is a trade-off between risk and return (Fama, 2017). Risk or return: This paper aims to establish a relationship between stock price volatility and stock return to maximize profit with minimum risk in the Turkish stock market.

2. LITERATURE REVIEW

Mishra et al. (2010) investigated Granger causality in the Vector Error Correction Model from January 1991 to December 2009 using domestic gold prices and stock market returns based on the BSE 100 index. Johansen's cointegration test reveals that a long-run equilibrium relationship exists between gold prices and stock market returns in India; also, the Granger causality test in the vector error correction model shows evidence of a feedback causality running amid the price of gold and stock returns. One can use significant information from the price of gold and stock returns to predict the other.

Olweny and Omondi (2011) examine how macroeconomic variables affect the volatility of stock returns on the Nairobi Securities Exchange in Kenya. Time series data covering from January 2001 to December 2010 were analyzed using EGARCH¹⁴⁷ and TGARCH¹⁴⁸ Models. The variables indicated a weak negative correlation. The results of the study show that when the foreign exchange rate increases by 1%, stock returns

¹⁴⁷ Exponential generalized autoregressive conditional heteroscedasticity.

¹⁴⁸ Threshold generalized conditional heteroscedasticity.

decrease by 35.54%; when the interest rate increases by 1%, stock returns decrease by 18.86%; and when the inflation rate increases by 1%, stock returns decrease by 7.65%.

Kishor and Singh (2014) investigate the connection between stock return volatility and developing economies from 2007 to 2013, which also encompasses the financial crisis of 2008 and its effects on these economies. The GARCH model is employed to investigate the influence of news emanating from the United States on the returns of the global index S&P 500 and the indices of the BRICS countries. The research determined that the US stock market news has substantially impacted the BRICS stock market, except for Brazil and China. The volatility of stock returns varies significantly across all countries' stock markets. These results have momentous implications for investors who are interested in portfolio diversification.

Nadyayani and Suarjaya (2021) aim to ascertain how return on assets (ROA), return on equity (ROE), and net profit margin (NPM) impact stock returns. This study was conducted on manufacturing businesses listed on the Indonesia Stock Exchange (IDX) from 2017 to 2019. Based on multiple linear regression investigations, it is determined that ROA, ROE, and NPM are affected by a simultaneously positive and significant impact on stock returns.

Lashgari and Ahmadi(2014) test the impact of dividend policy on share price volatility in the Tehran Stock Exchange. In this study, Parkinson's stock price volatility was utilized to evaluate the stock changes. A fixed effects model is used, and the consequence is indicated at the error level of 5%; the dividend payout ratio has a significantly negative effect on stock price volatility, and the asset growth rate has a considerably positive effect on stock price volatility. Also, variables such as leverage, earning volatility, and company size have no significant effects on stock price volatility.

3. METHODOLOGY

The study applies time series data from 2002 to 2020, collected from World Development Indicators (WDI) and analyzed by Stata18 through the ARDL approach. ARDL model has the advantage of predicting future results based on past results because it contains lagged effects. Because the results of economic events are not immediately apparent, the ARDL analysis is a powerful method to account for lagged impacts (Çiraklı & Yildirim, 2019). Our study considers the impact of stock volatility on the stock return in Turkey. Stock market capitalization to GDP (%), Stock market turnover ratio (%), and Stock market total value traded to GDP (%) are considered control variables for this study.

3.1. Variable of The Study: The explanatory variables of the study, along with the response variable, are defined by World Banks (WB) as follows:

3.1.1. Stock Price Volatility: SPV is the average of the 360-day volatility of the national stock market index.

3.1.2. Stock Market Return: SMR is the growth rate of the annual average stock market index, which is constructed by taking the average of the daily stock market indexes available at Bloomberg.

3.1.3. Stock Market Turnover Ratio (%): Total value of shares traded during the period divided by the average market capitalization for the period.

3.1.4. Stock Market Total Value Traded To GDP (%): Total value of all traded shares in a stock market exchange as a percentage of GDP.

3.1.5. Stock Market Capitalization To GDP (%): Total value of all listed shares in a stock market as a percentage of GDP (WDI, 2024).

3.2. ARDL Model: The general form of the autoregressive distributive lag model is shown in equation 1:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \dots + \beta_p Y_{t-p} + \alpha_0 X_t + \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + \dots + \alpha_q X_{t-q} + \varepsilon_t \dots(1)$$

$$\Delta Y_t = \beta_0 + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \sum_{j=0}^{q1} \gamma_j \Delta X_{1t-j} + \sum_{k=0}^{q2} \delta_k \Delta X_{2t-k} + \varphi Z_{t-1} + e_t \dots(2)$$

In equation 2, Z is the error correction term connecting the long-run and short-run models.

The unrestricted ARDL model of the study is specified by equation 3 as follows:

$$\Delta \ln SPV_t = \alpha_1 + \alpha_{SMR} \ln SMR_{t-1} + \alpha_{TOR} \ln TOR_{t-1} + \alpha_{SMC} \ln SMC_{t-1} + \alpha_{TVT} \ln TVT_{t-1} + \sum_{i=1}^p \alpha_i \Delta \ln SPV_{1t-i} + \sum_{j=0}^q \alpha_j \Delta \ln SMR_{1t-j} + \sum_{k=0}^n \alpha_k \Delta \ln TOR_{1t-k} + \sum_{l=0}^n \alpha_l \Delta \ln SMC_{1t-l} + \sum_{m=0}^n \alpha_m \Delta \ln TVT_{1t-m} + \mu_t \dots(3)$$

The ECM term to be established in the model is of the form:

$$\Delta \ln SPV_t = \delta_0 + \sum_{i=1}^p \delta_i \Delta \ln SPV + \sum_{k=0}^q \delta_3 \ln \Delta SMR_{t-k} + \sum_{l=0}^o \delta_4 \Delta TOR_{t-l} + \sum_{m=0}^n \delta_5 \Delta TVT_{t-m} + \omega ECM_{t-1} + \varepsilon_t \dots(4)$$

Masih and Masih (1997) propose that the existence of the ECM term in the model shows the variations in the explained variable in both the short and long-run models (Javangwe & Takawira, 2022).

4. EMPIRICAL RESULTS AND DISCUSSION

As per Table 1, the time series of Models is integrated at level I(0) and/or first difference I(1). According to Zivot Andrews Test, the null hypothesis (H_0); The presence of unit root was refused for all variables at the first difference I(1) except SMR and SMC, which is stationary at level I(0). The model is tested for ARDL bounds tests with the control variables (SMR, TOR, SMC, and TVT) to proceed with cointegration estimation.

Table 1: Unit Root Test

Variables	@ I (0)		@ I (1)	
	t- Stats	B. Year	t- Stats	B. Year
SPV	-3.52	2003	-5.52***	2010
SMR	-5.94***	2008		
TOR	-0.15	2017	-5.98***	2010
SMC	-6.13***	2013		
TVT	-1.83	2012	-5.4***	2011

Source: Compiled by authors through Stata 18

Table 2 reports the optimal lag length of four (4) out of a maximum of 4 lag lengths as selected by four different criteria: Likelihood Ratio (LR), Akaike Information Criteria (AIC), Hannan-Quinn Information Criterion (HQIC) and Schwarz Information Criterion(SBIC).

Table 2: Lag-Order Selection Criteria

Number of obs=17

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-318.72				2.4e+10	38.08	38.10	38.33
1	-288.43	60.58	25	0.000	1.5e+10	37.46	37.60	38.93
2	-212.24	152.37	25	0.000	1.1e+08	31.44	31.70	34.13
3	1083.03	2590.5	25	0.000	1.2e-54*	-118.003	-117.61	-114.08
4	2419.60	2673.1*	25	0.000	—	-274.24*	-274.24*	-270.49*

*Optimal lag

The time series of the Model is integrated at level I(0) and/or first difference I(1); to determine the cointegration relating the study variables, we need to conduct the ARDL bond test. The tests indicate (See Tables 3 and 4) that the F value is less than the critical value for I(0) regressors or t stat is greater than the critical value for I(0) regressors to accept the null hypothesis, that there is a cointegration linking between stock price volatility and stock return.

Table 3: ARDL Bounds Test

Variables	@ I (0)		@ I (1)	
	f- stats	Critical-V	f- stats	Critical-V
SPV	2.89	3.74	5.26	5.06

Accept if $F < \text{critical value for I (0) regressors}$, Reject If $F > \text{critical value for I (1) regressors}$.

Table 4: ARDL Bounds Test

Variables	@ I (0)		@ I (1)	
	t- stats	Critical-V	t- stats	Critical-V
SPV	-3.83	-4.85	-4.90	-4.80

Accept if $t > \text{critical value for I (0) regressors}$, Reject if $t < \text{critical value for I (1) regressors}$.

we estimate the long-run equilibrium connection between the variables in Table 5 and report the approximation results. our empirical evidence exposes that the relationship between stock price volatility and SMR and TVT is negatively significant at 5% and 1%, respectively. whereas TOR and SMC estimated long-run coefficients are significant at 5%. The result of the long-run estimated coefficient shows that a 1% increase in stock market return will lead to a decrease of 0.09% in stock price volatility while a 1% increase in stock return will fall TVT by 9.3%. furthermore, increasing 1% TOR, and SMC will increase stock price volatility in 2.07%, and 12,43% respectively. the coefficient of determination (R^2) is 0.9535. the result shows that about 95% of the variation in stock price volatility is affected by variations in the explanatory variables.

Table 5: Long-Run Effect

ARDL (2,2,2,2,2) regression				Number of obs	=19
Sample: 2002 thru 2020				R- squared	=0.9535
Log-likelihood = -30.19				Adj R- squared	=0.7909
Dependent Variable: Stock Price Volatility (SPV)				Root MSE	= 2.5840
Regressors	Coefficient	Standard error	t- value	P value	
SMR	-0.09	0.30	-0.31	0.05	
TOR	2.07	1.81	1.14	0.03	
SMC	12.43	9.25	1.34	0.02	
TVT	-9.30	6.46	-1.44	0.01	

Source: Compiled by authors through Stata 18

A correction error model was conducted to assess the variables' short-term effects. Regressors significantly impact the response variable at first difference. Error correction term specifies the speed of adjustment to fix up equilibrium in the dynamic model. The ECM coefficient shows how speedily variables converge to equilibrium, and it should have a statistically significant coefficient with a negative (-) sign. The speed adjustment of the study toward equilibrium is 37% for each year. According to Bannerjee et al. (1998), the highly significant error correction term further verifies the existence of a stable long-run relationship. In a short-run relationship, a change in 1% stock return, the stock price volatility will decrease by 11%. These associations are significant based on p values, as shown in Table 6.

Table 6: Correction Error Model

ARDL (2,2,2,2,2) regression				Number of obs	=19
Sample: 2002 thru 2020				F (14,4)	=17.28
Dependent Variable: Stock Price Volatility (SPV)				Prob>F	=0.0069
				R- square	=0.9837
				Adj R- squared	=0.92
Log-likelihood =30.19507				Root MSE	= 2.5840
Regressors	Coefficient	Standard error	t- value	P> t value	
D(SMR)	-0.11	0.12	-2.89	0.04	

D(TOR)	0.05	0.11	2.46	0.06
D(SMC)	0.33	0.84	2.39	0.07
D(TVT)	-0.13	0.94	-2.47	0.07
ECT(-1)	-0.37	0.22	2.85	0.02

Source: Compiled by authors through Stata 18

For the stability of the model, based on Durbin Watson's d-statistic (15, 19) =3.11 and the B-G LM Test for Autocorrelation, P=0.0008, the model has no serial correlation.

Table 7: Breusch- Godfrey LM test

Breusch- Godfrey LM test for autocorrelation			
Lags(P)	Chi2	df	Prob>CHI2
4	19.000	4	0.0008

H₀: no serial correlation

Source: Compiled by authors

Furthermore, the white test indicates that p is greater than 0.005, which means no heteroscedasticity problem exists in the model, as shown in Table 8:

Table 8: White Test

H ₀ =Homoscedasticity H _a = Unrestricted Heteroscedasticity Chi2(8) = 9.00 Prob>chi2= 0.34 Cameron and Trivedi's decomposition of IM test			
Source	Chi2	df	P
Homoscedasticity	19.00	18	0.39
Skewness	10.72	14	0.70
Kurtosis	2.27	1	0.13
Total	31.99	33	0.51

Source: Developed by Authors

The study used the cumulative sum squares (CUSUMSQ) test that Borensztein et al. (1998) proposed and applied to the residuals of the ECM model to evaluate its stability (Alimi, 2014). It can be seen from Figure 1. that the plot of CUSUMQ stays within the critical 5% bounds that confirm the long-run associations among variables and thus show the constancy of the coefficient.

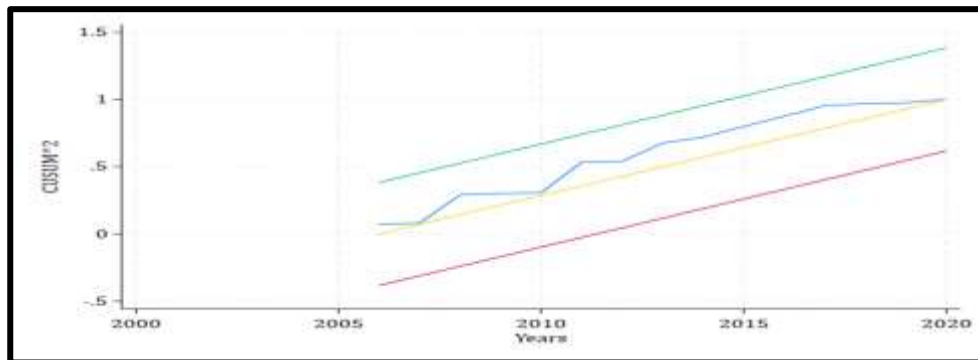


Fig 1. Cusum Sequire

Source: Compiled by authors through Stata 18

5. CONCLUSION AND DISSCUSION

This study shows the association between stock price volatility and stock return in Turkish stock markets from 2002 to 2020. For some variables, the Data was not stationary at the level; at the first difference, the data became stationary. The ARDL bond test results indicate a long-term relationship between regressors and the response variable. An error correction model was conducted to assess the short-term linkage between the mentioned variables. For the stability of the model, some tests (Durbin Watson, Breusch- Godfrey LM test for autocorrelation, white test, and CUSUM Square) were employed and showed the stability of the error correction model.

The Turkish Stock Exchange must monitor the probable determinants contributing to stock price volatility. To stabilize the movement of stock prices, it is crucial to consider the real gross domestic product growth rate as one of the primary elements to address, among other internal factors that impact liquidity, such as stock market liquidity and share volume. It is essential to enhance the laws and regulations that regulate stock exchange operations to safeguard the interests of buyers and sellers on the stock market. This will strengthen investors' market confidence and stimulate domestic investor engagement, expanding the economy's stock ownership base. In addition, the government must promote listing private enterprises on the stock exchange by offering tax advantages and enhancing the markets' liquidity.

The study's literature shows the effect of different explanatory variables (gold price, emergency economy, return on asset, return on equity, net profit margin, inflation, foreign exchange rate, and interest rate) on stock return and finds differing results in different research methods. Lashgari and Ahmadi (2014) conducted research on the effect of dividend policy on stock price volatility. They found a significant adverse effect, which is in line with our hand-held result of the research. The stock market is mainly dependent on foreign direct investment. To stabilize the stock price volatility, regulatory bodies, policymakers, academicians, practitioners, and researchers could pay attention to analyzing the effect of foreign direct investment (FDI) on stock price volatility.

REFERENCES

- Nguyen, T., Nguyen, H., Tran, Q., & Le, Q. (2020). Dividend policy and share price volatility: empirical evidence from Vietnam. *Accounting*, 6(2), 67-78.
- Li, S., Wang, Y., Zhang, Z., & Zhu, Y. (2022). Research on the factors affecting stock price volatility. 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022),
- Qammar, R., & Zain-Ul-Abidin, R. (2019). Is Stock Price Volatility A Risk? An Evaluation Review. *International Journal of Management, Accounting & Economics*, 6(1).
- Fama, E. F. (2017). *The Fama Portfolio: Selected papers of Eugene F. Fama*. University of Chicago Press.
- Maulana, Y., Nugraha, N., Disman, D., & Sari, M. (2023). The Effect of Financial Fundamentals on Stock Returns with Sustainability as a Intervening Variable. *Jurnal Ilmu Keuangan Dan Perbankan (JIKA)*, 12(2), 317-328.
- Mishra, P. K., Das, J., & Mishra, S. K. (2010). Gold price volatility and stock market returns in India. *American Journal of Scientific Research*, 9(9), 47-55.
- Olweny, T., & Omondi, K. (2011). The effect of macro-economic factors on stock return volatility in the Nairobi stock exchange, Kenya. *Economics and Finance Review*, 1(10), 34-48.
- Kishor, N., & Singh, R. P. (2014). Stock return volatility effect: Study of BRICS. *Transnational Corporations Review*, 6(4), 406-418.
- Bhowmik, R., & Wang, S. (2020). Stock market volatility and return analysis: A systematic literature review. *Entropy*, 22(5), 522.

- Nadyayani, D. A. D., & Suarjaya, A. A. G. (2021). The effect of profitability on stock return. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 5(1), 695-703.
- Lashgari, Z., & Ahmadi, M. (2014). The impact of dividend policy on stock price volatility in the Tehran stock exchange. *Arabian Journal of Business and Management Review (Kuwait Chapter)*, 3(10), 273-283.
- Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth? *Journal of international Economics*, 45(1), 115-135.
- Alimi, R. S. (2014). ARDL bounds testing approach to Cointegration: A re-examination of augmented fisher hypothesis in an open economy. *Asian Journal of Economic Modelling*, 2(2), 103-114.
- Çirakli, Ü., & Yildirim, H. H. (2019). The impacts of economic crises on health behaviors of population: An ARDL bounds testing approach. *Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(1), 101-123.
- Javangwe, K. Z., & Takawira, O. (2022). Exchange rate movement and stock market performance: An application of the ARDL model. *Cogent economics & finance*, 10(1), 2075520.
- Masih, A. M., & Masih, R. (1997). A comparative analysis of the propagation of stock market fluctuations in alternative models of dynamic causal linkages. *Applied Financial Economics*, 7(1), 59-74.

