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SUSTAINABLE FINANCE AND THE CIRCULAR ECONOMY

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SESSION III. SUSTAINABLE FINANCE AND THE CIRCULAR ECONOMY

SUBSTANȚELE CHIMICE ŞI DEŞEURILE ACESTORA ÎN REPUBLICA MOLDOVA: GRADUL DE INFORMARE ȘI CONȘTIENTIZARE A POPULAȚIEI

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Abstract. *Chemicals are used in dozens of industries and are found in thousands of consumer products that we purchase daily. The chemicals and substances that make up these products can have a significant impact on health and the environment. Access to information about the chemicals in products is a global issue that requires worldwide collaboration among stakeholders across the entire life cycle of these substances. The lack of information regarding chemicals in products is one of the obstacles to reducing the risks associated with these chemicals. This article presents some results from the study on "Public Concerns Regarding Chemicals and Their Waste in the Republic of Moldova," which was developed as part of the national chemical safety campaign within the project "Promoting Good Governance and Building Platforms for Better Coordination of Sustainable Chemicals and Waste Management in Line with the SAICM Post-2020 Approach in Moldova." in partnership with Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union". The aim of this article is to identify the level of knowledge, information, and attitudes of the survey respondents concerning issues related to chemicals and their waste. To achieve the proposed objectives, general scientific methods were applied: analysis, synthesis, survey, interview, statistical processing of empirical data, graphic methods, indicators, comparison, grouping, etc. The informational support of the research is primarily based on a developed questionnaire.*
Keywords*: chemicals, environmental protection, hazardous waste, level of information*
JEL*: O10, O13, O20, Q56*
UDC: *502.174*

Introducere. Substanțele chimice sunt folosite în zeci de industrii și se găsesc în mii de produse de consum pe care le achiziționăm zilnic. De la alimente la produse

cosmetice, la vopsele și textile, substanțele chimice sintetice naturale și manufacturate sunt prezente în fiecare aspect al vieții noastre. Produsele chimice și substanțele care intra în compoziția acestora pot avea un impact semnificativ asupra sănătății și mediului ambiant. Acest impact poate fi pozitiv sau negativ, în funcție de felul în care sunt folosite și gestionate. Accesul la informațiile despre substanțele chimice din produse este o problemă globală, care necesită o colaborare la scară mondială, între părțile interesate și pe întreg ciclul de viață a acestora. Împărtășirea informațiilor despre substanțele chimice din produse între toate părțile interesate implicate în ciclul de viață. Lipsa de informații privind substanțele chimice din produse este unul dintre obstacolele în calea reducerii riscurilor legate de aceste substanțe chimice. Datele statistice arată că emisiile industriale, cum ar fi emisiile de dioxid de sulf și de particule fine, contribuie la creșterea poluării aerului și la creșterea cazurilor de boli respiratorii și cardiovasculare la nivel global. În Republica Moldova, conform BNS, în anul 2021, evacuarea substanțelor poluante de la sursele staționare ale agenților economici pe ingrediente a constituit 17,5 mii tone (BNS, 2021).

Conform Programului privind managementul durabil al substanțelor chimice, aprobat în noiembrie 2023, în Republica Moldova se produce un spectru îngust de substanțe chimice și amestecuri, cum ar fi: preparate farmaceutice, fertilizanți, coloranți, lacuri și vopsele, preparate ignifuge, produse și preparate de parfumerie, amestecuri de substanțe odorizante, produse din mase plastice. Datele denotă că, volumul producerii industriale a produselor ce fac parte din activitatea economică C20 ,,Fabricarea substanțelor și a produselor chimice" are o tendință de oscilantă de creștere. Cea mai mare pondere o deține producerea cleiurilor - circa 64 %, urmată de preparate de spălat și curățat - 9 %, polietilen tereflalat și săpunuri - câte 3,5 % fiecare. Astfel, în anul 2022, valoarea produselor chimice a constituit 2,5 mlrd MDL (Program, 2023).

Totuși, majoritatea necesităților economiei naționale privind substanțele și produsele chimice sunt acoperite din import. Principalele substanțe chimice importate sunt: îngrășăminte, pesticide, diverse materii prime, produse și substanțe pentru industria de prelucrare și pentru alte industrii. Astfel, în anul 2022, în R. Moldova au fost importate produse chimice în valoare de circa 3,7 mil. USD. Aceste statistici ilustrează impactul semnificativ al substanțelor chimice și al activităților umane asupra mediului și subliniază necesitatea luării de măsuri pentru a minimiza acest impact și a proteja ecosistemele și sănătatea umană. Taylor și et. (2018) au concluzionat că îndeplinirea responsabilității față de mediu poate sacrifica anumite beneficii economice pe termen scurt, dar garantează dezvoltarea durabilă pe termen lung. Graafland (2021) a concluzionat că îndeplinirea responsabilității de mediu de către companii a devenit un standard strict, trecând de la o constrângere ușoară, deoarece forțele sociale din toate direcțiile sunt foarte preocupate de acest aspect, iar asumarea responsabilității de mediu a devenit o oportunitate și un obiectiv pentru dezvoltarea companiilor. Îndeplinirea responsabilității de mediu de către companii este o formă directă de atitudine pozitivă a acestora față de problemele legate de protecția mediului. Companiile dispuse să își asume responsabilitatea de mediu în

mod proactiv au de obicei un avantaj în atingerea dezvoltării durabile (Huk și Kurowski, 2021).

Acest articol conține unele rezultate reflectate în studiul privind „Preocupările publicului în domeniul substanțelor chimice şi deşeurilor acestora în Republica Moldova", care a fost elaborat în cadrul campaniei naționale de siguranța chimică, în cadrul proiectului "Promovarea bunei guvernări și construirea de platforme pentru o mai bună coordonare a gestionării durabile a substanțelor chimice și deșeurilor în conformitate cu abordarea SAICM post 2020 în Moldova" în parteneriat cu Subprogramul 030101 „Fortificarea rezilienței, competitivității și durabilității economiei Republicii Moldova în contextul procesului de aderare la Uniunea Europeană". Prezentul articol are scopul de a identifica gradul de cunoaștere, informare și atitudine a respondenților participanți la sondaj vis-a-vis de subiectele legate de substanțele chimice și a deșeurilor acestora.

Metodologia utilizată. Pentru realizarea obiectivelor propuse au fost aplicate metodele științifice generale: analiza, sinteza, sondajul, interviul, prelucrarea statistică a datelor empirice, metoda graficelor, indicatorilor, comparația, gruparea etc. Suportul informațional al cercetării este constituit dintr-un chestionar elaborat. Datele prezentate în acest studiu au fost colectate și prin metoda Interviurilor telefonice pe baza chestionarului menționat, iar răspunsurile au fost prelucrate și sistematizate pe Platforma Google forms. La sondaj au participat 2680 persoane, din care 54,5% au fost respondenți de genul feminin, și 45,5% - respondenți de genul masculin. Categoria de vârstă a celor mai activi respondenți a fost încadrată în limita 41-60 ani (34,0%), și respectiv respondenți în limita de vârstă 26-40 ani au constituit 29,8%, 14-25 ani (23,4%) și peste 60 ani (12,8%). Circa 50,7% din respondenți sunt cu studii superioare, 22,6 % au studii profesionale și 26,7% - sunt cu studii medii.

Din analiza eșantionului s-a atestat o repartiție geografică conform Figurii 1, De menționat că la acest studiu a participat și diaspora, care a atins ponderea de circa 10% din total respondenți. Cele mai reprezentative raioane și municipii au fost, după cum urmează: Chișinău – 10%, Cahul – 8,5%, Bălți – 8% Ungheni – 7,5%, Călărași – 12%, Orhei – 10%, Hâncești – 9%, Nisporeni – 8%, Restul raioanelor – 17%. Din cei 2680 de respondenți, circa 54,6% locuiesc în mediul urban și 45,4% locuiesc în mediul rural. Culoarea verde a hărții din Figura 1, indică raioanele de unde au parvenit răspunsuri la chestionar.

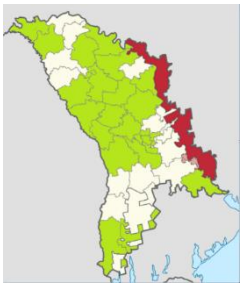

Figura 1. **Repartizarea geografică a respondenților**
Sursa: date prelucrate în baza chestionarului

La sondaj au participat circa 21% de antreprenori (inclusiv manageri și conducători), 19% - fermieri, 19% - specialiști calificați (profesori, medici, ingineri, etc.), circa17% - specialiști necalificați (inclusiv muncitori etc.), 12% - elevi, studenți, 9% - funcționari publici. Circa 1% - sunt pensionari.

Eșantionul este unul reprezentativ și corespunde scopului prezentului studiu, este unul de tip probabilist, stratificat, aleatoriu, cu respectarea condițiilor studiului. Eroarea maximă de eșantionare a fost estimată de ±5%.

Atitudinea respondenților privind problemele de mediu în Republica Moldova. În urma răspunsurilor colectate, s-au conturat top 5 probleme majore de mediu cu care se confruntă Republica Moldova, în opinia respondenților:

1. **Poluarea solului prin utilizarea pesticidelor**: a fost identificată drept cea mai gravă problemă de mediu, aproximativ 84% dintre respondenți considerând-o o preocupare majoră. În principiu, respondenții au răspuns în astfel de proporție, deoarece este bine cunosctut faptul despre utilizarea excesivă și necontrolată a pesticidelor, cu care s-a confruntat agricultura Moldovei în perioada sovietică, a afectat și continuă să afecteze calitatea solului, contaminând resursele agricole și, în consecință, punând în pericol sănătatea publică.

2. **Poluarea apei:** a doua problemă majoră, menționată de 81% dintre respondenți. Acest răspuns a inclus mai multe opțiuni, cum ar fi: contaminarea râurilor, lacurilor și a apelor subterane, cauzată de gestiunea dăunătoare a deșeurilor industriale și agricole, precum și de lipsa unor sisteme eficiente de tratare a apelor uzate, cu care Republica Moldova se confruntă în prezent.

3. **Managementul ineficient al deșeurilor**: aproximativ 72% dintre respondenți au evidențiat problemele legate de gestionarea deșeurilor, subliniind necesitatea unor soluții mai bune pentru colectarea, reciclarea și eliminarea deșeurilor. Depozitarea necorespunzătoare a deșeurilor, care a fost menționată, de asemenea, contribuie la poluarea mediului și afectează sănătatea publică.

4. **Eroziunea solurilor**: cu 65% dintre respondenți menționând-o, eroziunea solurilor este o altă problemă majoră, care duce la pierderea fertilității terenurilor agricole, afectând astfel productivitatea agricolă și biodiversitatea. Din analizele efectuate se constată că anume practicile agricole nesustenabile și defrișările, lipsa rotației culturilor, etc. contribuie semnificativ la acest fenomen.

5. **Schimbările climatice**: circa 59% dintre respondenți au identificat schimbările climatice drept o preocupare majoră, reflectând impactul tot mai vizibil al acestora asupra mediului, economiei și sănătății. Modificările în regimul precipitațiilor, creșterea temperaturilor și fenomenele meteorologice extreme sunt doar câteva dintre efectele menționate de respondenți.

De asemenea, este important de menționat faptul că 32% dintre respondenți nu au fost în măsură să identifice care ar fi problemele majore de mediu pentru Republica Moldova. Acest procent semnificativ sugerează o lipsă de conștientizare sau informare în rândul populației cu privire la problemele de mediu, evidențiind necesitatea unor campanii de educație și sensibilizare mai intense în acest domeniu.

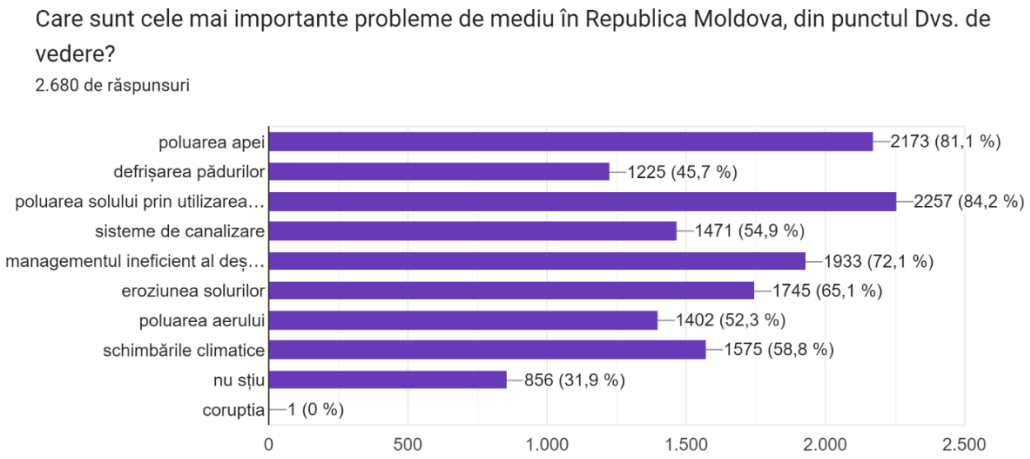

Figura 2. **Cele mai importante probleme de mediu în Republica Moldova, conform opiniei respondenților**

Sursa: date prelucrate în baza chestionarului

Opinia respondenților privind instituțiile care ar trebui să ofere informații despre problemele de mediu reflectă în mod clar încrederea acordată anumitor entități și nevoia de surse de informare credibile. Distribuția răspunsurilor evidențiază prioritățile și percepțiile publicului cu privire la rolul diferitelor instituții în educarea și informarea despre mediul înconjurător. Astfel, am obținut următoarele rezultate:

1. **Autoritățile de mediu:** aproximativ 81% dintre respondenți consideră că autoritățile de mediu ar trebui să fie principala sursă de informații privind problemele de mediu. Acest rezultat subliniază așteptările ridicate ale populației față de aceste instituții, care sunt percepute ca fiind direct responsabile pentru monitorizarea și gestionarea aspectelor legate de protecția mediului.

2. **Autoritățile de sănătate publică**: în jur de 69% dintre respondenți au indicat că autoritățile de sănătate publică ar trebui să ofere informații privind problemele de mediu. Această opinie reflectă, de fapt, legătura percepută între sănătatea mediului și sănătatea publică, populația fiind conștientă de impactul pe care poluarea și alte probleme de mediu îl pot avea asupra sănătății.

3. **Mass media**: doar 49% din respondenți au menționat că mass media este o sursă importantă de informare. În principiu, din studiu, se observă că respondenții văd drept un rol al mass media în diseminarea informațiilor și sensibilizarea publicului larg cu privire la problemele de mediu. Deși mass media este recunoscută ca un canal relevant, procentul sugerează că există încă o nevoie de creștere a acoperirii și calității informațiilor transmise de către mass media.

4. **Primăriile:** așteptările respondenților față de administrațiile publice locale sunt văzute doar cu 47 la sută ca fiind apropiate de cetățeni și responsabile pentru informare.

5. **Consiliile raionale, asociațiile obștești, grupurile de acțiune locală, ministerele de ramură**: aceste instituții au acumulat un procentaj și mai mic, de până la 33%, indicând o încredere relativ scăzută sau o vizibilitate mai redusă în rândul respondenților.

Circa 30% dintre respondenți nu au știut ce să răspundă la această întrebare, ceea ce sugerează o potențială lipsă de cunoaștere sau de interes în legătură cu sursele de informare privind problemele de mediu.

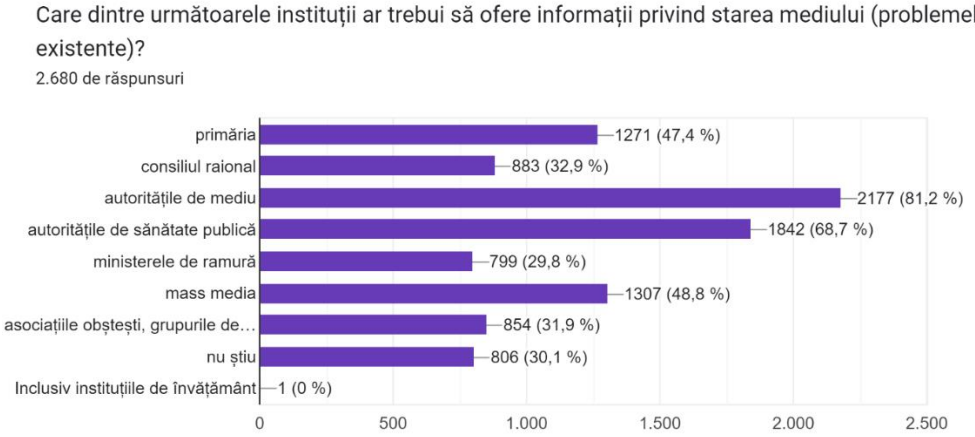

Figura 3. **Instituțiile care trebuie să ofere informații privind starea mediului, în opinia respondenților**
Sursa: date prelucrate în baza chestionarului

Gradul de conștientizare a respondenților privind problemele legate de utilizarea produselor/substanțelor chimice. Circa 75% dintre respondenți consideră că localitățile în care locuiesc se confruntă cu probleme legate de utilizarea produselor sau substanțelor chimice. Acest procent semnificativ reflectă o preocupare generală în rândul populației privind impactul negativ al chimicalelor asupra mediului și sănătății publice. Substanțele chimice, cum ar fi pesticidele, îngrășămintele sau alte produse industriale, sunt percepute ca fiind factori de risc majori care afectează solul, apa și aerul, contribuind astfel la deteriorarea calității vieții. Pe de altă parte, circa 13% dintre respondenți nu au știut ce să răspundă la această întrebare, indicând fie o lipsă de informare, fie o percepție mai redusă a riscurilor asociate utilizării substanțelor chimice. De asemenea, este de menționat că 12% dintre respondenți consideră că în localitățile lor nu există probleme legate de utilizarea produselor sau substanțelor chimice. Acest lucru poate reflecta fie condiții locale mai bune, fie o percepție diferită asupra riscurilor, însă ar putea, de asemenea, indica o subestimare a impactului acestor substanțe asupra mediului înconjurător.

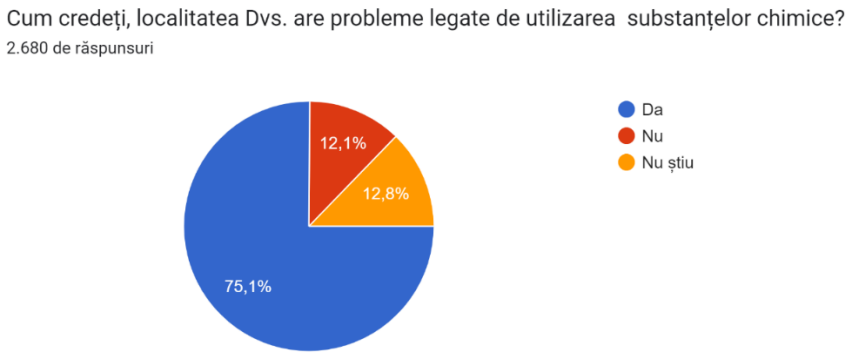

Figura 4**. Opinia respondenților privind existența problemelor legate de utilizarea produselor/substanțelor chimice în localitatea sa**
Sursa: date prelucrate în baza chestionarului

Gradul de conștientizare a comunității în care locuiesc respondenții studiului este evidențiat prin următoarele constatări:

- Circa 49% dintre respondenți consideră că locuitorii sunt puțin conștienți de problemele de mediu din localitate. Acest procent indică faptul că, deși există o oarecare conștientizare, nivelul de informare și sensibilizare cu privire la problemele de mediu este insuficient pentru a genera acțiuni concrete la nivel comunitar.
- 18% dintre respondenți au declarat că locuitorii sunt conștienți de problemele de mediu. Această minoritate sugerează că există anumite comunități sau grupuri unde educația și informarea cu privire la mediul înconjurător sunt mai eficiente, ceea ce ar putea servi drept model pentru alte localități.
- 16,7% dintre respondenți consideră că locuitorii nu sunt deloc conștienți de problemele de mediu din localitate. Acest rezultat este îngrijorător, deoarece indică existența unor comunități, unde problemele de mediu sunt ignorate sau minimizate, ceea ce poate duce la agravarea situațiilor de mediu și la dificultăți în implementarea măsurilor de protecție.
- 16,8% dintre respondenți nu au știut ce să răspundă la această întrebare, ceea ce arată o lipsă de claritate sau de informare atât la nivel individual, cât și comunitar. Această incertitudine subliniază necesitatea unor eforturi suplimentare de sensibilizare și educație, pentru a îmbunătăți gradul de conștientizare a problemelor de mediu în rândul populației.

Aceste rezultate indică faptul că, în general, există un nivel scăzut de conștientizare a problemelor de mediu în comunitățile studiate, evidențiind nevoia de acțiuni concertate pentru educarea și implicarea activă a cetățenilor în protejarea mediului.

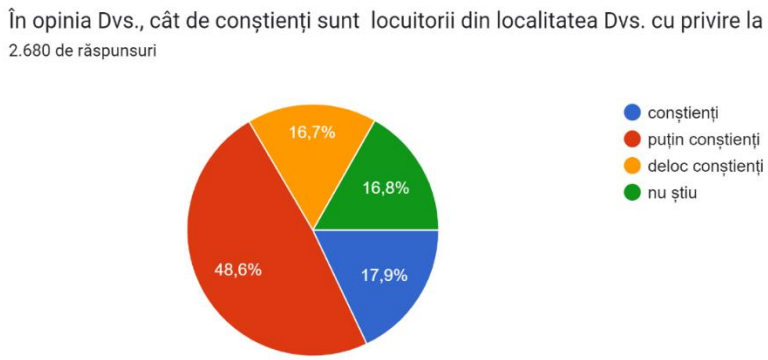

Figura 5**. Gradul de conștientizarea a locuitorilor din localitățile respondenților privind problemele de mediu**

Sursa: date prelucrate în baza chestionarului

Astfel, din răspunsurile enunțate putem conchide faptul că respondenții în mare parte sunt conștienți de problemele majore de mediu cu care se confruntă Republica Moldova, sunt conștienți de faptul că aceste probleme sunt corelate și cu utilizarea produselor/substanțelor chimice. Marea majoritate din respondenți preferă să se documenteze despre substanțele, produsele chimice din Internet și alte rețele de socializare. De notat, un procent mare de respondenți care nu au știut ce să răspundă, prin urmare nu sunt la curent cu situația în domeniu.

Gradul de informare privind substanțele/produsele chimice cu un risc sporit pentru sănătate. Rezultatele sondajului evidențiază preocupările respondenților cu privire la impactul substanțelor și produselor chimice asupra sănătății, arătând o conștientizare ridicată a riscurilor asociate cu anumite materiale și produse utilizate frecvent. Astfel, am obținut următorul tablou:

- Pesticidele au fost identificate de circa 99% dintre respondenți ca reprezentând cel mai mare risc pentru sănătate. Acest consens aproape universal indică faptul că majoritatea populației este foarte conștientă de pericolele legate de utilizarea pesticidelor, probabil datorită legăturilor clare între aceste substanțe și problemele de sănătate, cum ar fi intoxicațiile, problemele respiratorii și efectele pe termen lung asupra mediului.
- Plasticul a fost considerat un risc major de 83% dintre respondenți, ceea ce sugerează o înțelegere largă a pericolelor pe care le prezintă plasticul, atât în ceea ce privește poluarea mediului, cât și potențialele efecte asupra sănătății umane, inclusiv expunerea la microplastice și aditivi chimici dăunători.
- Uleiurile industriale, cum ar fi cele utilizate pentru mașini și aparate, au fost menționate de 77% dintre respondenți ca fiind riscante. Aceste produse sunt adesea asociate cu poluarea apei și a solului, precum și cu expunerea toxică, ceea ce explică gradul ridicat de conștientizare a riscurilor lor.
- Lacurile și vopselele au fost considerate periculoase de 69% dintre respondenți. Respondenții au menționart că aceste produse chimice pot conține solvenți și alte

substanțe toxice, care pot afecta calitatea aerului și pot provoca probleme de sănătate, cum ar fi iritațiile respiratorii și alergiile.

- 64% dintre respondenți au indicat că termometrele cu mercur reprezintă un risc major, astfel s-a menționat că drept pericol pentru sănătate este expunerea la mercur, o substanță extrem de toxică, care poate cauza daune grave sistemului nervos și altor organe.
- Medicamentele și produsele farmaceutice au fost considerate riscante de 61% dintre respondenți, ceea ce subliniază îngrijorarea legată de eliminarea necorespunzătoare a acestor produse, care pot contamina apa și solul, afectând atât sănătatea umană, cât și ecosistemele.
- Foile de ardezie au fost menționate de 53% dintre respondenți, ceea ce poate fi legat de conținutul de azbest, cunoscut pentru efectele sale cancerigene.
- 47% dintre respondenți au ales detergenții drept substanțe periculoase, explicând prin faptul că aceste produse pot provoca iritații și alte probleme de sănătate, în special în cazul utilizării îndelungate.

În plus, 26,5% dintre respondenți nu au știut ce să răspundă, ceea ce sugerează, din nou, o nevoie de informare suplimentară privind riscurile asociate cu diverse substanțe chimice. De asemenea, 19% dintre respondenți nu au considerat că substanțele și produsele chimice enumerate prezintă un risc sporit pentru sănătate, ceea ce ar putea reflecta o subestimare a riscurilor sau o lipsă de conștientizare completă.

Aceste date subliniază importanța educării publicului cu privire la riscurile chimice și nevoia de măsuri eficiente pentru a reduce expunerea la aceste substanțe periculoase, contribuind astfel la îmbunătățirea sănătății publice și protecția mediului.

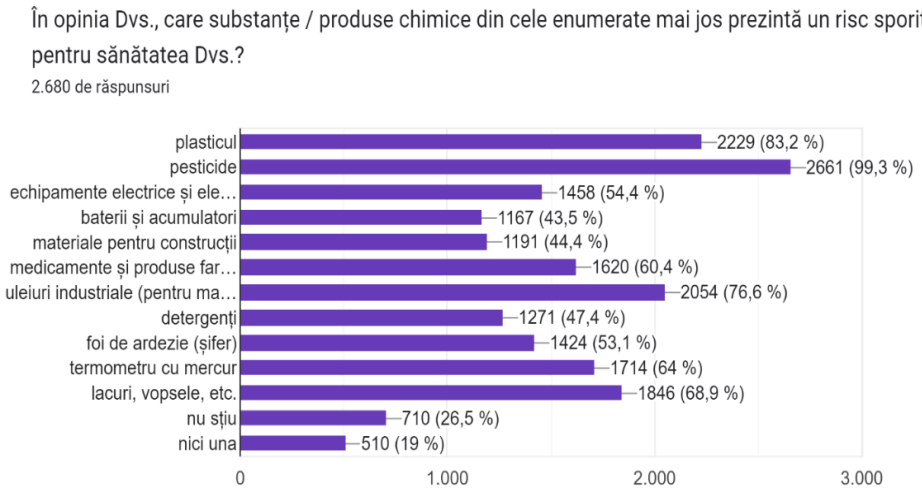

Figura 6. **Opinia respondenților privind substanțele/produsele chimice cu un impact sporit pentru sănătate**

Sursa: date prelucrate în baza chestionarului

Conform opiniei respondenților, gradul de cunoaștere privind substanțele și produsele chimice variază semnificativ:

- Circa 36% dintre respondenți declară că, cunosc foarte bine ce reprezintă substanțele și produsele chimice. Aceștia sunt probabil bine informați despre natura acestor substanțe, utilizările lor și impactul pe care îl pot avea asupra sănătății și mediului.
- Circa 34% dintre respondenți afirmă că au o cunoaștere generală despre substanțele chimice, dar nu pot afirma cu certitudine semnificația și impactul acestora. Acest grup are o înțelegere de bază, însă le lipsesc informațiile detaliate necesare pentru a înțelege pe deplin consecințele utilizării acestor produse.
- Circa 17% dintre respondenți cunosc foarte puțin despre substanțele și produsele chimice. Procentul respectiv indică, de fapt, o lipsă de informare sau educație în acest domeniu, ceea ce poate reprezenta un risc în ceea ce privește expunerea nesigură la aceste substanțe.
- 2% dintre respondenți nu cunosc nimic despre substanțele și produsele chimice, sugerând o totală lipsă de conștientizare și, implicit, o vulnerabilitate mai mare la potențialele pericole.
- Pe circa 11% dintre respondenți nu îi interesează substanțele și produsele chimice. Această lipsă de interes poate reflecta o percepție că aceste substanțe nu le afectează direct viața sau o deconectare de la problemele de mediu și de sănătate publică asociate cu ele.

Aceste rezultate subliniază o distribuție largă a nivelurilor de cunoaștere și interes față de substanțele și produsele chimice în rândul populației. Deși un procent semnificativ are o bună înțelegere a acestui subiect, există încă o parte considerabilă a populației care fie este insuficient informată, fie nu manifestă interes, ceea ce sugerează necesitatea unor programe de educare și conștientizare mai eficiente și mai accesibile.

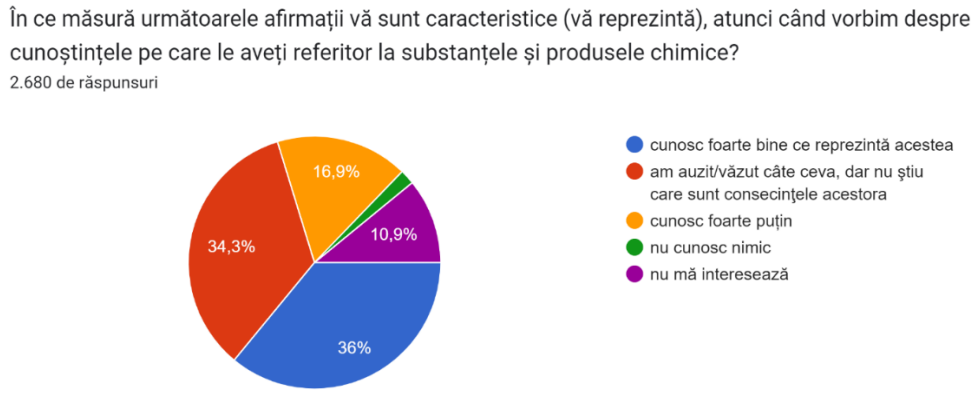

Figura 7. **Gradul de cunoaștere a respondenților privind substanțele /produsele chimice (autoevaluare)**

Sursa: date prelucrate în baza chestionarului

Gradul de informare al respondenților privind impactul substanțelor chimice și a deșeurilor acestora asupra mediului și sănătății umane relevă niveluri variate de cunoștințe și conștientizare în rândul populației:

- Marea majoritate, aproximativ 47% dintre respondenți, au declarat că sunt informați doar într-o mică măsură despre impactul substanțelor chimice și al deșeurilor acestora. Prin urmare, există o conștientizare de bază a problemei, dar că multe persoane nu au acces la informații detaliate sau nu sunt expuse în mod suficient la educația și resursele necesare pentru a înțelege pe deplin riscurile.
- Circa 29% dintre respondenți au afirmat că sunt bine informați. Acești respondenți par să aibă un nivel mai avansat de cunoștințe, ceea ce le permite să recunoască și să înțeleagă riscurile asociate substanțelor chimice și gestionării deșeurilor.
- 12% dintre respondenți au indicat că sunt foarte bine informați. De aici apare și ipoteză fie că acest procent are acces la surse fiabile de informație fie beneficiază de educație și formare specifică, ceea ce le permite să fie conștienți de impactul semnificativ al acestor substanțe asupra sănătății și mediului, fie se supraestimează.
- Circa 13% dintre respondenți au declarat că nu sunt deloc informați. Această categorie reprezintă un segment vulnerabil al populației, care poate fi expus la riscuri mari fără a fi conștient de acestea.

Aceste date arată că, deși există un anumit nivel de informare în rândul populației, este evidentă nevoia de a îmbunătăți accesul la informații și de a promova o mai mare conștientizare cu privire la impactul substanțelor chimice și al deșeurilor acestora. Prin urmare, factorii de decizie ar trebui să gândească în politicile publice și posibilitatea de efectuare a unor campanii educaționale mai ample și mai accesibile care ar ajuta la creșterea gradului de conștientizare și la încurajarea unor practici mai sigure și mai responsabile în gestionarea acestor riscuri.

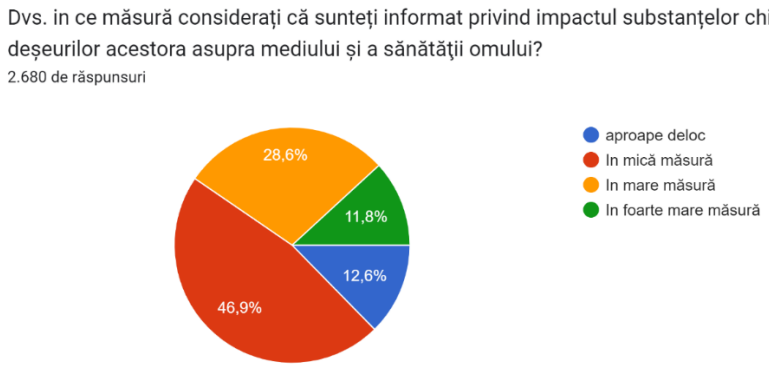

Figura 8. **Gradul de informare privind impactul substanțelor chimice și a deșeurilor acestora asupra mediului ambiant și a sănătății umane**
Sursa: date prelucrate în baza chestionarului

Concluzii finale. Din studiu realizat s-a atestat că respondenții posedă diferite nivele de informare și conștientizare a problemelor legate de protecția mediului, impactul substanțelor chimice, managementul deșeurilor acestora.
Pentru redresarea situației create în acest domeniu se pot întreprinde anumite acțiuni, cum ar fi:

1. Campanii de informare la locurile de studii și muncă – aproximativ 84% dintre respondenți consideră că educația directă și informarea la nivelul comunității sunt esențiale pentru creșterea gradului de conștientizare cu privire la impactul substanțelor chimice și la gestionarea deșeurilor.
2. Organizarea expozițiilor cu produse alternative celor chimice periculoase – aproximativ 66% dintre respondenți susțin promovarea alternativelor ecologice prin expoziții, oferind astfel consumatorilor opțiuni mai sigure și sustenabile.
3. Organizarea zilelor de informare în cadrul magazinelor care comercializează pesticide și produse de uz fitosanitar – 56% dintre respondenți consideră că astfel de evenimente ar contribui la o mai bună înțelegere a riscurilor asociate utilizării acestor produse și la promovarea unor practici mai sigure.
4. Instalarea containerelor și tomberoanelor pentru colectarea separată a deșeurilor electrice și electronice, inclusiv baterii uzate, a fost susținută de 99,3% dintre respondenți, acest procent impresionat indică faptul că populația este pregătită pentru colectarea separată a deșeurilor, însă lipsește infrastructura respectivă.

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DEZVOLTAREA COOPERAȚIEI DE CONSUM DIN REPUBLICA MOLDOVA DIN PERSPECTIVA INTEGRĂRII EUROPENE

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Abstract. *Cooperatives play a vital role in contemporary society due to their significant impact on socioeconomic development. They are key actors in the social economy, contributing substantially to occupational and inclusion policies and the development of local communities. Despite their considerable potential, cooperatives currently occupy a relatively minor position in broader economic and social policies and practices. Republic of Moldova's status as a candidate country (2022) and the initiation of European Commission accession (2023) have placed the nation on a new developmental trajectory. This shift emphasizes aligning economic and social policies, including those related to cooperatives, with community priorities and objectives. Concurrently, cooperatives in Moldova face numerous challenges, including economic, financial, regulatory, environmental, and governmental cooperation issues. These challenges necessitate a new vision for cooperative development, based on a systemic, innovative, and holistic approach. This research aims to analyze the current situation and trends in the development of consumer cooperatives in the Republic of Moldova. It evaluates European policies and practices in the cooperative sector to assess their applicability in Moldova and identifies strategic priorities and actions for the cooperative system's development. The research employs a comprehensive methodology. The main result of this research is the elaboration of the "Strategy for the Development of Consumer Cooperatives in the Republic of Moldova, 2025-2030." Implementing this strategy will enhance the cooperative sector's growth and increase its contribution to sustainable economic and social development.*
Key-words: *cooperatives, socioeconomic development, European integration*
JEL: *F15, M20, O20, O21, P13, Q13*
CZU: 334.73(478:4)

Introducere. Cooperativele sunt recunoscute drept afaceri de succes, fiind organizații orientate spre comunitate, deținute de membri și guvernate democratic, care reprezintă o forță importantă pentru creșterea economică și coeziunea socială. Ele activează în toate sectoarele economice şi terțiare, implică diferite tipuri de întreprinderi, indiferent de dimensiunile lor și sunt capabile să răspundă prompt la provocările societale. Cooperativele sunt prezente în toate zonele propuse de Obiectivele de Dezvoltare Durabilă.

Grație importanței cooperativelor, ONU a proclamat anul 2012 - Anul Internațional al Cooperativelor cu sloganul „Cooperativele construiesc o lume mai bună”, care rămâne a fi actual până în prezent. Recunoscând și apreciind rolul cooperativelor în societate, la Asambleea Generală a ONU din 20 iunie 2024 a fost proclamat și anul 2025 - Anul Internațional al Cooperativelor, care va derula sub același slogan. În 2016 UNESCO a recunoscut oficial cooperativele ca patrimoniu cultural imaterial al umanității datorită valorilor promovate.

Fiind organizații bazate pe valori și ghidate de principii oneste, întreprinderile cooperatiste sunt prin natura lor o formă de afaceri durabilă și participativă. Însă pentru asigurarea dezvoltării lor sustenabile sunt necesare politici eficiente, care să pună în valoare întregul lor potențial economic, social și ecologic și care să ia în considerare contextul național și viitoarele evoluții socioeconomice.

Pornind de la faptul că cooperația de consum din Republica Moldova este un sistem dinamic, care operează într-un mediu în continuă schimbare, şi având în vedere importanța planificării strategice pentru asigurarea funcționării sustenabile a acestuia, s-a decis promovarea prezentului studiu, care are drept scop evaluarea importanței şi rolului cooperativelor în economia modernă, analiza tendințelor de dezvoltare a cooperației de consum din țară, identificarea provocărilor pe care le întâmpină sistemul cooperatist şi argumentarea priorităților strategice de dezvoltare a sectorului.

Importanța acestui deziderat crește în condițiile obținerii Republicii Moldova a statutului de țară candidată pentru integrare în UE (2022) și deschiderea de către Consiliul European a negocierilor de aderare a republicii la UE (decembrie 2023) prin care țara noastră, dar și sectorul cooperativelor, și-a asumat angajamentul de aliniere la cadrul european.

Analiza literaturii. Cercetările privind natura, funcționarea și dezvoltarea cooperativelor sunt în atenția multor cercetători, iar aspectele privind susținerea cooperativelor sunt reflectate în multe documente de politici internaționale. Astfel, subiectele ce vizează rolul cooperativelor în economia socială sunt în atenția autorilor C. Borgaza, Dependi S., Ermanno T. (2009); natura activității cooperatiste este studiată de Menard G. (2004), Petrescu C. (2013), Guzmán C., Santos F., Barroso M. (2020), reglementarea legislativă a activităţii cooperativelor este cercetată de Henry H., Fici A., Cracogna, D. (2013); modelul cooperatist de afaceri este analizat în lucrările Birchall J., Ketilson L. (2009), Zeuli K. (2004), modele de guvernare a cooperativelor sunt abordate de Banaszac I., Beckmann V. (2009), Bijman J., Hendrikse G., van Oijen A. (2013), Kyazze L. M., Nkote I. N., Wakaisuka-Isingoma J. (2017), Buang M., Abu Samah A. (2021), de cercetarea tipologiei şi diversității formelor de organizare a cooperativelor sunt preocupaţi Corcodan H., Wilson D. (2010), Ajates R. (2020), iar subiecte privind reziliența cooperativelor la situații de criză este abordată în lucrările Billiet A., Dufays F., Friedel S., Staessens M. (2021) ş.a.

Un rol important în asigurarea funcționării eficiente, sustenabile a cooperativelor revine planificării strategice a dezvoltării acestora. În acest sens, necesită menționat faptul că, cercetarea problematicii referitoare la proiectarea strategiilor de dezvoltare a cooperativelor sunt mai puțin reflectate în literatura de specialitate. Totuși, la nivel global au fost adoptate politici de dezvoltare a sectorului cooperativelor. În 2020 Alianța Cooperatistă Internațională a aprobat "A People-Centred Path for a Second Cooperative Decade. 2020-2030 Strategic Plan" (International Cooperative Alliance, 2020), care stabilește obiective ambițioase bazate pe cinci piloni: consolidarea identității cooperativelor, dezvoltarea cadrului legal, consolidarea capitalului, participare și cooperare, sustenabilitate, care devin puncte de reper în proiectarea strategiilor de dezvoltare a cooperativelor la nivel național, regional, sectorial.

Cu toate că există puncte de tangență comune dintre problematica abordată în cercetările menționate mai sus şi barierele pe care le întâmpină sistemele cooperatiste naționale, totuși provocările cu care se confruntă sectorul cooperativelor, orientările de dezvoltare a acestuia la nivel național, regional sunt specifice fiecărei țări şi depind de condițiile economico-sociale, politice concrete în care activează entităţile cooperatiste şi necesită a fi studiate profund.

Cercetările privind dezvoltarea cooperației de consum din Republica Moldova se regăsesc în lucrări autorilor din țară, precum Șavga L. (2019, 2023), Șavga, L. Livițchi, O. (2021), Şavga L., Sitnicenco V., Şavga G. (2016) ș.a. Însă cooperația de consum din republică este un sistem complex și dinamic, supus influenței factorilor de ordin intern și extern și evoluează în consens cu provocările perioadelor respective. În acest sens, cercetarea problematicii cooperativelor, a provocărilor cu care se confruntă acest sector și identificarea priorităților de dezvoltare strategică a cooperativelor, ajustarea lor la condiții și perioade specifice a devenit un deziderat important pentru asigurarea funcționării eficiente și a evoluției cooperației de consum.

Metodologia de cercetare. Pentru realizarea cercetării au fost analizate documente relevante naționale, dintre care: Strategia Națională de Dezvoltare „Moldova Europeană 2030"; strategii și programe sectoriale de dezvoltare; rapoarte de evaluare a implementării acestora şi a progreselor înregistrate. Un rol important i-a revenit evaluării priorităților de dezvoltare a Republicii Moldova din perspectiva integrării europene. La fel, au fost consultate documentele de politici internaționale şi europene în domeniul susținerii și promovării cooperativelor.

În scopul analizei tendințelor de dezvoltare a cooperativelor de consum din țară și a situației curente s-au utilizat datele şi rapoartele organizațiilor cooperatiste, s-au evaluat rezultatele implementării Strategiei de dezvoltare a sistemului cooperatist în 2020-2023.

Identificarea perspectivelor de dezvoltare a cooperației de consum din republică s-a realizat prin intervievări a actorilor principali și consultări cu angajații, membrii cooperatori, factorii de decizie și alte părți interesate. Aceasta s-a bazat pe următoarele principii: participare şi transparență, corelare cu alte

documente strategice, eficiență, adiţionalitatea resurselor, inovare, parteneriat, incluziune, flexibilitate, orientare spre rezultate, responsabilitate.

Pentru realizarea studiului s-au utilizat următoarele metode și tehnici: documentarea, analiză și sinteza, problematizarea, metoda sistemică, statistică, inducției, deducția, analiză comparativă, PESTLE, SWOT, benchmarking, modelarea, previziunea și altele.

Rezultate principale. Contextul internațional al cooperativelor. Cooperativele joacă un rol important în societatea contemporană datorită impactului pe care îl au asupra dezvoltării socioeconomice în orice țară. Pe parcursul existenței sale ele au dovedit reziliență la provocări, crize şi au demonstrat că pot depăși impactul acestora. Cooperativele se disting esențial de alte tipuri de întreprinderi prin faptul că pun interesele și beneficiile membrilor săi prioritar profitului, fiind populare în rândul diferitor categorii de beneficiari. Ele reprezintă un model dual, bazat pe o componentă economică şi una socială, devenind actori-cheie ai economiei sociale.

Cooperativele sunt prezente în cele mai diferite sectoare economice (de producție, agrar, comerț, bancar, asigurări, farmaceutic, forestier, energie regenerabilă ș. a.) și sociale (educație, ocuparea forței de muncă, preocupare pentru comunitate). Fiind organizații bazate pe *principii* oneste (asocierea voluntară și deschisă; controlul democratic de către membri; participarea economică a membrilor; autonomia și independența cooperativelor; educație, formare și informare a membrilor; cooperarea între cooperative; preocuparea pentru comunitate), *valori* (auto-ajutorare, auto-responsabilitate, de democrație, de egalitate, de echitate și de solidaritate) și etică, întreprinderile cooperatiste sunt prin natura lor o formă de afaceri durabilă și participativă.

Mișcarea cooperatistă a cunoscut o evoluție consecventă în întreaga lume, implicând un număr din ce în ce mai mare de membri și părți interesate.

Actualmente, la nivel global sunt peste 3 milioane de cooperative, care asociază cca un miliard de membri. Cooperativele oferă peste 280 de mil.de locuri de muncă, asigurând 10% din toate locurile de muncă din lume (International Cooperative Alliance, 2024). Diviziunea Europeană a ICA - Cooperatives Europe asociază 141 mil. de membri, 4,7 de mil. de angajați și 180 de mii de întreprinderi (CoopsEurope, 2024). Un sector important al mișcării cooperativelor reprezintă cel al cooperativelor de consum. La nivel European acesta este reprezentat de Comunitatea Europeană a Cooperativelor de Consum, care reunește 30 de mil. de membri-consumatori (sau 21,3% din numărul total de membri în Europa), 750 de mii de angajați (14,9%), dispunând de o infrastructură de 94 de mii de puncte de vânzări (EuroCoop, 2024). Aceste date demonstrează amploarea și importanța cooperativelor și ale organizațiilor care le reprezintă în sistemul economic și social mondial și european, în particular.

Dimensiunea internațională a cooperativelor, contribuția lor la realizarea ODD, impactul asupra dezvoltării socioeconomice în diferite țări, plasează obiectivele de dezvoltare şi de susținere a cooperativelor pe agenda autorităților și

organizațiilor internaționale, aceste obiective regăsindu-se în politicile internaționale, comunitare şi naționale. Astfel, multiple documente internaționale, inclusiv europene (United Nations, 2021, 2023; European Commission, 2021 ș.a.) orientează spre susținerea acestei forme de activitate şi încurajează guvernele, mediul academic şi de cercetare să contribuie la dezvoltarea cooperativelor prin îmbunătățirea legislației, punerea în aplicare a strategiilor, politicilor și programelor naționale, locale și regionale de susținere a cooperativelor, identificarea şi implementarea formelor inovative de cooperative şi de activitate cooperatistă, promovarea educației în domeniu în baza principiilor şi bunelor practici internaționale.

Totodată sunt necesare politici inovative și eficiente de dezvoltare a cooperativelor la nivel global. Obiectivele unor asemenea politici se regăsesc în ”A People-Centred Path for a Second Cooperative Decade. 2020-2030 Strategic Plan” (International Cooperative Alliance, 2020), care stabilește, printre cele trei ținte de atins, ca modelul de afaceri cooperatist *să devină un lider recunoscut în sustenabilitate economică, socială și de mediu.*

Susținerea și facilitarea dezvoltării cooperativelor de către autorități, alături de proiectarea unor strategii inovative de dezvoltare, au devenit imperative pentru Republica Moldova, mai ales în contextul aspirațiilor de integrare europeană.

Cooperația de consum din Republica Moldova: misiune, situația actuală. Misiunea cooperației de consum constă în promovarea activităților economice pentru satisfacerea necesităților și intereselor membrilor săi, contribuția la dezvoltarea localităților, în special a celor din mediul rural, asigurarea dezvoltării sustenabile a pieței de consum și ocuparea forței de muncă implicate în activitatea cooperatistă. Cooperația de consum, fiind un important element în sistemul economic al țării, cu un profund caracter social şi cu activități diverse, are drept obiective fundamentale: asigurarea cu bunuri de consum a populației din aria sa de activitate; oferirea diferitor servicii membrilor săi și altor beneficiari; dezvoltarea infrastructurii și implementarea tehnologiilor inovative; diversificarea și extinderea prestațiilor cooperatiste; sporirea calității mărfurilor și serviciilor, protecția consumatorilor; oferirea programelor de dezvoltare profesională; promovarea intereselor economice, sociale și culturale ale membrilor cooperatori; dezvoltarea parteneriatelor externe.

Dezvoltarea cooperației de consum din Republica Moldova pe parcursul activității sale de peste 155 de ani a cunoscut diferite etape de ascensiune și de declin, dar a reușit să se mențină în sistemul economic al țării. În urma implementării Strategiei de dezvoltare a cooperației de consum pentru anii 2020-2023, în condițiile, legate de pandemia COVID-19, războiul din regiune, criza energetică, organizațiile și întreprinderile cooperatiste au continuat activitățile sale economice, inclusiv oferirea unui spectru larg de servicii, precum comerț cu amănuntul și cu ridicata, achiziționarea produselor agricole, de origine animalieră și de altă natură, procesarea acestora, prestarea diverselor servicii, inclusiv celor

educaționale, de piață, de alimentație publică, fiind în serviciul membrilor și comunității din aria sa de activitate (cca 57% din populația țării).

Actualmente sistemului cooperației de consum din țară asociază circa 56 mii de membri; 118 agenți economici, inclusiv 74 de cooperative de consum; 1344 de unități de comerț; 144 de unități de alimentație publică; 21 de piețe.

O atenție deosebită în ultimii ani a fost acordată modernizării infrastructurii entităților cooperatiste ca factor determinant în sporirea calității și asigurarea eficienței prestațiilor cooperatiste. Aceasta a contribuit la creșterea vânzărilor cu amănuntul cu 7% în anul 2023 în raport cu 2020, vânzările angro s-au majorat de peste 2 ori, prestarea serviciilor cu plată populației a crescut cu 13,1%, achiziționarea producției agricole, de origine animalieră şi de altă natură - de 2,2 ori. Însă fabricarea producției industriale s-a menținut la nivelul anului 2020. Totodată, venitul brut s-a majorat în perioada 2020-2023 cu 12,5%, iar profitul net cu 58,2% comparativ cu perioada 2016-2019.

Deși entitățile cooperației de consum activează în condiții de insuficiență de resurse financiare, sistemul cooperatist a investit în dezvoltarea proprie în ultimii ani cca 50 mil. lei. Totuși, lipsa investițiilor necesare și neatractivitatea sistemului pentru investitorii externi rămâne o barieră importantă pentru dezvoltarea sustenabilă a cooperației de consum pe termen lung.

Cu toate acestea, potențialul intern al cooperației de consum, dar și cel din cadrul ecosistemului pentru cooperative, nu este valorificat pe deplin, iar evoluția cooperativelor înscrie un ritm lent. Sistemul cooperatist se confruntă cu multiple provocări de ordin intern și extern, inclusiv cu cele globale, cărora nu întotdeauna reușește să le răspundă și care devin o barieră în dinamizarea activității lor. Respectiv sunt necesare politici, care să valoarifice întregul potențial și resursele cooperativelor.

Orientări strategice de dezvoltare a cooperației de consum din Republica Moldova în perioada până în 2030. Proiectarea dezvoltării strategice este un proces complex, care implică multiple activități orientate spre dezvoltarea organizațională, o bună guvernare și management eficient al organizației. Necesitatea elaborării și implementării Strategiei de dezvoltare a cooperației de consum este prevăzută prin legea cooperației de consum 1252/2000, care stabilește că organizațiile cooperatiste de toate nivelurile, trebuie să elaboreze propriile strategii de dezvoltare - art. 36 i); 55 c); 70 e), iar strategia de dezvoltare a cooperației de consum la nivel național se aprobă la congresul acestui sistem (care se organizează o data în 4 ani) (art. 74 c). Implementarea unor asemenea politici permite focalizarea energiei și a resurselor, consolidarea proceselor și ghidarea membrilor și angajaților pentru a atinge obiectivele comune.

La solicitarea Uniunii Centrale a Cooperativelor de consum din Moldova, echipa condusă de autorul prezentei lucrări a elaborat proiectul Strategiei de dezvoltare a cooperației de consum în perioada 2025-2030. La proiectarea viziunii strategice de dezvoltare a cooperației de consum din republică s-a ținut cont de prevederile Legii cooperației de consum, nr. 1252/2000; prioritățile de dezvoltare

social-economică a Republicii Moldova, în special ”Strategia Moldova 2030”, programele naționale în domeniile de transformare digitală și promovarea economiei verzi; prioritățile de integrare a Republicii Moldova în Uniunea Europeană; Regulamentul (CE) nr. 1435/2003 al Consiliului din 22 iulie 2003 privind statutul societății cooperative europene (SCE); Recomandările Organizației Mondiale a Muncii privind promovarea cooperativelor (R193/2002); raportul Secretarului General și rezoluțiile ONU privind cooperativele în dezvoltarea socială (United Nations, 2021, 2023), Comunicatele Comisiei și Parlamentului European privind promovarea societăților cooperative în Europa (European Commission, 2021), vizând piața unică europeană pentru perioada 2021-2027, privind piața unică digitală unică, Pactul verde european; strategiile de dezvoltare a cooperativelor pe plan internațional, alte documente, studii, informații statistice, bune practici, rapoarte relevante.

În baza tehnicilor PESTLE și SWOT a fost analizat mediul intern și extern de funcționare a cooperativelor de consum, identificate provocările cu care se confruntă sectorul și conturate direcțiile strategice de acțiune pentru a dinamiza evoluția cooperației de consum și a spori contribuția lor la dezvoltarea societății. Această analiză, precum și evaluarea politicilor și practicilor internaționale, a cercetărilor în domeniul cooperativelor au permis de a fundamenta *viziunea, misiunea și zonele strategice* de dezvoltare a cooperației de consum din țară în orizontul de timp 2030. Proiectarea viziunii de viitor a dezvoltării cooperației de consum corelează cu Strategia Națională de Dezvoltare ”Moldova Europeană 2030”, obiectivul strategic major al căruia este centrarea pe calitatea vieții; cu alte documente naționale și sectoriale care vizează dezvoltarea mediului de afaceri, transformarea digitală, dezvoltarea economiei circulare; cu prioritățile strategice de dezvoltare a cooperativelor la nivel internațional. Într-un asemenea context, *viziunea strategică* a dezvoltării cooperației de consum este ca aceasta să devină un sistem sustenabil în aspect economic, social și de mediu, inovativ, incluziv, competitiv la nivel național și internațional, rezilient la provocările externe și interne, focusat pe calitatea vieții membrilor săi, a populației deservite și a angajaților, integrat în comunitatea europeană.

Misiunea Strategiei este de a contribui la realizarea unei transformări inovative a sistemului cooperației de consum prin digitalizarea activităților și implementarea modelelor economiei circulare, la eficientizarea guvernării sistemului cooperatist, la sporirea competitivității acestuia, la creșterea bunăstării membrilor și împărtășirea valorilor europene, facilitând astfel procesul de integrare a Republicii Moldova în Uniunea Europeană.

În baza analizelor efectuale, consultării factorilor de decizie și a membrilor din cooperative, altor actori relevanți au fost identificate *zonele strategice* de intervenție viitoare. Acestea se focusează pe următoarele:

- crearea unui mediu favorabil dezvoltării cooperativelor de consum;
- integrare, dezvoltare și modernizare infrastructurală, inovare tehnologică;

- diversificarea activităților, promovarea serviciilor eficiente către membri și alte categorii de beneficiari, apropierea acestora de consumator;.
- cooperare multidimensională.

Acțiunile privind *crearea unui mediu favorabil dezvoltării cooperativelor de consum* vizează prioritar: promovarea recunoașterii naturii specifice a cooperativelor și a identității acestora; îmbunătățirea cadrului legislativ-normativ de reglementare și de politici în domeniul cooperației de consum; promovarea cooperației de consum în politicile naționale, sectoriale de dezvoltare; creșterea numărului de membri cooperatori, sprijinirea creării de noi cooperative; cartografierea potențialului economic cooperatist și optimizarea sistemului prin lichidarea/reorganizarea entităților cooperatiste cu potențial limitat; diagnosticul structural, economic, financiar al sistemului cooperației de consum și redimensionarea acestuia pe principii integrative; optimizarea și reproiectarea ierarhiei manageriale a sistemului cooperației de consum pe verticală, precum și pe orizontală; consolidarea sistemului cooperatist prin integrare pe verticală și orizontală la nivel local, regional, național pentru a sprijini partajarea resurselor; dezvoltarea mecanismelor economico-financiare eficiente de reziliență la crize economice, sociale, financiare, la situații incerte; promovarea brand-ului coop și a propriilor mărci comerciale; dezvoltarea comunicării interne și externe, în special prin media electronică, extinderea utilizării instrumentelor moderne de marketing digital; încurajarea creării cooperativelor de consum a tinerilor în cadrul instituțiilor de învățământ cooperatiste și ghidarea în organizarea activității lor; îmbunătățirea marketingului comun al produselor și serviciilor cooperatiste proprii și celor dezvoltate în comun cu alți parteneri; crearea și operaționalizarea unui sistem automatizat de colectare, stocare, gestionare, distribuire a datelor privind activitatea entităților cooperatiste pentru digitalizarea proceselor de afaceri și de management; instituirea serviciului de audit intern în cadrul sistemului cooperației de consum; adoptarea unor planuri de îmbunătățire continuă a competențelor angajaților sistemului cooperatist, a membrilor și altor beneficiari; sprijinirea instruirii tinerilor în domeniul cooperativelor, susținerea antrenării lor în activitatea cooperatistă de consum.

Obiectivele și acțiunile strategice pe dimensiunea *integrare, dezvoltare și modernizare infrastructurală, inovare tehnologică* se focusează pe: extinderea infrastructurii cooperatiste existente, apropierea de beneficiari și de necesitățile acestora; consolidarea potențialului de investiții prin atragerea surselor financiare din exterior, inclusiv din fonduri europene; modernizarea infrastructurii entităților cooperatiste; inovarea produselor, serviciilor, proceselor de afaceri și de management din cadrul cooperației de consum, creșterea competitivității acestora pe piața internă și externă; crearea unui centru cooperatist agro-alimentar la nivel republican cu bază tehnico-materială şi logistică corespunzătoare (depozite, camere frigorifice, mijloace de transport, marketing etc.), specializat în achiziționare-procesare-comerț-export a produselor cooperatiste; promovarea și susținerea integrării infrastructurale pe domenii de activitate economică, dezvoltarea unor structuri regional-sectoriale (comerciale, de achiziție ș.a.) pentru

optimizarea proceselor de afaceri (marketing și promovare, distribuție, achiziționarea produselor ș.a.); extinderea gamei de servicii oferite membrilor și populației din aria de activitate cooperatistă; dezvoltarea unui sistem integrat comercial în cadrul cooperației de consum cu o politică comercială unitară, un sistem centralizat de achiziționare a mărfurilor și cu integrarea sistemelor logistic, informațional, financiar, precum și design și tehnologii comerciale unificate; implementarea tehnologiilor moderne pe toate dimensiunile de activitate cooperatistă; proiectarea și implementarea modelelor de afaceri circulare și a lanțurilor valorice eficiente; digitalizarea proceselor de afaceri cooperatiste și a serviciilor oferite membrilor și altor beneficiari; edificarea unui sistem informațional integrat corporativ al cooperației de consum; dezvoltarea platformei online de informare privind ofertele de produse și servicii, oportunitățile de afaceri intercooperatiste; creșterea accesului la piețe, penetrarea pe piețe externe a produselor cooperatiste; creșterea investițiilor în modernizarea lanțului agroalimentar; motivarea membrilor și implementarea unor măsuri stimulative pentru investiții în activitatea entităților cooperatiste și de recompensare a acestora; crearea structurilor de micro finanțare și a fondurilor de creditare în formatul cooperatist conform experienței internaționale.

În domeniul *diversificării activităților, promovării serviciilor eficiente către membri și alte categorii de beneficiari, apropierii acestora de consumatori* Strategia prevede: diversificarea și îmbunătățirea continuă a gradului de utilitate, a calității și competitivității produselor și serviciilor oferite de cooperația de consum; dezvoltarea subsectoarelor conexe activităților tradiționale ale cooperației de consum, precum și prestări de servicii, inclusiv celor cu caracter social; instituirea unui sistem de feed-back și de comunicare permanentă cu beneficiarii reali și potențiali ai cooperației de consum, în scopul identificării necesităților lor adiționale; monitorizarea percepțiilor publice a activităților și mesajelor cooperatiste; promovarea acțiunilor de sensibilizare a societății, privind importanța cooperativelor în societate, beneficiile oferite membrilor, avantajele modelului de afaceri cooperativ; diversificarea strategiilor și mijloacelor de comunicare, în special prin rețele sociale; consolidarea statutului de membru al cooperativei de consum, sprijinirea unei mai bune înțelegeri a rațiunii de a fi membri ai cooperativelor; facilitarea participării membrilor cooperatori în activitatea de business cooperatist și în procesul decizional; motivarea participării membrilor cooperatori în afacerile cooperatiste prin repartizarea unei părți din beneficiul obținut de către organizațiile cooperatiste către membrii lor; perfecționarea relațiilor de proprietate în cadrul cooperației de consum în conformitate cu necesitățile interne de schimbare, legislația și experiența europeană cu privire la cooperative și bunele practici internaționale în domeniu; asigurarea competitivității și sustenabilității funcționării sistemului comercial cooperatist, prin orientarea către client și asigurarea satisfacției maxime a acestuia; elaborarea și promovarea brand-urilor comerciale proprii pentru produsele fabricate și/sau comercializate, serviciile oferite; dezvoltarea rețelei comerciale în mediul urban din țară, inclusiv în mun. Chișinău; introducerea unor forme moderne de vânzare pentru a spori

vizibilitatea şi credibilitatea consumatorilor față de produsele cooperatiste; consolidarea valorii ecologice și sustenabile a mărcilor comerciale cooperatiste, promovarea campaniilor de promovare a acestora pentru a diferenția brandul coop de mărcile concurenților.

Un rol important în dinamizarea activității cooperativelor revine *cooperării multidimensionale.* Acțiunile în această sferă prevăd instituirea unei rețele eficiente de colaborare dintre conducerile entităților cooperatiste de consum din diferite regiuni în vederea adoptării unor decizii colaborative de afaceri, schimb și transfer de experiență și bune practici; constituirea hub-urilor regionale cooperatiste cu infrastructură bine dezvoltată și dotată, ce ar contribui la eficientizarea economică și managerială a activităților economice; dezvoltarea cooperării pe orizontală, crearea, în parteneriat, a unor structuri comune sau organizarea unor alianțe pentru eficientizarea afacerilor (distribuție, achiziționare, comercializarea și logistică etc.), exploatarea eficientă a resurselor; sprijinirea cooperării între cooperativele din țară cu cele din exterior, inclusiv în domeniul integrării în lanțurile valorice sustenabile, dezvoltării și implementării tehnologiilor inovative și know-how (logistică, marketing ș. a.); colaborarea cu Guvernul, autoritățile publice centrale și locale pentru a asigura politici de suport, acces la resurse și surse de finanțare, favorabile dezvoltării cooperativelor; dezvoltarea parteneriatelor cu agenții, entități relevante naționale (ODA, AIPA ș. a.) și cele internaționale pentru proiecte de consolidare a capacităților instituționale și investiționale; colaborarea cu autoritățile publice pentru susținerea de către acestea a promovării și menținerii prestațiilor cooperatiste în localitățile în care activitățile cooperatiste sunt neprofitabile (cu număr mic al populației sau îndepărtate), dar sunt solicitate de populație; colaborarea cu alte tipuri de cooperative (de producere, agricole ș. a.) pentru o mai bună integrare în lanțul valoric, consolidarea avantajelor competitive și a celor de rețea; dezvoltarea parteneriatelor strategice cu organizații patronale, precum Camera de Comerț și Industrie și cele profesionale promovarea mișcării cooperatiste și susținerea implicării diferitor categorii de parteneri în valorificarea potențialului parteneriatelor cu cooperativele; stabilirea și dezvoltarea relațiilor comerciale directe cu producători, furnizori pentru obținerea beneficiilor de preț; extinderea parteneriatelor cu producătorii agricoli locali (fermieri, producători individuali, populație) în vederea încheierii contractelor de lungă durată privind achiziționarea producției agricole, procesarea și comercializarea acesteia prin rețeaua cooperatistă, concentrarea pe produse agricole cu valoare adăugată înaltă.

Strategia se bazează pe premisa că cooperativele de consum pot juca un rol valoros în dezvoltarea economico-socială, prin realizarea obiectivelor majore, precum crearea locurilor de muncă, reducerea sărăciei, susținerea socială a membrilor, îmbunătățirea nivelului de viață și a condițiilor de muncă, incluziune socială, protecția mediului.

Discuții și concluzii. Cooperativele au devenit un segment important al economiei naționale în orice țară, datorită impactului său nu doar economic, dar și social. Dezvoltarea ascendentă a acestui sector depinde de politicile adoptate și

implementate, care trebuie sa se bazeze pe o abordare inovativă, sistemică și complexă, precum și pe principii care iau in considerare contextul cooperativelor și provocările mediului în continuă schimbare. Anume o asemenea abordare a servit drept bază pentru elaborarea proiectului Strategiei de dezvoltare a cooperației de consum din Moldova în perioada 2025-2030. Documentul constituie cadrul general de planificare strategică pentru dezvoltarea cooperației de consum din Republica Moldova pe o perioadă de șase ani, incluzând patru zone de intervenție strategică, fiecare cu obiectivele aferente și o serie de acțiuni prioritare. Acestea sunt concepute din perspectiva evoluției ecosistemului cooperației de consum din țară și ancorate în realitățile organizațiilor și întreprinderilor cooperatiste. Strategia menționată, aprobată la Congresul sistemului cooperatist din 12 septembrie 2024, este deja în aplicare.

Implementarea Strategiei va avea impact nu doar economic, ci și social și ecologic. Totodată, pentru o proiectare și implementare de succes, trebuie avute în vedere riscurile ce pot apărea pe parcurs, precum riscurile legate de membri, de reglementările legislative și de politicile financiare, de inovare și tehnologie, precum și riscurile exogene negative, alături de metodele de atenuare a acestora. Rezultatele cercetării sunt deschise pentru discuții, expunere de opinii, idei și propuneri de îmbunătățire.

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THE EFFECTS OF STOCKPILING ON BUSINESSES AND CONSUMERS DURING THE COVID-19 PANDEMIC: ADVANTAGES AND DISADVANTAGES

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Abstract. *The Covid-19 pandemic has profoundly impacted businesses and consumers worldwide triggering significant changes in supply chains and marketing strategies. Particularly, the emergence of stockpiling at the onset of the pandemic has created both challenges and opportunities. This study aims to understand the effects of products stockpiling during the Covid-19 pandemic on businesses and consumers. Specifically, it investigates the reasons behind the increased stockpiling and examines its implications for business operations and consumer shopping behaviors. The research includes a literature review and various survey studies conducted to understand business and consumer behaviors during the Covid-19 period. The literature review synthesized findings from previous studies to analyze the effects of stockpiling on businesses and consumers. Survey studies aimed to gather real-world data by directly engaging with business Owners and consumers. Findings indicate that product stockpiling provides short term Advantages for does but leads to long term challenges in supply chain management and cost increases. For consumers stockpiling creates a sense of security during uncertain times but contributes to supply shortages and price fluctuations. These results contributed significantly to strategic management and consumer behavior studies during Crisis periods.*

Keywords: *Stockpiling, Covid-19 Pandemic, Supply Chain, Consumer Behavior, Business Operations, Crisis Management*
GEL*: C53, G17, G32, H12, M21*
UDC*: 339.14*

Introduction. The COVID-19 pandemic has created an unprecedented health crisis on a global scale, leading to deep and long-lasting consequences affecting the entire world. The uncertainty and anxiety created by this crisis has had a significant impact on both consumers and businesses. In the early stages of the pandemic, one of the most striking phenomena was the widespread stockpiling behavior across the

world (Hacıalioğlu, 2021). This situation has led to radical changes in both supply chains and transformed consumer habits.

Consumer Behavior and Stockpiling: At the beginning of the pandemic, consumers showed a tendency to stockpile essential items (İnce & Kadıoğlu, 2020). The main reasons behind this behavior included concerns about the spread of the virus, uncertainty about restrictions such as quarantine and curfews, and fear that access to essential items would be cut off. Although this behavior provided consumers with a sense of security in the short term, in the long term it led to disruptions in supply chains, product shortages, and price increases (Baltacı & Akaydın, 2020).

Some important consequences of stockpiling behavior are:

- Supply chain disruptions: Heavy stockpiling has caused sudden and unexpected demand spikes in supply chains, making it difficult for many businesses to manage their inventory and preventing timely delivery of products.
- Product shortages: As stocks deplete, access to some basic necessities has become more difficult, creating a significant challenge, especially for disadvantaged groups.
- Price increases: The increase in demand has led to an increase in product prices. This has contributed to inflation and strained the budgets of many consumers (Türkoğlu, 2014).
- Panic buying: In some cases, hoarding behavior has turned into panic, leading to excessive and irrational shopping, with negative consequences for both consumers and businesses.

Business Operations and Stockpiling: Businesses had to develop various strategies to keep up with sudden increases in demand and supply chain disruptions during the pandemic. To cope with the challenges in inventory management and logistics processes, many businesses made their supply chains more flexible and invested in digital transformation. While this may increase sales in the short term, in the long term it led to problems such as increased costs, logistics difficulties and lack of flexibility in supply chain management (Eymen, 2007)

Here are some lessons businesses have learned from the stockpiling phenomenon:

- Supply chain resilience: Making supply chains more flexible and resilient to shocks will enable better preparation for future crises (Şişman, 2023)
- Inventory management: Better inventory management and forecasting methods will help manage stocks more effectively and prevent product shortages (Çelebi& Bayraktar, 2011).
- Digital transformation: Investing in digital technologies will help businesses optimize their supply chains and improve their logistics processes.
- Communication and collaboration: Open and transparent communication between governments, businesses and consumers will enable more coordinated action in future crises.

The COVID-19 pandemic and the stockpiling phenomenon offer important lessons in the fields of supply chain management and crisis management (Turgut, 2022). To be better prepared for future crises, governments, businesses and

individuals must work together and take the necessary steps to create a more resilient and sustainable system.

Stocking Products during Covid-19: Challenges and Opportunities. The Covid-19 pandemic has caused sudden and dramatic changes in the global economy. Especially in the first months of the pandemic, consumers' intensive stockpiling of products has created new challenges and opportunities for both businesses and consumers. This study examines the effects of product stockpiling during the pandemic and the challenges and opportunities created by this situation (Cavlak & Selvi 2021) The aim of this study is to analyze the effects of product stockpiling behavior during the Covid-19 pandemic on businesses and consumers. The study aims to reveal the main reasons behind stockpiling trends and the reflections of these trends on business operations and consumer shopping behavior.

The research was conducted through a literature review. The literature review analyzed the effects of stockpiling by synthesizing the findings of previous studies. The research findings show that stockpiling provides advantages for businesses in the short term, such as increased sales and rapid stock depletion, but in the long term, it causes difficulties such as supply chain management, product availability and cost increases. For consumers, stockpiling behavior creates a sense of security in times of uncertainty, but it also leads to problems such as supply shortages and price fluctuations.

The difficulties:

1. **Supply Chain Management:** Sudden increases in demand have created disruptions in the supply chain and problems with product availability (Aydın & Güner, 2020)
2. **Cost Increases:** High demand and supply shortages have caused increases in product costs and prices (Çıkmak & Ungan, 2021).
3. **Product Availability:** Consumers' intensive stockpiling behavior has made it difficult to find some basic products in the market (Alper, 2010).

Opportunities:

1. **Increased Sales:** Increased demand during the pandemic has significantly increased the sales of some businesses (Güven, 2020).
2. **Acquisition of New Customers:** Stockpiling behavior has enabled some businesses to reach new customers (Şahin, 2022).
3. **Strategic Restructuring:** Businesses have become more prepared for future crises by reviewing their supply chain and inventory management strategies (Gürsoy & Artantaş. 2021). The product stockpiling behavior experienced during the Covid-19 pandemic has had significant consequences for both businesses and consumers. Businesses need to develop better management strategies when faced with similar situations in the future. The flexibility of supply chain management should be increased and consumer behavior should be better understood (Balcı, 2018). In addition, consumers' tendency to overstock should be controlled with awareness campaigns.

Analysis of Consumer and Business Responses during Covid-19: A Study on Product Stockpiling. The Covid-19 pandemic has caused radical changes in

consumer and business behavior around the world. One of the behaviors that has attracted particular attention during the pandemic is the intensive stockpiling of products by consumers. This has deeply affected the operations of businesses and the shopping habits of consumers (Tekin, 2020).

Consumer Behavior. There are various psychological and social factors behind consumers' product stockpiling behavior during the pandemic (Yılmaz, 2022).

- **Need for Security:** The desire to have access to basic necessities during times of uncertainty.
- **Anxiety and Fear:** Anxiety triggered by information and disinformation spread about the pandemic.
- **Social Influence:** The tendency to act in similar ways by observing the behavior of others.

Business Responses. Businesses have responded to the increasing demand for stocking with various strategies (Seyhan & Yılmaz, 2010):

- **Supply Chain Adaptations:** Speeding up or flexing manufacturing and distribution processes.
- **Pricing Strategies:** Dynamic pricing practices based on product availability.
- **Customer Communication:** Transparent information sharing on stock status and product availability.

The difficulties

- **Supply Chain Disruptions:** Sudden increases in demand have caused disruptions in the supply chain and supplier problems (Çıkmak & Ungan, 2021).
- **Cost Increases:** High demand has increased raw material and production costs.
- **Stock Management:** Restocking of rapidly depleting products and the difficulties experienced in this process.

Opportunities

- **Increase in Demand:** Demand has increased significantly in some sectors during the pandemic (Yalman et al., 2021).
- **Digital Transformation:** Businesses' interest in online sales channels and digital marketing strategies has increased.
- **Customer Loyalty:** Businesses that can provide reliable and fast service during crisis periods have gained customer loyalty (Turhan et al., 2012).

The product stockpiling behavior experienced during the Covid-19 pandemic has had significant consequences for both consumers and businesses. Understanding the reasons behind consumers' stockpiling tendencies can help businesses be better prepared for such crisis situations. When faced with similar situations in the future, flexible supply chain management and effective customer communication strategies will be of great importance.

Strategic Management and Consumer Behavior in Crisis Periods: Covid-19 Stocking Information. The Covid-19 pandemic has led to significant changes in

businesses' strategic management approaches and consumer behavior. Product stockpiling behavior that emerged during the pandemic is one of the most obvious examples of these changes (Alankuş, 2021). Businesses have had to restructure their supply chains to cope with the suddenly increased demand and have developed various strategies to ensure product availability. Consumers, on the other hand, have shown a tendency to stock up heavily, especially on basic necessities, due to the uncertainty and anxiety brought about by the pandemic. This behavior is a reflection of consumers' search for security during crisis periods and their desire to be prepared for future uncertainties (Marangoz & Akçam, 2023). However, this situation has also led to problems such as disruptions in supply chains, price fluctuations, and the unavailability of some products in the market. Businesses should review their strategic management approaches in such crisis periods and develop new methods to both improve supply chain management and increase consumer confidence.

Supply Chain Dynamics and Consumer Behavior during the Pandemic-Induced Stockpiling Process. The Covid-19 pandemic caused significant disruptions in global supply chains, seriously affecting businesses' product supply processes (Karagoz, 2020). Consumers' intensive stockpiling behavior in the early stages of the pandemic was one of the most obvious reasons for these disruptions. The sudden and intense increase in demand for basic necessities made it difficult for supply chains to quickly adapt to this unexpected situation. Consumer behavior has changed significantly during the pandemic. Feelings of uncertainty and insecurity have led consumers to turn to essential items, especially food, cleaning products, and hygiene supplies. While stockpiling these products provides consumers with a sense of security in the short term, it has also led to supply-demand imbalances in the market. This has led to some products becoming unavailable or prices rising, further increasing consumer concerns.

Businesses have learned important lessons about flexibility and resilience in supply chain management during this period. Supply chain disruptions experienced during the pandemic have led businesses to find alternative supply sources and re-evaluate inventory management. In addition, the importance of digitalization and e-commerce has become even more evident, which has encouraged businesses to invest in online sales channels. The experiences gained during this process have contributed to the reshaping of strategic management approaches in order to be better prepared for future crises.

The Dual Impacts of Covid-19 Stockpiling on Business Operations and Consumer Safety. The Covid-19 pandemic has had significant, dual-pronged impacts on business operations and consumer safety. The uncertainty and fear experienced in the early days of the pandemic led consumers to stock up heavily on essential items, especially food, cleaning supplies, and hygiene products. While this provided consumers with a sense of security in the short term, it led to serious disruptions in supply chains in the long term.

Business operations had to adapt quickly in the face of consumer stockpiling. The sudden increase in demand required increased production capacity and flexible

supply chains. Many businesses revised their inventory management strategies to develop more efficient and flexible solutions. However, this process also resulted in increased costs and logistical challenges. To overcome these challenges, businesses had to work with alternative suppliers and invest in digital transformation. In terms of consumer safety, stockpiling behavior had both positive and negative effects. On the one hand, consumers felt safer during times of uncertainty thanks to the products they stockpiled. On the other hand, excessive stockpiling behavior caused some basic necessities to become unavailable in the market and their prices to increase, which negatively affected overall consumer safety. In addition, rapid depletion of stocks and the long-term unavailability of some products triggered panic buying among consumers, which further increased the pressure on supply chains (Kocaoğlu, 2019). These experiences during the Covid-19 process have revealed that businesses and consumers need to be better prepared for similar crises in the future. In addition to creating flexible and resilient supply chains, businesses should develop strategies to better manage consumer needs during times of crisis. Consumers should adopt more conscious and sustainable shopping habits by understanding the long-term effects of panic and overstocking.

Covid-19 and the Stockpiling Phenomenon: A Comprehensive Study on Effects and Consequences. The Covid-19 pandemic has led to unprecedented economic and social changes globally. In the early days of the pandemic, the sudden increase in demand for basic necessities and the resulting stockpiling phenomenon had significant impacts for both businesses and consumers. This study comprehensively examines the causes, effects and long-term consequences of stockpiling behavior. The stockpiling phenomenon was primarily caused by consumers' feelings of uncertainty and fear. Uncertainty about the pandemic led consumers to stockpile essential items. While this provided consumers with a sense of security in the short term, it also brought about various problems in the long term. Disruptions in supply chains and difficulties in product availability led to higher prices and the unavailability of some products in the market. This panic among consumers caused further pressure on supply chains.

For businesses, the stockpiling phenomenon has created both opportunities and challenges. The sudden increase in demand provided short-term sales increases for many businesses. However, this situation caused disruptions in supply chains and difficulties in stock management. In order to respond to this sudden demand, businesses had to increase their production capacity and make their supply chains flexible. This process brought about cost increases and logistics problems. Businesses had to re-evaluate their supply chain strategies in order to be more prepared for similar crises in the future.

This comprehensive study provides important findings to understand the far-reaching effects and consequences of the stockpiling phenomenon experienced during the Covid-19 pandemic. Both consumers and businesses should learn from these experiences and be better prepared for future crises. Awareness campaigns are gaining importance in order for consumers to control panic and excessive stockpiling

behaviors. Businesses should develop more effective management strategies during crisis periods by creating flexible and resilient supply chains. In this way, both consumer safety can be ensured and business operations can be managed sustainably.

From Short-Term Gains to Long-Term Challenges: The Impact of Stockpiling During Covid-19 on Business and Consumers. The Covid-19 pandemic has caused sudden and profound economic and social changes globally. The uncertainty and anxiety experienced in the early days of the pandemic led consumers to stockpile essential goods. This sudden increase in demand created short-term gains and long-term challenges for both businesses and consumers.

From the perspective of businesses, the initial impact of stockpiling behavior was positive. Many businesses increased their sales in the short term and quickly depleted their stocks thanks to the sudden increase in demand. However, this temporary gain also brought serious challenges. Disruptions in supply chains, product availability problems and increasing production costs threatened the long-term sustainability of businesses. During this period, businesses had to increase their supply chain flexibility and review their crisis management strategies.

For consumers, stockpiling may have initially created a sense of security. However, in the long run, this behavior created supply chain disruptions and product availability difficulties, leading to higher prices. This negatively impacted consumers' shopping habits and budgets. Consumers' hoarding habits led to empty grocery shelves and some products ending up on the black market, reducing overall consumer satisfaction.

These experiences during the Covid-19 process contain important lessons for both businesses and consumers. Businesses should improve their supply chain management and crisis strategies to be better prepared when faced with similar crises in the future. Consumers should understand the long-term effects of panic and overstocking behaviors and develop more conscious shopping habits. The information obtained during this process is of great importance in terms of future crisis management and shaping consumer behavior.

Understanding the Consequences of Stockpiling in the Context of Covid-19 for Businesses and Consumers. The Covid-19 pandemic has attracted attention not only for its global health crisis but also for its economic and social impacts. The stockpiling behaviors experienced at the beginning of the pandemic stood out as one of the most prominent features of this period. This process has had various consequences for both businesses and consumers, and understanding these consequences may be the key to being prepared for future crises.

For consumers, stockpiling emerged as a reflection of feelings of uncertainty and insecurity. The increased demand for basic necessities during the pandemic provided many consumers with a sense of security. However, while this situation provided a short-term solution, it created some negative effects in the long run. In particular, the unavailability of products in the market and the increase in their prices negatively affected consumers' shopping experiences and financial situations. In

addition, these stockpiling behaviors triggered panic buying and shopping irregularities in general among consumers.

For businesses, the stockpiling phenomenon has caused significant disruptions and operational challenges in the supply chain. Sudden increases in demand have put pressure on production and supply processes, and many businesses have had to re-evaluate their inventory management and logistics processes. Businesses have reviewed their strategies to create flexible supply chains and respond more quickly to crisis situations. This process has encouraged businesses to invest in digital transformation and strengthen their online sales channels.

Understanding the consequences of stockpiling behaviors during the Covid-19 pandemic can help both consumers and businesses better prepare for future crises. It is important for consumers to understand the negative impacts of overstocking and develop more balanced shopping habits. Businesses should make strategic changes to ensure greater flexibility and resilience in supply chains and operational processes. This understanding can both increase consumer safety and help businesses manage more effectively during times of crisis.

Management of Changes in Supply Chain and Consumer Behavior during the Covid-19 Stocking Process. The Covid-19 pandemic has caused radical changes in supply chains and has deeply affected consumer behavior. Stockpiling trends that emerged in the early stages of the pandemic have significantly transformed both supply chains and consumer habits. Effectively managing the changes experienced during this process allows businesses to develop more sustainable and effective strategies during crisis periods.

Supply chains have adapted rapidly to respond to the sudden increases in demand and supply disruptions brought on by the pandemic. Businesses have tried to overcome these challenges with strategies such as making their supply chains flexible and creating alternative sources of supply. However, supply chain disruptions during this period have had significant impacts on product availability and costs. It has become clear that businesses need to make investments in areas such as better inventory management, advanced logistics solutions and digitalization to manage these changes.

Consumer behavior has also experienced significant changes during the pandemic. Feelings of uncertainty and insecurity have increased consumers' tendency to stock up on essential items. While this situation provides a sense of security in the short term, it has caused problems in supply chains and price increases in the long term. It is important for consumers to develop more conscious shopping habits and strategies to stay calm during crisis periods in order to prevent panic shopping and excessive stockpiling.

The lessons learned from this process provide important information on how to better manage both supply chain management and consumer behavior in crisis situations. Businesses should review their strategic planning and risk management processes to strengthen their supply chains and respond more effectively in times of crisis. Consumers should develop a more balanced and secure consumption approach

on both a personal and societal level by adopting conscious and sustainable shopping habits in times of crisis. These approaches can reduce the effects of future crises and provide more sustainable consumption and supply chain management.

Conclusion and Discussion. The COVID-19 pandemic was an unprecedented event that profoundly affected global supply chains and consumer behavior. This paper examined the significant impacts of stockpiling that emerged in the early stages of the pandemic on both businesses and consumers. The findings provide important insights into understanding the challenges and opportunities that emerge during times of crisis.

Consumer Behavior: During the pandemic, consumers have exhibited a tendency to stockpile essential items intensively, motivated by feelings of uncertainty and anxiety. Although this behavior provided consumers with a sense of security in the short term, it has led to supply chain disruptions, product shortages, and price increases in the long term. Consumers' panic shopping and overstocking tendencies have caused imbalances and general dissatisfaction in the market. In this context, it is of great importance for consumers to adopt conscious shopping habits and avoid panic buying during crisis periods.

Business Operations: Businesses have developed various strategies to cope with sudden demand increases and supply chain disruptions. They have made their supply chains more flexible and invested in digital transformation to cope with challenges in inventory management and logistics processes. However, short-term gains have led to long-term problems such as increased costs and operational difficulties. Businesses have learned from the experiences gained during this period and have understood the need to create more prepared and resilient supply chains against future crises.

Social and Economic Impacts: The phenomenon of stockpiling has had significant social and economic impacts on society. Panic shopping has made it difficult for disadvantaged groups to access basic necessities. In addition, supply chain disruptions and price increases have contributed to inflation. This has created a significant financial burden, especially for low-income families.

Policy Recommendations: Governments and relevant institutions should develop a variety of policies to be more resilient to future crises. These policies may include:

- **Strategic stockpiling:** Establishing strategic stocks of basic necessities on a national or regional scale.
- **Supply chain resilience:** Making supply chains more flexible and resilient to shocks.
- **Emergency communication:** Providing accurate and up-to-date information to the public during times of crisis.
- **Support for disadvantaged groups:** Developing social support programs for low-income families and disadvantaged groups.

The COVID-19 pandemic and the hoarding phenomenon offer important lessons in crisis management and supply chain management. To be better prepared

for future crises, governments, businesses and individuals must work together and take the necessary steps to create a more resilient and sustainable system.

This paper comprehensively examines the impacts of the COVID-19 pandemic and the stockpiling phenomenon. However, there are some limitations. The research focuses on a specific geographic region or sector, and different results may occur in different regions or sectors. In addition, the study is based on a qualitative research and is not supported by quantitative data.

Future research could conduct a broader analysis of the hoarding phenomenon by collecting data from different countries and sectors. It would also be useful to examine the factors that motivate hoarding behavior and the long-term effects of this behavior on society.

The Covid-19 pandemic has highlighted the importance of crisis management and strategic planning. Both consumers and businesses have learned several lessons to develop more effective strategies and accelerate adaptation processes during crisis periods. The resilience of supply chains and the importance of digitalization have become more evident during the pandemic. In order to be prepared for future crises, both businesses and consumers need to learn from these experiences and shape their strategies accordingly.

As a result, a comprehensive understanding of stockpiling behaviors and supply chain dynamics during the Covid-19 pandemic can help both businesses and consumers develop more effective management strategies during crisis periods. This process has laid an important foundation for mitigating the effects of future crises and ensuring more sustainable consumption and supply chain management. Flexibility, resilience, and conscious behaviors are key to success for both individuals and businesses during crisis periods.

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RISK RATING FROM ROAD TRAFFIC ACCIDENT FATALITIES FOR THE WORLD INSURANCE SECTOR

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Abstract. *Traffic insurance is a system that compensates the insured for various damages that may arise due to accidents. Insurance companies finance these damages with the premiums received from the insured. Suitable insurance premium tariff. It keeps the customer demand in optimum balance and at the same time affects the financial success of the insurance company. Therefore, there is a need for optimal pricing. In order for insurance companies to establish the optimal risk-pricing balance, they need to rate the risks. Rating the mortality risks due to traffic accidents also allows insurance companies to price appropriate premiums. For this reason, the aim of this study is to rate the global traffic accident related mortality risks by countries. This study examines the global distribution of road traffic mortality by analyzing data from 231 countries using the DBSCAN algorithm. By classifying the number of deaths per 100,000 population, we identify patterns of similarity and show that countries can be grouped into 27, 8 or even as few as 7 distinct classes, depending on the tuning parameters of the DBSCAN algorithm. These results suggest that, despite the large number of countries, road traffic fatalities show similar patterns that can be attributed primarily to human factors. The classification highlights the importance of focusing on vehicle and driver-related issues rather than infrastructure, which appears to be less of a differentiating factor between countries. This findings have important implications for policy makers and insurance companies aiming to reduce the number of road deaths through targeted interventions.*
Key-words: *Classification, Transportation, Insurance, Government Expenditures statistics*
JEL: *G22, H51, R40, R41*
UDC: *364.322*

Introduction. Road traffic accidents are one of the world's leading public health problems. Large cities and heavy traffic can trigger fatal accidents. These accidents have serious economic and social burdens on individuals and society (Özen

et. al., 2014). The insurance system offers different types of policies taking into account these risks and premiums are calculated based on these risks. Accurate rating of the mortality risks arising from traffic accidents enables insurance premiums to be determined more appropriately. Insurance premiums are usually calculated by looking at how much risk there is. In traffic accidents, these risks are calculated based on variables such as drivers' age, gender, alcohol use and accident history, but the risk of death is also one of the most important factors. For this reason, the risk of death of drivers is graded in detail. Apart from individual factors, factors that increase the risk of death can be counted as vehicle characteristics, traffic density, road conditions, weather conditions, education level and traffic infrastructure. It is observed that fatal accidents are less in countries with more modern traffic infrastructure (Özen et.al., 2024).

Rating the risks of death due to traffic accidents and including these risks in insurance premium calculations is a multidimensional process. Companies use actuarial and statistical methods to determine mortality risks, which in turn determine insurance premium rates. Accurate determination of mortality risks contributes to the determination of fair premium rates for both drivers and companies.

Optimal determination of risks and adjustment of premiums accordingly may be perceived by drivers as an incentive to be more careful while driving. This, in turn, may lead to a decrease in traffic accidents and thus a decrease in premiums through reinforcing safe driving habits of drivers and harmonisation with technology. Thus, both individual and social benefits can be created.

The rating of mortality-related risks according to countries also supports insurance companies operating both locally and internationally in making decisions on issues such as market entry and pricing. Therefore, the main purpose of this study is to categorise countries worldwide according to their risk of death due to traffic accidents.

Method and Findings. Cluster analysis is a statistical technique used to group data points into clusters, where points within the same cluster are more similar to each other than to those in different clusters. It helps to identify patterns and structures within large data sets, allowing data to be categorised based on inherent similarities (Hennig et al. 2015; Kaufman, and Rousseeuw, 1990; Hartigan, 1975). Clustering is a crucial technique in data analysis and machine learning that lets you group similar data points together. Among the various cluster algorithms, DBSCAN (Density-Based Spatial Cluster of Applications with Noise) is notable for its ability to detect clusters of any shape and to be robust to noise and outliers. DBSCAN was developed in 1996 by Martin Ester, Hans-Peter Kriegel, Jörg Sander and Xiaowei Xu. It has become a widely used method in applications ranging from geographic data analysis to image processing.

In this study, we try to determine the optimal number of clusters according to the magnitude of the number of mortalities caused by traffic accidents or injuries throughout the world.

Section 1: Research methodology and data set. DBSCAN is a density-based clustering algorithm that groups data points into clusters based on the density of their local neighborhoods. The algorithm is based on two key parameters:

1. Eps (ε): The maximum distance between two points to be considered as neighbours.
2. MinPts: The minimum number of points required to form a dense region (cluster).

Based on these parameters, DBSCAN classifies data points into three categories: Core Points: Points that have at least `MinPts` within a distance of `eps`; Boundary Points: Points that are within `eps` distance of a core point, but do not have enough neighbours to be a core point themselves; Noise Points: Points that are neither core nor boundary points and do not fit into any cluster.

Section 1.1: The DBSCAN Algorithm Steps.

1. Start with an unvisited point: Randomly select an unvisited point and determine if it is a core point.
2. Expand the cluster: If the point is a core point, a cluster is formed. The algorithm then iteratively adds all reachable points (i.e. points within `eps` of any point in the cluster) to the cluster.
3. Mark noise points: If the point is not a core point and cannot be added to an existing cluster, it is marked as noise.
4. Repeat: The process is repeated until all points have been visited.

Section 1.2: The structure of data set. The dataset used in this analysis comes from the World Bank's official database, specifically from the indicator "Mortality caused by road traffic injury (per 100,000 people)". The data span the years 2000 to 2019 and provide a comprehensive view of road traffic deaths worldwide. This indicator is essential for understanding the impact of road traffic injuries on public health and for assessing the effectiveness of road safety measures over time. The data can be accessed directly through the World Bank's data portal and the missing values are omitted while analyzing. (https://data.worldbank.org/indicator/SH.STA.TRAF.P5).

Section 2: Main results. The application of the DBSCAN algorithm to the analysis of road traffic fatalities in 231 countries provides significant insights into the global distribution of these events. The results, which vary according to the tuning parameters used, demonstrate the algorithm's ability to classify countries into distinct clusters based on the number of road deaths per 100,000 population (Ester et al.,

1996; Jain et al. 1999).

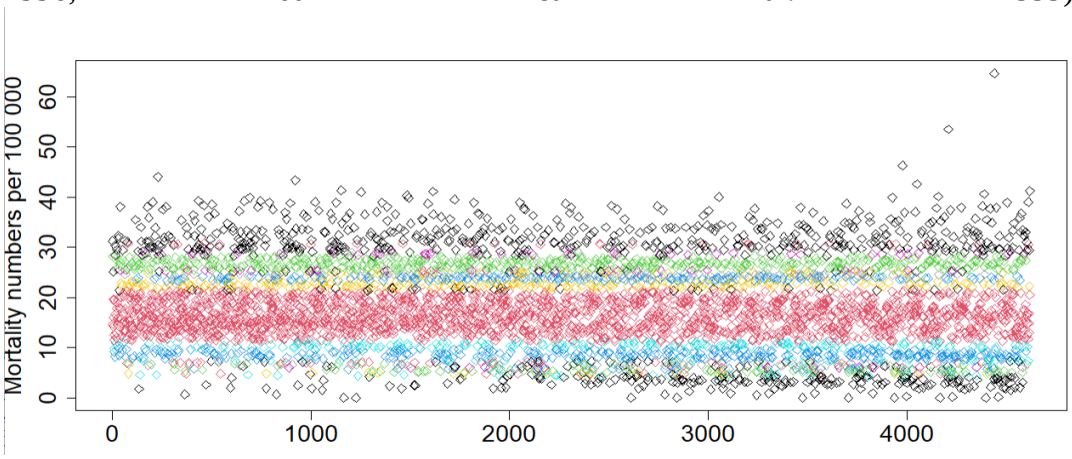

Figure 1. ε, ***eps = 0.1, MinPts = 23, the number of clusters: 27***

Figure 1. shows the results when the DBSCAN parameters are set to ($\varepsilon = 0.1$ and ($\mathbf{MinPts} = 23$). Under these conditions, the data is grouped into 27 distinct clusters. This relatively large number of clusters suggests a more detailed differentiation between countries where fatality rates show subtle differences between regions.

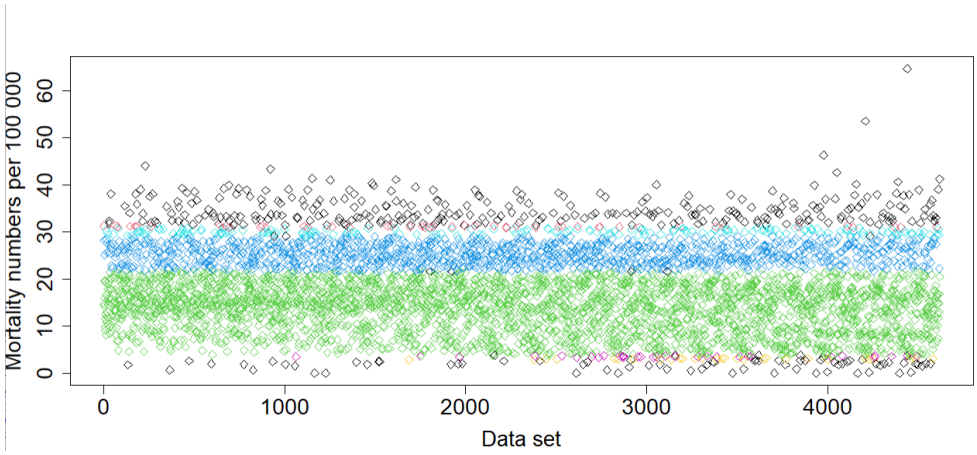

Figure 2. **ε , eps = 0.15, MinPts = 23, the number of clusters: 8**

Figure 2. shows the result of increasing $\varepsilon = 0.15$ while keeping ($\mathbf{MinPts} = 23$). The number of clusters is reduced to 8, indicating that the higher ε value leads to a broader grouping, with countries with moderately similar fatality rates being grouped into fewer clusters. This aggregation reflects a higher tolerance for differences in the number of fatalities, emphasising broader regional similarities.

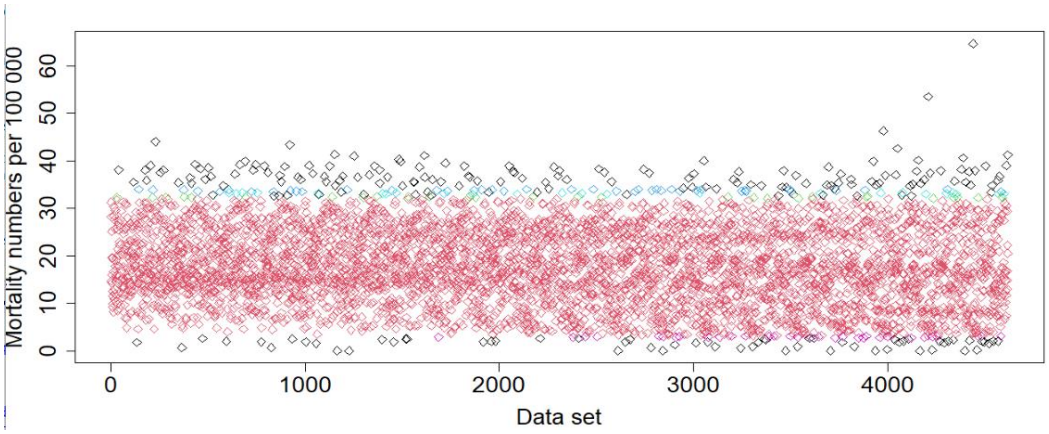

Figure 3. ***ε, eps = 0.2, MinPts = 23, the number of clusters: 7***

Figure 3. shows the scenario where $\varepsilon = 0.2$ and ($\mathbf{MinPts} = 23$). Here the data points are clustered into only 7 groups. This further reduction in the number of clusters suggests that as ε increases, the algorithm identifies even broader patterns of similarity between countries, likely driven by dominant human factors rather than regional or infrastructural differences.

These results highlight the ability of DBSCAN to reveal varying degrees of similarity between countries based on road traffic mortality rates. The identification of only 7 clusters across 231 countries underlines the commonality of the underlying factors contributing to road crashes, mainly human factors such as driver behavior and vehicle conditions. The findings suggest that these factors transcend geographical and infrastructural differences, highlighting the need for global strategies focused on improving driver safety and vehicle standards to effectively reduce road deaths worldwide.

Table 1. **The R codes and explanations**

```
# Install and load necessary libraries
install.packages("fpc")
library(fpc)
# Perform DBSCAN clustering
dbscan_result <- dbscan(data_long$Value, eps = 0.1, MinPts = 23) #MinPts = 15:
Specifies the minimum number of points required to form a dense region, which becomes a core
point of a cluster.
dbscan_result$eps
# Plot the clusters
plot(data_long$Value, col = dbscan_result$cluster + 1, pch = 5, cex = 1,
xlab="Data set",ylab="Mortality numbers per 100 000",cex.lab=1.6, cex.axis=1.6)
# Number of unique clusters (including noise as a separate color)
num_colors <- length(unique(dbscan_result$cluster)) + 1 # +1 for noise
```

In Table 1, code snippet performs DBSCAN clustering on a dataset, visualises the results by plotting the clusters, and calculates the number of unique clusters

(including noise). DBSCAN is a useful algorithm for identifying clusters of different shapes and sizes in data, especially when noise or outliers are present (Hennig,2015).

In 231 countries, when the number of traffic accident fatalities in 100 000 people in the population is classified within themselves, it is seen that those who show similar numbers or those who give the same numerical pattern can find themselves in 27, 8 and 7 classes according to different tuning parameter values in the DBSCAN algorithm. This result shows that although there are 231 countries in the world in terms of the number of deaths caused by traffic accidents on the basis of numerical magnitudes, it can be observed that the number of deaths in traffic accidents is similar to 27, 8 and even 7. This shows that accidents are generally caused by human phenomenon. We can classify this phenomenon as an infrastructure, two vehicles and a driver. In this sense, it is important for insurance companies to focus especially on the vehicle and driver situation; because the fact that the number of accidents can be reduced to 7 types from 231, countries analyzed in terms of the number of accidents can also be concluded that there are no infrastructure problems or that the infrastructures can be homogeneous between countries.

Discussion and conclusions. The analysis shows that road deaths in 231 countries can be categorized into a surprisingly small number of groups, suggesting that similar factors are at work around the world. The reduction to just 7 classes suggests that human factors, such as driver behavior and vehicle condition, are the main contributors to road crashes, rather than differences in infrastructure. This finding is significant because it shifts the focus of accident prevention strategies towards addressing human factors, which are more manageable and consistent across different regions. For insurance companies, the study highlights the importance of tailoring policies and prevention measures to driver and vehicle-related risks. By focusing on these areas, insurers will be able to develop more effective strategies for the reduction of road traffic fatalities. In addition, the homogeneity of infrastructure across countries suggests that efforts to improve road safety should be global rather than local, with best practice being shared on an international basis.

General proposals. *Focus on driver and vehicle interventions*: Insurers and policymakers should prioritize initiatives aimed at improving driver behavior and vehicle safety. These could include stricter driver training requirements, regular vehicle inspections and incentives for the use of advanced vehicle safety technologies. *Global cooperation on road safety*: Given the similarity in crash patterns between countries, there is an opportunity for international cooperation to standardize safety practices and share successful interventions. Countries with lower mortality rates can serve as models for others. *Further research on infrastructure homogeneity*: While this study suggests that infrastructure may not be a significant differentiator in road fatalities, further research is needed to confirm this finding. If infrastructure is indeed homogeneous across countries, this raises the possibility of global standards in road design and traffic management.

Data-driven policy-making: Governments should continuously monitor and classify road crashes using data analytics and machine learning techniques such as DBSCAN. This will enable dynamic and responsive policy-making that adapts to emerging trends and patterns in road safety.

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PROFILES OF THE CIRCULAR ECONOMY IN THE STRATEGIC FRAMEWORK OF THE EUROPEAN UNION

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Abstract. *The contribution highlights profiles of the circular economy starting from Boulding's famous 1966 article on the circular economy. Further reference concerns Ellen MacArthur, who, in 2010 created a foundation to accelerate the transition towards a circular economy. In the European context, the concept of the circular economy first appeared between the 1990s and the early 2000s, since in those years, the strategic objective of the EU was to become a more competitive knowledge-based economy capable of achieving sustainable economic growth. Among the threats to Sustainable Development are the loss of biodiversity and the increase in waste. In more recent years, the circular economy has become one of the most significant stages of the European Union. In 2015, the European Commission COM (2015) "The Missing Link" EU Action Plan for the circular economy, the first strategy for the circular economy, was identified to make circular the final part of the product life cycle. In 2019, the European Commission's COM (2019) outlined and adopted a Green Deal for the EU and its citizens, mobilising industry for a clean economy to achieve zero climate impact circular economy goals. In 2020, the European Commission presented a second strategy for the circular economy: A new circular economy action plan for a cleaner and more competitive Europe (COM) (2020). The transition to a circular economy has both economic and environmental implications. One of the potential opportunities of the circular economy is the reduction of pressures on the environment. This research focuses on the environmental profile.*
Key-words*: Sustainable development, Green Deal, Agenda 2030*
JEL: *K33, Q01, Q56*
UDC: *338(4)*

Some profiles of circular economy. Our environment is in a constant state of decline, and fundamental transformations in the conduct of industrial activities are required to reverse the decline. Various production models have been proposed in recent years, and among these models, the circular economy has assumed an important role. The circular economy model contrasts the traditional linear economy system, where raw materials are eventually converted into waste. In the case of the circular model, goods at the end of their useful life are converted into resources for the next generation of goods (Rajat Panwar, Eva Niesten). There is still no clear consensus on what circular economy (CE) means. According to Fabio Rispadori, the

notion of circular economy is different in that it proposes itself as an alternative to the current economic system that can be summarised in the definition of linear economy (take-make-dispose). The foundation of linear economy concerns how individuals obtain the maximum benefit from using material and immaterial resources. The objective of this system is the growth of wealth in goods and services produced and measurable in monetary terms, while it considers the availability of the resources necessary for production and how they are used to be marginal. The circular economy turns This system upside down since it places resources at the centre, not products (Fabio Rispadori). Another definition of circular economy is that of Boulding. In one of his famous articles, he states that the global economy must adopt circular systems to sustain human life in the long term (Boulding, K. 1966).

Further definition comes from the Ellen MacArthur Foundation, an international charity in the United Kingdom. The foundation defines the circular economy as a framework of systemic solutions that address global challenges, such as biodiversity loss, climate change, waste and pollution. According to its definition, the circular economy is based on three design-led principles: eliminating waste and pollution, circulating products and materials, and regenerating nature (Ellen MacArthur (2010). In 2014, at the World Economic Forum in Davos, the circular economy appeared internationally with an action plan to expand the circular economy (World Economic Forum).

Origin and evolution of the circular economy in the EU legal system. For many decades, Europe has experienced growth and well-being based on an intensive use of resources, creating many difficulties due to scarcity and environmental impacts. In the mid-1970s, the Commission of the European Communities commissioned two scholars to draft a report on production costs. The scholars in question were Walter Stahel and Geneviéve Reday-Mulvey. The results of the report, entitled The Potential for Substituting Manpower for Energy, show that the increased energy consumption required to produce a manufactured product does not depend on the production processes but on the extraction, transformation and transport of the raw materials needed to produce the manufactured product **(**Walter Stahel e Genevieve Reday). In the following years, the European Community moved in several acts on the environment from the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. In particular, the Resolution of the Council and the Representatives of the Member States estimates that achieving sustainable development presupposes significant changes in development models, production, consumption and behaviour (GUCE 138/1993). Another outcome of the Rio 92 Conference was Agenda 21.

Agenda 21 calls for new strategies to invest in the future to achieve overall sustainable development in the 21st century. The strategies concern new ways to preserve natural resources and new ways to have a sustainable economy (United Nations, Agenda 21). Later, the European Commission focused on waste, intending to reduce its production and negative environmental impacts. With the Commission Communication “Towards a thematic strategy on the prevention and recycling of

waste," waste is transformed into a new life cycle of resources for production processes. It becomes the primary reference of the emerging European circular economy concept (COM (2003) 301).

Furthermore, waste begins to occupy a privileged place here, and the European Commission confirms this with the 2014 Communication "Towards a circular economy: a zero-waste programme for Europe." For the first time, the Commission illustrates a general framework that indicates the sectors in which to intervene to encourage the circular economy. It also states that adopting models based on the circular economy gives a glimpse of a certain optimism for the European economy to overcome current and future challenges. However, with this act, the Commission has expressed some aspects of the theme without establishing precise commitments, postponing the possibility of planning strategies for future acts (COM (2014) 398).

The first strategy of the circular economy. The Circular Economy Action Plan entitled "The missing link - EU Circular Economy Action Plan" (COM (2015) 614 final). Sets out the transition to a circular economy in Europe. The European Union aims to develop a sustainable, low-carbon economy with resource efficiency to create new sustainable competitive advantages. Developing a sustainable economy will strengthen the Union's competitiveness, protect businesses from resource scarcity and price volatility, and create new business opportunities and jobs. Developing a sustainable economy will bring numerous benefits, including energy savings, environmental protection, and new forms of sustainable development. Economic actors, local and regional authorities, and the EU are essential to guide this process. The EU has a fundamental role in ensuring an adequate regulatory framework for developing the circular economy, giving clear signals to economic operators and society on the way forward, and preparing concrete and ambitious actions. With this Communication, the Commission complies with the commitments made under Goal 12 of the United Nations 2030 Agenda for Sustainable Development, particularly on production and consumption patterns (United Nations Agenda 2030). The Circular Economy Action Plan focuses on waste management. On the same day as the Action Plan, the Commission publishes four legislative proposals related to waste (EU legislation).

The circular economy starts from the first phases of the product life cycle; the design and production phases affect the supply of resources and the generation of waste. However, the central point of the Plan is the value chain, which considers production, consumption, repair, regeneration, waste management and reintroducing secondary raw materials into the economy. The saving of precious resources depends on the product's design, even if the current market signals are insufficient to improve this aspect. Limited to production processes, the importance of better management of primary raw materials is highlighted, which, once placed on the market, must be managed and recovered, given that Europe has only a minimal amount of them. Regarding consumption, consumer orientations and business impulses are considered (2015) 614 final). On waste management, the Commission confirms the waste hierarchy principle, which must be treated according to an order of priority, i.e.,

prevention, reuse, recycling, recovery and disposal. In order to push and optimise waste, the Commission focuses on the market of secondary raw materials and the reuse of water for agricultural and industrial purposes. Still in the field of waste management, the Action Plan deals with priority sectors such as plastic, food waste, essential raw materials, demolition waste and others.

These sectors must be monitored carefully since their management impacts the environment, the value chain and the circular economy. The transition to the circular economy is a structural change, which, in addition to all the actions to achieve it, we need to create the conditions for it to thrive, particularly public and private funding. Innovation, investment, and monitoring are essential for a successful European circular economy strategy. In 2019, the Commission took stock of the progress of the work with the publication of the report on the implementation of the 2015 Action Plan for the Circular Economy (COM (2019) 190 final). The report highlights that some initiatives have been launched while others are delayed. The Commission itself believes that the work has helped integrate the principles of circularity into production, plastic consumption, water management, food systems and management of specific waste streams. All this has been possible thanks to the involvement of Member States, the European Parliament and the business community. The European Parliament, in its 2018 Resolution, welcomes the Commission and considers that the main objective of the Commission should be to prevent hazardous chemicals from entering the material cycle, to ensure complete coherence between laws implementing waste and chemicals policies, and to ensure better enforcement of existing legislation, while addressing regulatory gaps that could hinder a sustainable EU circular economy, with particular reference to imported articles. It also stresses that in an actual circular economy, products must be designed with the ability to be improved, durable, repairable, reusable and recyclable in mind, with minimal use of substances of concern (RSP2018/2589).

Second Circular Economy Strategy. In the Communication "A New Circular Economy Action Plan - For a Cleaner and More Competitive Europe" (COM (2020) 98 final), the Commission presents a new action plan for the circular economy. The introductory part of the document sets out the serious situation due to the increased consumption of materials and waste expected in the next forty years. It then shows that the extraction and transformation of resources, loss of biodiversity and water stress are at the origin of the increase. The New Plan is part of the Green Deal strategy, which, in paragraph 2, Transforming the EU Economy for a Sustainable Future, develops a series of transformative policies to achieve climate neutrality by 2050(COM (2019) 640 definitive). However, the EU needs a regenerative growth model to achieve climate neutrality. This model will promote the maintenance of resource consumption within the planet's limits and will work to reduce the consumption footprint, increasing the percentage of use of circulating materials in the next decade (COM (2020) 98 final). The new Action Plan is confirmed to be more consistent than the previous Communication, The Missing Link. The introduction states two principles as inspirations to place actions and policies towards a

regenerative growth model. The principles in question are the principle of dissociation and the principle of the product as a service.

The first requires that economic growth not occur from using new resources. The second involves the legal ownership of a good that should be the prerogative of the producer and intermediary to whom they ensure the use and reuse of a product until recovery or recycling. Concerning sustainable product design, EU initiatives and legislation already partly address the sustainability aspects of products, both on a mandatory and voluntary basis, such as the Ecodesign Directive for Energy-Related Products (Reg. (EU) 2024/1781 13 /6/2024) repeals Directive(2009/125/CE), the ECOLABEL brand (Reg. (CE) n. 66/2010), the criteria for green public procurement (green public procurement). In order to make products fit for a climate-neutral and resource-efficient economy, the Commission is proposing a legislative initiative on sustainable products. The legislative initiative should contain principles and modalities that should inspire the measure. The measure includes improving the durability, reusability, and repairability of products, increasing recycled content in products, reducing carbon and environmental footprints, limiting single-use products, combating premature obsolescence, prohibiting the destruction of unsold durable goods, promoting the "product as a service" model and digitalisation of products. This new regulation on sustainable products is a real circular transaction (Reg. (EU) 2024/1781). Regarding consumers, the Commission has updated (Directive (EU) 2019/771), with Directive (EU) 2024/1799). The amendments to Directive (EU) 2019/771 are in Article 16 of the new Directive 2024/1799) laying down common rules promoting goods repair. This Directive pursues the objectives of the Green Deal to promote more sustainable consumption for a circular economy and green transition. The Commission will assess proposals to empower and protect consumers against façade greening. (Dirt. (EU) 2024/825**)** and premature obsolescence. The new Action Plan includes a section dedicated to product value chains (COM (2020) 98 final), which focuses on products that have a greater impact on sustainability. This criterion will answer the different challenges ranging from climate emergency to biodiversity.

The Commission will work in the main value chains to identify the obstacles that prevent the expansion of markets for circular products and how to overcome them. Following the scheme presented in paragraph, electrical, electronic and ICT equipment are considered: batteries and vehicles; packaging; plastics; textiles; construction and building; food, water and nutrients. For each item mentioned, new legislative initiatives are reported. The legislative initiative for circular electronics includes introducing measures and rules to ensure durability, repairability and recycling (COM (2021) 547 definitive). Also, the Commission will propose a new regulatory framework for batteries. The legislative proposal will be based on evaluating the Batteries Directive (Direct.2006/66 CE). On 18 August 2023, the new EU Regulation 2023/1542 on industrial batteries and battery waste came into force, replacing the previous Directive 2006/66/EC. The new regulation introduces new rules to ensure greater transparency and sustainability throughout the life cycle of batteries Reg. (EU) 2023/1542). For packaging, the Commission will review

Directive 94/62 EC to strengthen the mandatory essential requirements that packaging must meet to be placed on the EU market. Directive 94/62 EC is repealed by the European Parliament Legislative Resolution of 24 April 2024(RSP9TA (2024)0318). The EU Strategy for Plastics in a Circular Economy has provided a set of initiatives to address this issue. In order to increase the use of recycled plastics Reg. (EU) (2022/1616), the regulation provides for decontaminating plastic material through recycling technology. The Commission will adopt binding provisions on recycled content and measures to reduce waste such as packaging, construction materials and vehicles. For construction and building, the plan links to the Renovation Wave initiative for Europe (COM (2020) 662 final) to make Europe more beautiful, sustainable and welcoming. Paragraph 4 concerns waste (COM (2020) 98 final), where a framework is outlined that refers to the waste hierarchy announced in the missing link. This framework divides waste into four sub-themes: a strengthened waste policy to support circularity, interventions on toxic substances, secondary raw materials market, and management of waste exports. The objective inherent in the paragraph is the progressive reduction of waste through the valorisation of secondary raw materials, which means making waste and its use safe. This objective can be achieved thanks to interventions that reduce their toxicity. Paragraph 5 deals with circularity serving people, regions, and cities. One of the problems of the circular transition is highlighted, namely its social effects, particularly those inherent in work and social inclusion. The Commission underlines the importance of adequate skills to address the transition from a linear to a circular economic system. The Commission document sees the resources to avoid or reduce negative externalities during the system's transformation from linear to circular in the structural funds and other financial instruments. In paragraph 6 it deals with some cross-cutting actions.

These actions concern the links of the circular economy to climate neutrality, research, innovation and digitalisation. Paragraph 7 "Leading global efforts." In this sense, it believes that the EU's efforts on the circular economy can only be successful if there is a just, climate-neutral and resource-efficient global transition. To support this global transition to a circular economy, the Commission intends to lead international efforts to reach a global agreement on plastics, propose a global alliance for the circular economy to identify gaps, launch an international debate on managing natural resources, and build a partnership. In paragraph 8, another highlighted aspect is the strengthening and updating of the monitoring framework for the circular economy. The Annex to the new Action Plan contains actions and initiatives the Commission will implement to implement the circular economy strategy (COM (2020) 98 final).

European Parliament Resolution of 10 February 2021. European Parliament Resolution on the New Circular Economy Action Plan (RSP 2020/2077) (INI) Welcomes the Commission's New Action Plan for the Circular Economy. Parliament calls on the Commission to present all the initiatives foreseen in the Action Plan. It stresses that the circular economy is a critical factor in reducing the environmental footprint of European production and consumption and for its vital

contribution to achieving the objectives of the Paris Agreement and the United Nations Sustainable Development Goals. In point 6, Parliament stresses that it is necessary to decouple growth from the use of resources fully and calls on the Commission to propose binding, science-based, short- and long-term targets for reducing the use of primary raw materials and environmental objectives. Parliament, in point 21, stresses the need to transform the linear economy based on the formula take-make-dispose into a genuinely circular economy based on the following principles: reducing energy and resource use; maintaining value in the economy, preventing waste; designing waste-free, free from harmful substances and non-polluting; keeping products and materials in use and closed loops; protecting human health; promoting consumer benefits; regenerating natural systems; Parliament stresses that these objectives should guide the new strategic framework on sustainable products.

Conclusions. We can illustrate some general considerations of the European Union's commitment to the circular economy through careful research. It appears confirmed that the EU, particularly the European Parliament and the Commission, is responding with great attention and political commitment to the transition of the circular economy. The reasons may be different, and the particular sensitivity for environmental issues has increasingly developed within the EU, such as the Green Deal strategic plan.

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CENTRAL BANKS' ROLE IN ADVANCING SUSTAINABLE FINANCE

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Abstract. *This paper examines the critical role of central banks in promoting sustainable finance within the context of global climate change challenges and the transition to a low-carbon economy. It analyzes various instruments and policies that central banks can employ to foster green finance and mitigate climate-related risks in the financial system. The study explores how central banks can integrate sustainability considerations into their core functions, including monetary policy, financial regulation, and supervision. Furthermore, the paper discusses the challenges central banks face in balancing their traditional mandates with emerging sustainability objectives and explores how the emerging sustainability-focused duties may impact the autonomy and answerability of central banking institutions. The study underscores the significance of collaboration among central banks, governments, and the private sector in ensuring an orderly and effective transition towards a sustainable economy. Finally, it offers policy recommendations for enhancing the role of central banks in advancing sustainable finance and addressing climate-related financial risks.*

Keywords: *Central banks, sustainable finance, climate risk, green* finance, monetary policy, financial stability, environmental policy, ESG integration
JEL: *E52, E58, G28, Q54, Q56*
UDC: *336.711*

Introduction. Climate change represents a major global challenge of the 21st century, with significant implications for economies and societies worldwide. The international community has urgently recognized the need to address this issue, culminating in agreements such as the 2015 Paris Accord. In this rapidly evolving landscape, central banks find themselves facing a new challenge: adapting to the reality of climate change. As public awareness grows and global political commitment to combating global warming intensifies, these institutions are compelled to reevaluate their roles and responsibilities. We are witnessing a gradual transformation, with some pioneering central banks already integrating environmental considerations into their policies, from green finance to climate risk management.

This evolution is not without precedent. History shows that central banks have redefined their roles at crucial moments, such as the 2008 financial crisis, when financial stability became a priority. Now, in the face of the climate threat, a new stage in their evolution is emerging. The current debate centers on the extent to which these institutions should engage in promoting sustainability, balancing the imperative of climate action with the limits of their traditional mandates.

The financial sector plays a crucial role in facilitating the transition towards a sustainable, low-carbon economy. This sector faces multiple challenges, from developing new financial products to integrating climate risks into investment strategies. In this context, the Republic of Moldova is also taking important steps towards a more sustainable and energy-efficient economy. A concrete example is the recently approved World Bank project aimed at improving energy efficiency in public buildings and the district heating sector in Moldova (LEGKL, 2024).

The purpose of this article is to examine the role of central banks, particularly the National Bank of Moldova, in advancing sustainable finance and addressing climate-related financial risks. Key questions we aim to address include: How can central banks effectively integrate sustainability considerations into their core functions? What specific tools and policies can the National Bank of Moldova implement to promote sustainable finance? How can the balance between traditional central bank mandates and emerging sustainability objectives be achieved?

This research topic is gaining increasing importance, reflecting the urgency with which society seeks solutions to the climate crisis and the vital role that the financial sector can play in this global transition. By exploring these issues, we aim to contribute to the ongoing dialogue on sustainable finance and provide actionable insights for policymakers and financial institutions in Moldova.

Literature review. The evolving role of central banks in sustainable finance has become a focal point of academic research and policy discussions, with numerous scholars examining the various aspects of this complex and multifaceted issue. Dikau & Volz (2019, 2021) emphasize the crucial role of central banks in supporting the development of green finance models and ensuring accurate assessment of environmental and carbon risks by financial institutions. They argue that central bank involvement is not limited to passive incorporation of environmental factors into existing frameworks but extends to active engagement in sustainable financing practices. This perspective is also supported by PIERRE et al. (2022), who note a growing acceptance of the idea that central banks and financial supervisors should address climate-related concerns. Durrani et al. (2020) highlight the importance of central bank participation in initiatives such as the Network for Greening the Financial System (NGFS) and the Sustainable Banking Network (SBN), demonstrating their commitment to expanding sustainable financing practices. This aspect is reinforced by Khairunnessa et al. (2021), who emphasize the role of NGFS in analyzing and managing climate and environment-related risks in the financial sector.

Saratian & Arief (2018), as well as Chen et al. (2022) and Zheng et al. (2021), extend the discussion to the broader context of sustainable development, arguing that central bank involvement in sustainable financing contributes to achieving Sustainable Development Goals (SDGs) and transitioning to a green economy. Chamdani & Santoso (2023) discuss the concrete implementation of "green policies" by central banks, such as green versions of quantitative easing and support for environmentally friendly financial institutions through green bond purchases. Finally, Svartzman et al. (2020) underscore the importance of addressing climate change risks for monetary and financial stability, highlighting in particular the systemic financial risks presented by climate change in the transition to a low-carbon economy.The literature demonstrates a clear evolution in thinking about the role of central banks in sustainable financing. From an initially more cautious approach, there is a transition towards more active and complex involvement. This evolution reflects the growing recognition of the impact of climate change on financial stability and the need for a proactive approach from central banks. However, significant challenges remain in balancing these new responsibilities with the traditional mandates of central banks and managing potential conflicts of interest or unintended risks. It is crucial for central banks to continue exploring and refining their approaches to sustainable financing while maintaining a balance between environmental objectives and long-term financial stability.

In conclusion, the theoretical framework for the role of central banks in sustainable financing combines classical economic theories with newer concepts from the field of sustainability and finance. The literature in this field is dynamic and continually evolving, reflecting the complexity and urgency of challenges related to climate change and sustainability in the global financial system.

Research methodology. This study employs a mixed-methods approach to examine the role of central banks in advancing sustainable finance. The methodology combines qualitative analysis of policy documents and literature with quantitative assessment of central bank initiatives and their impacts. This methodology allows for a comprehensive examination of central banks' role in sustainable finance, combining theoretical insights with practical examples and expert perspectives. The mixed-methods approach provides a nuanced understanding of both the policy landscape and the real-world impacts of central bank initiatives in this rapidly evolving field.

Main results. Central banks' involvement in sustainable finance has undergone a significant evolution in recent decades, reflecting an increasing awareness of the importance of environmental factors in global financial stability. This transformation can be analyzed in several distinct stages, each marking an important advancement in the financial sector's approach to environmental challenges. The initial stage, in the 1990s, was characterized by the first efforts to recognize the link between finance and sustainability. The creation of the United Nations Environment Programme Finance Initiative (UNEPFI) in 1990 marked the

beginning of this global awareness (Fufa, 2024). his initiative laid the groundwork for future actions of central banks in the field of sustainable finance.

In the 2000s, we witnessed a transition towards the concrete implementation of environmental policies in the banking sector. The People's Bank of China (PBC) played a pioneering role in this regard, issuing a notification in 1995 that required financial institutions to consider environmental factors in their credit policies (Liu & Tobias, 2023). This step was followed by the publication of the "Green Credit Guidelines" in 2012, which mandated financial institutions to adjust credit decisions to address environmental risks and support green growth (Wang & Wang, 2023).

Figure 1 provides a visual timeline of key events and initiatives in the evolution of central banks' involvement in sustainable finance from 2015 to 2024, illustrating the rapid progression of developments in this field.

The mid-2010s marked an intensification of efforts and a broader recognition of climate risks to financial stability. Mark Carney's "Breaking the Tragedy of the Horizon" speech in 2015 was a turning point, drawing attention to the urgent need to address climate risks in the financial sector (Carney, M., 2015). This speech catalyzed a series of global initiatives, including the creation of the Network for Greening the Financial System (NGFS) in 2017, which marked the beginning of international collaboration between central banks on the topic of sustainable finance (One Planet Summit, n.d.).

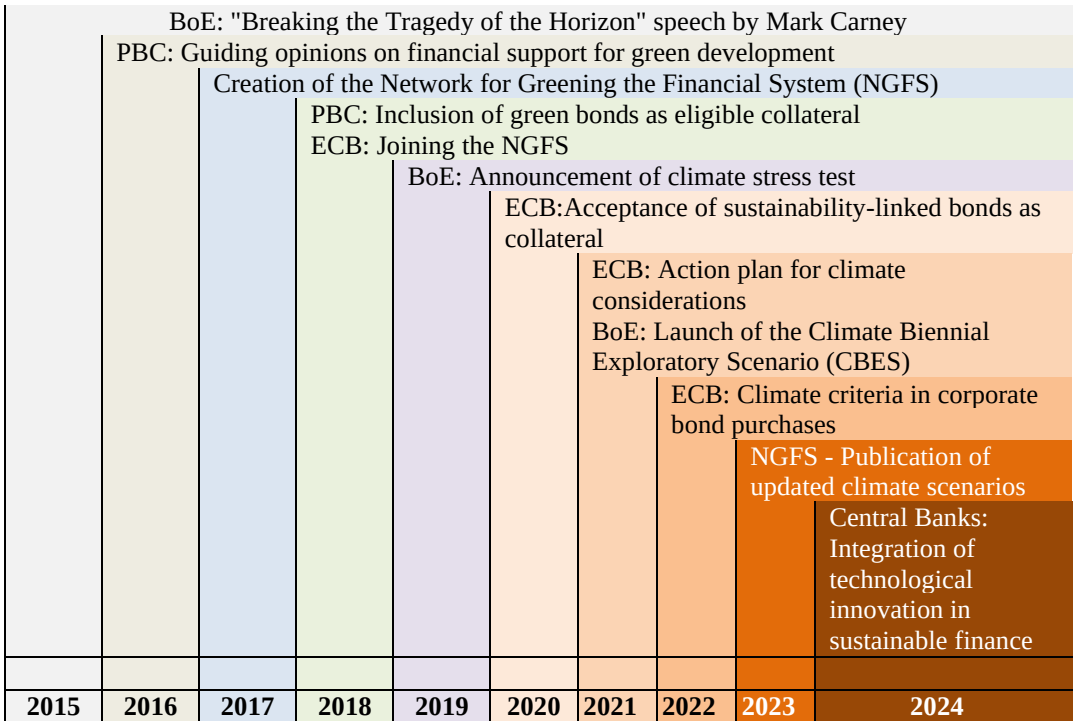

Figure 1. **Evolution of Central Banks' Involvement in Sustainable Finance (2015-2024)**
Source: Author's elaboration based on sources cited in bibliography

The period 2018-2021 was characterized by an acceleration of concrete actions. Central banks began to integrate environmental considerations into their core operations. For example, the People's Bank of China included green bonds as eligible collateral for its lending facilities (Macaire & Naef, 2021), while the European Central Bank (ECB) began accepting sustainability-linked bonds as collateral for refinancing operations. During the same period, the Bank of England (BoE) announced plans for the first comprehensive climate stress test.

Recent research highlights the transformative role of central banks in promoting a sustainable future (Tashtamirov, 2023). A 2021 study showed that while only 12% of central banks have explicit sustainability mandates, 40% are mandated to support government policy priorities, including sustainability objectives (Dikau & Volz, 2021). In recent years, we are witnessing an ever-deeper integration of sustainable finance into central bank practices. Technological innovation plays a crucial role in this transformation, contributing significantly to sustainable financial performance (Serdarušić, 2024). Central banks are not only promoting green finance but are beginning to incorporate it into the very structure of their operations, from monetary policy to banking supervision.

Consequently, through collaborative efforts and strategic interventions, central banks play an essential role in shaping a more sustainable future for the financial sector and the global economy. The evolution of their involvement in sustainable finance reflects a growing recognition of the importance of integrating ESG factors into financial policies and practices.

Central Bank Initiatives for Driving Sustainable Finance. Central banks' efforts in the field of sustainable finance are grounded in the fundamentals of modern economic theory and the expansion of the traditional role of monetary policy, particularly in the context of global challenges such as climate change. The theory of externalities, initially developed by economist Arthur Pigou in the early 20th century, provides a robust justification for central bank intervention in correcting market failures related to climate change (McClure & Watts, 2016). Pigou argued that negative externalities, such as pollution, require government intervention to address market failures, suggesting the implementation of production taxes to internalize these external costs (Decker, 2019; Fleurbaey et al., 2021).

In the current context, there is growing recognition of the need for central bank intervention to address market failures associated with environmental externalities (Antoine et al., 2020). Climate-related risks have been identified as a significant concern for central banks, impacting financial stability (Antoine et al., 2020; Dikau & Volz, 2021). Scholars advocate for the integration of climate-related risks into central banks' policy frameworks to ensure macro-financial stability (Dikau & Volz, 2021; Wołoszczenko-Hołda, 2022).

Moreover, the concept of the "tragedy of the horizons" introduced by Mark Carney, former Governor of the Bank of England, underscores the need for central banks to address long-term risks associated with climate change, even if these extend

beyond traditional economic and political cycles. This approach aligns with the broader objective of rectifying market failures and promoting efficient resource allocation (Fleurbaey et al., 2021; Boneva et al., 2021). By incorporating Pigouvian principles in addressing climate change, central banks can play a crucial role in promoting sustainability and mitigating risks associated with environmental externalities. Post-Keynesian monetary theory and Richard Werner's "credit guidance" concept suggest central banks can influence capital allocation towards sustainable investments (Werner, R., 2005). Recent literature explores the role of banking and monetary policy in financing low-carbon transitions, the impact of monetary policy on green finance, and the complex role of central banks in promoting sustainable development through green banking practices.

In this context, central banks expand their traditional mandate to include sustainability, aiming to redirect financial flows towards sustainable investments, integrate climate risks into the financial system, and support green financial product development. Building on these theoretical foundations, central banks' efforts aim to redirect financial flows towards sustainable investments, integrate climate risks into the financial system, and support the development of green financial products. These actions manifest through various instruments and initiatives, such as:

1. **Incorporating climate risks:** Central banks integrate climate-related risks into their policy implementation frameworks, contributing to the protection of macro-financial stability (Dikau & Volz, 2021).
2. **Sustainability criteria:** Establishing sustainability criteria for lending activities and investment portfolios (Abuatwan, 2023).
3. **Participation in international initiatives:** Central banks engage in networks such as the Central Banks and Financial Supervisors Network for Greening the Financial System (NGFS) to expand sustainable financing practices (Durrani et al., 2020).
4. **Policy frameworks for green financing programs:** Offering refinancing programs under favorable conditions, credit allocations to financial enterprises, and sector-specific transformation projects (Azad et al., 2022).
5. **Development of Green Banking (GB):** The example of Bangladesh Bank (BB) illustrates the implementation of green finance through the development of Green Banking, considered crucial for the transition to a green economy and achieving the Sustainable Development Goals (Chen et al., 2022).
6. **Green transformations in internal operations:** Banks and non-bank financial institutions adopt green financing mechanisms and implement green transformations in their internal operations (Khairunnessa et al., 2021).
7. **Modifying regulatory frameworks:** Central banks in the Asia-Pacific region are modifying regulatory frameworks to encourage green lending and products (Durrani et al., 2020).
8. **Supporting green financing programs:** In Vietnam, major banks such as HSBC, Deutsche Bank, Société Générale, and BNP Paribas have initiated green financing programs with the support of central banks (Nguyen et al., 2022).

9. **Integrating digital transformation:** The concepts of "green Fintech" and "sustainable digital finance" are promoted to maintain environmental objectives and promote sustainability (Serdarušić, 2024).

10. **Policies to stimulate green innovation:** In China, the central bank accepts green bonds rated AA or higher as eligible collateral assets, thus encouraging green innovation and supporting the green transformation of enterprises (Wang & Wong, 2023).

The diverse array of instruments and initiatives employed by central banks to promote sustainable finance can be categorized into several key areas (see figure 2). This classification not only provides a structured view of current efforts but also allows for future expansion and refinement as the field of sustainable finance evolves.

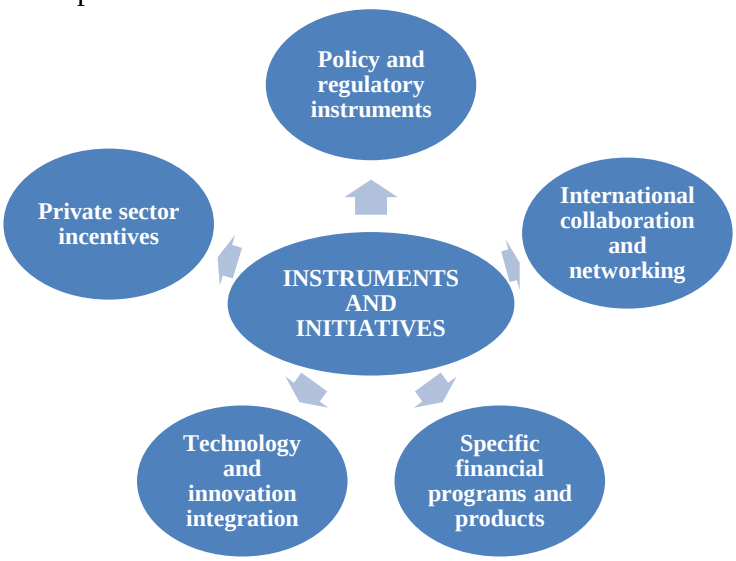

Figure 2. **Classification of Central Banks' instruments and initiatives for promoting sustainable finance**

Source: Author's elaboration based on sources cited in bibliography

Policy and Regulatory Instruments: This category encompasses a range of tools that central banks use to shape the financial landscape. It includes the incorporation of climate risks into policy frameworks, the establishment of sustainability criteria for lending and investment, the development of green financing policy frameworks, and the modification of existing regulatory structures. These instruments form the backbone of central banks' efforts to integrate sustainability into the core of financial operations.

International Collaboration and Networking: Recognizing the global nature of climate challenges, central banks actively participate in international initiatives. Networks such as the NGFS play a crucial role in sharing best practices and coordinating efforts across borders.

Specific Financial Programs and Products: This category highlights the practical implementation of sustainable finance principles. It includes the development of Green Banking practices, green transformations in internal operations, and support for specific green financing programs. These initiatives

demonstrate how sustainable finance principles are being translated into tangible financial products and services.

Technology and Innovation Integration: As the financial sector rapidly digitalizes, central banks are exploring the intersection of technology and sustainability. The promotion of concepts like "green Fintech" and "sustainable digital finance" represents an exciting frontier in sustainable finance.

Private Sector Incentives: Recognizing the crucial role of the private sector in driving sustainable development, central banks are implementing policies to stimulate green innovation. These incentives aim to encourage businesses to align their operations with sustainability goals.

It's important to note that this classification is not exhaustive and may evolve as new challenges emerge and innovative solutions are developed. The field of sustainable finance is dynamic, and central banks continue to adapt their approaches to meet emerging needs and opportunities. Future developments may introduce new categories or refine existing ones, reflecting the ongoing commitment of central banks to promoting a more sustainable financial system.

Monetary, Regulatory and supervisory measures of CB. The tools and initiatives of central banks in the field of sustainable finance are interconnected and complement each other. Figure 3 presents a schematic overview of the main areas of action for central banks, which can be divided into three major sections: monetary policy, regulation and supervision, and research and education.

These areas overlap with each other, highlighting how the various instruments and measures from each category interact. For example, in the intersection between monetary policy and regulation/supervision, we find instruments that combine elements from both domains, such as adjusting the eligibility criteria for collateral assets to favor green bonds, as the European Central Bank did in 2020 (Schoenmaker, D., 2021), or linking capital requirements to green financing activities, exemplified by the Hungarian Central Bank's program for green mortgage loans (CBH, 2022).

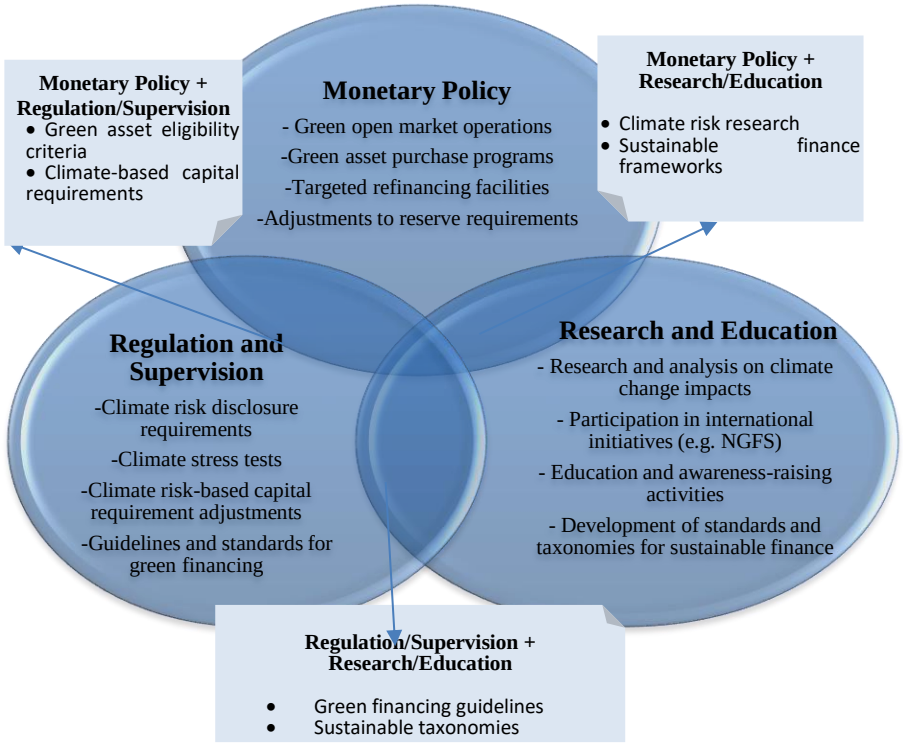

Figure 3. **Central banks' sustainable finance toolkit**
Source: Author's elaboration based on sources cited in bibliography

Furthermore, the overlap between monetary policy and research/education highlights initiatives through which central banks use monetary policy instruments to support research activities, analysis, and awareness-raising regarding climate-related risks, such as the publication of impact studies by central banks or participation in international networks like Network for Greening the Financial System (NGFS).

Finally, the intersection of the regulation/supervision domain with research/education reflects measures through which sustainability considerations are integrated into the regulatory framework, such as climate risk disclosure requirements or climate stress tests introduced by the Bank of England, alongside promoting understanding and knowledge exchange among market participants through educational programs and standards development (BoE, 2022).

This representation emphasizes that central banks' efforts to promote sustainable finance involve a complex and coordinated approach, in which the various components of their toolkit intertwine and reinforce each other to generate a positive impact on the transition to a sustainable economy.

Central banks have a wide range of tools at their disposal to promote sustainable finance, from monetary policy adjustments to regulatory measures and research activities. The effective use of these instruments can significantly impact redirecting financial flows towards sustainable activities and strengthening the

financial system's resilience to climate risks. However, implementing these measures requires a balanced approach that considers the traditional mandates of central banks and potential side effects on financial and economic stability.

As the field of sustainable finance continues to evolve, central banks will likely refine and expand their toolkit, developing new approaches to address emerging challenges and opportunities in the transition to a more sustainable economy.

Discussion and conclusions. The integration of sustainability objectives into the operational framework of central banks represents a complex and multidimensional challenge that requires a nuanced and strategic approach. This transformation involves reconciling potential short-term tensions between sustainability and price stability, as well as a fundamental reassessment of the concept of financial stability to incorporate long-term climate risks. In this context, central banks face the delicate task of managing public and political expectations while maintaining their operational independence and institutional credibility.

The effective implementation of sustainable finance policies is hindered by a series of significant obstacles. These include the deficit of reliable and standardized data on climate risks, inherent uncertainties in modeling the long-term impact of climate change on the economy, as well as methodological difficulties in quantifying and integrating climate risks into existing financial paradigms. These challenges also represent opportunities for innovation in data analysis and the development of new risk assessment methodologies, thus stimulating the evolution of the entire financial sector towards a better understanding and management of climate risks.

A holistic approach to sustainability in the financial sector requires unprecedented coordination between central banks, governmental authorities, and other regulatory bodies. This collaboration must aim to align monetary and fiscal policies to facilitate the transition to a low-carbon economy, while managing potential tensions between national and global sustainability objectives. The opportunity lies in developing innovative cooperation mechanisms and integrated policy approaches that allow for concerted and effective action in the face of climate challenges.

Expanding the role of central banks in the sphere of sustainability raises fundamental questions about the independence and accountability of these institutions. There is a risk that increased involvement in climate policies could lead to a politicization of central bank decisions, thus undermining their operational autonomy. To counter these risks, it is imperative that central banks precisely define the limits of their involvement in sustainability policies, improve decision-making transparency, and develop new oversight mechanisms adapted to their expanded roles.

The role of central banks in promoting sustainable finance has evolved significantly in recent years, reflecting the growing recognition of the impact of climate change on financial and economic stability. By utilizing a wide range of instruments - from monetary policy to regulation and supervision - central banks have

the potential to play a crucial role in facilitating the transition to a more sustainable economy.

However, this evolution is not without challenges. Central banks must strike a delicate balance between their new responsibilities in the sustainability domain and their traditional mandates, address limitations related to data and methodologies, and navigate a complex political and economic landscape.

The case studies presented in this article demonstrate that there are multiple paths of action for central banks, adapted to their specific contexts. Regardless of the chosen approach, it is clear that central banks will play an increasingly important role in shaping the future of sustainable finance.

Ultimately, the success of these efforts will depend not only on the actions of central banks but also on effective collaboration with governments, the private sector, and civil society. Only through a coordinated and comprehensive approach can we hope to effectively address the complex challenges of climate change and build a more resilient and sustainable financial system for future generations.

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OPTIMIZATION OF ENERGY MANAGEMENT THROUGH THE MODERNIZATION OF DISTRICT HEATING SYSTEM (DHS) CHISINAU: CHALLENGES AND SOLUTIONS

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Abstract. *The need to modernize the DHS Chisinau and the optimization of its energy management is very actual for ensuring living conditions in accordance with the demands of modern society. The improvement and modernization of the DHS structure represents the basis for obtaining thermal comfort of the residences in the Chisinau municipality. The development of DHS in Chișinău since the 1950s has had the function of providing its citizens with long-term energy insurance and security. Initially the distribution system of DHS was equipped with 22 pumping stations, whose initial functionality was compliant with the provision of quality services for the supply of thermal energy to consumers and ensured the efficiency and reliability of the operation of the main thermal networks. The pumping stations play a significant role both on the delivery and suction side of the thermal agent. As a result of recent technological improvements, the number of these stations has been gradually reduced to 18. The Republic of Moldova, in particular the city of Chisinau, based on the perspective of continuous industrial development, in most cases faces important tasks in the field of efficiency of natural resources utilization, production, transportation, and distribution of energy and its use in all forms. Energetics management, as a science, in the given context, occupies an important place relying on methods of organizing production, transportation, and efficient use of energy. This article purpose is to explore the specific challenges faced in the modernization of the city's DHS and present potential solutions aimed at improving energy efficiency and sustainability.*

Key words*: energy management, optimization, improvement, modernization, production efficiency.*
JEL: *M00, M10, M20*
UDC: *338.45:621.31(478-25)*

Introduction. The Republic of Moldova, in particular the city of Chisinau, based on the perspective of continuous industrial development, in most cases faces important tasks in the field of efficiency of natural resources, production, transportation and distribution of energy and its use in all forms. Energetics, as a science, in the given context, occupies an important place relying on methods of energy production, transportation, the result being and efficient utilization of energy, [3].

In the city of Chisinau the energy sector has an ongoing issue of national interest, which emphasizes on high efficiency cogeneration energy production. This approach implies a much more efficient use of available resources. In this context, a key objective is to research and optimize the operation of the Western CT of SACET Chisinau through retrofitting. The process of retrofitting will involve the integration of cogeneration plants adapted to the quality and quantity requirements of local thermal energy consumption. In this way, the aim is to identify the most efficient technical and economical solutions that will meet the energy requirements of the entire community of the city. Chisinau.

The centralised District Heating System (hereafter DHS) is an integrated set of technologies, functionally unitary, which includes a wide range of constructions, equipment, installations and specific facilities, as well as measuring instruments, all intended for producing thermal energy, transporting, distributing and supplying it to consumers [1]. This system aims to achieve high efficiency performance and compliance with high quality standards.

Results and discussions. The DHS is one of the main pillars of an urban infrastructure. An DHS can integrate different thermal energy sources, such as Combined Heat and Power (CHP) plants, District Heating Power Plants (DHPP), renewable energy plants and other modern technologies, operating in a common network, starting with the production, distribution and final supply of thermal energy to a wide range of uses, such as citizens' homes, office buildings, public institutions, etc., with a high level of stability and reliability [8].

The components are structured as follows:

- Sources of heating energy generation - thermal and/or district heating power plants;
- The primary heating distribution system;
- Central heat points placed at district level or individual heating points placed at building level;
- Thermal networks for the distribution of hot water and hot water for heating;
- Heat metering system at building level;
- Internal network for the supply of hot water and heat in buildings;
- Automation and control equipment and systems.
- The operation of DHS as a public heating service is regulated by the authorities in order to guarantee the following aspects [7]:
- Continuity and high quality of the services provided;
- Affordable prices for consumers;
- Securing the necessary long-term resources for the public service;
- Reliability in the operation of the public heat supply service;
- Transparency regarding heating costs and tariffs.

The objectives of the central heating system operator in the provision of services are

- Optimal use of energy resources;

- Contributing to the sustainable development of the administrative-territorial entities;
- Reducing the negative impact on the environment;
- Promoting efficient cogeneration and the use of new and renewable energy sources;
- Ensuring transparency of heating tariffs and prices.

A clear picture of the interconnection and functioning of all system components is provided by the schematic diagram of the structure of an DHS (Figure 1.).

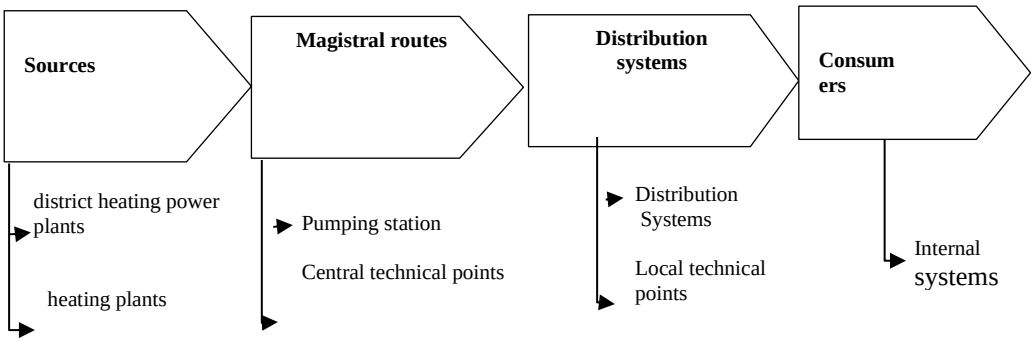

Figure 1. **The infrastructure of a centralized DHS [6]**

The system operator, as well as the Energy Regulatory Agencies and the relevant ministry, have a significant role in optimizing the management of the public service for the supply of heating energy, with multiple and diversified responsibilities. These include:

- Creating and approving specific programs for the thermal energy sector, reflecting local needs and particularities;
- Determining the tariffs for heating energy distributed to consumers, based on recommendations made by the service operator;
- Ensuring uninterrupted supply of thermal energy to consumers, thus ensuring the continuity of this essential service;
- Facilitating studies and analyses to assess the local potential of renewable energy resources and to develop feasibility projects to capitalize on this potential;
- Delimiting unit heating zones based on feasibility studies addressing regional development and specific community needs;
- Overseeing the establishment by the operator of protection and safety zones for DHS, thus ensuring the safety and efficiency of the system.

The system operator is also responsible for monitoring and maintaining the DHS infrastructure in optimal working order. Implementing annual maintenance and repair programs, as well as taking appropriate measures to prevent and manage possible emergencies or failures in the system, [1].

In addition to those listed above, of major importance is the promotion of heating energy innovations and solutions, thus contributing to increasing energy

efficiency and reducing environmental impacts. This includes exploring and integrating new technologies and energy efficiency practices in order to optimize the services offered and to meet the increasingly varied demands of consumers.In modern society, most people spend more than two thirds of their lives indoors. This creates significant challenges in terms of ensuring a comfortable indoor climate, especially in terms of temperature regulation. To address these challenges, heating systems play an important role in the implementation of innovative and efficient solutions. These systems are designed to:

- Equalizing room temperature, keeping it as constant as possible;
- Adapting the internal temperature according to specific requirements, considering thermal inertia;
- Preventing cold radiation and water vapor condensation on building surfaces;
- Warming spaces without polluting indoor air or the environment;
- Eliminating disturbing draughts inside rooms;
- Providing efficient and economical solutions, both in terms of installation and operation.

To optimize the energy management of a heating installation, a set of criteria of varying degrees of importance is established. The first priority is thermal comfort, assessed by indoor air temperature, followed by the stability and uniformity of this temperature and vertical temperature differences. The overall thermal comfort index, air flow velocity and relative humidity are also key factors in optimizing energy performance. Safety in operation, fire prevention, stability, airtightness, health and environmental protection, acoustic comfort, together with economic efficiency, are crucial criteria for ensuring optimal and sustainable energy management [4].

The choice of the optimal heat supply method should take into account relevant criteria such as energy efficiency and sustainability. Consumers have various options available to them, including:

- Individual heating systems in apartments or houses using fossil fuels;
- Direct electric or heat pump heating systems;
- Collective heating systems for block stairwells with fossil fuel boilers;
- Centralized systems (DHS) at district, town or city level.

Consumers connected to the DHS who wish to disconnect can switch to these solutions, but the alternatives may be limited in some cases, such as in buildings without access to natural gas networks. In such situations, district heating may remain the most viable option [4].

Individualized heating solutions, such as apartment central heating systems, have become increasingly popular, especially in low population density areas, offering better control over energy consumption and superior thermal comfort. In Chisinau municipality, many consumers have chosen to switch from DHS to individual systems due to the poor quality of centralized services, not necessarily for cost reasons, but to achieve a higher level of comfort.

Thus, individual and communal systems can be efficient solutions for areas with low population density, helping to optimize energy management through

increased control over the resources used and reduced dependence on centralized suppliers. The main advantages of the individualized solution include:

- Energy independence for the consumer;
- Affordability consumption;
- Personalization of comfort;
- Independence from neighbors' financial situation.

Disadvantages include:

- High initial investment;
- Dependence on a single fuel type and fuel price variations;
- Need to have or extend natural gas network;
- High local pollution and risk of explosions and poisoning in the event of individual thermal power plant failure.

DHS, compared to individual systems, has its advantages and disadvantages. Consumers connected to the DHS must accept that this centralized system has limitations in providing thermal comfort compared to individual options. DHS disconnections in the Republic of Moldova, have been influenced not only by the cost of heating [3], but also by factors such as:

- Low quality of services;
- Impossibility of local temperature regulation;
- Aggressive marketing of individual equipment suppliers and their affordability due to falling prices on the local market.

In dense urban environment, DHS represent the solution that becomes a preferable one, e.g. in city centres and high-rise neighbourhoods. If in such areas it is easy to notice the presence of residential buildings with their own heating installations, this is, for the locals, an evident sign of deficiencies in the functioning of the central heating system. A infrastructure that is well planned from the beginning, maintained and optimized, which includes advanced production, transportation and distribution technologies, followed by punctuality and competitively priced billing becomes much more attractive than individual heating systems.

Thus, the benefits of district centralized heating system are multiple:

- Promoting a healthy and unpolluted environment in inhabited areas;
- Strategic positioning of thermal power plants in suburbs and construction of tall chimneys;
- Effective dispersion of pollutants and minimization of emission sources;
- Preventing storage and handling of fuels and combustion residues in densely populated areas;
- Accessibility of high efficiency technologies, such as cogeneration, which are not feasible on an individual basis;
- Utilization of alternative fuels, such as waste and biomass, which are not viable options for individual systems in cities;
- Exploiting local renewables or waste, some of which are not efficient or individually usable;

- Limiting the use of fuels and combustion equipment by people without specific technical knowledge.

Some disadvantages of DHS can also be identified, such as:

- Producing thermal energy in one place;
- Thermal agent transportation and distribution losses;
- Extensive ageing of infrastructure and equipment;
- Lack of funds for repairs and development;
- Poor system management.

However, although central heating is generally an efficient way of heating buildings, there can be some potential disadvantages that are worth considering. For example, switching on a central heating system usually takes some time after the system has been switched off, and this means that it is necessary to wait a while for the house to warm up after the system is switched on.

DHS is usually the main object of competition between different heat producers using different resources and technologies. In this type of system, competition helps to lower the cost of thermal energy. The mismatch between the cost of natural gas for end-users and the price paid by heat producers underpins the benefits of DHS due to the impact of energy market liberalization and national policies.

The current situation of the energy production sources in the capital of the Republic of Moldova, whose operation is coming to an obvious end, being morally and physically outdated, as well as the future perspective of the modernization of these sources, becomes an increasingly relevant topic. The possibility of using cogeneration, which entails the simultaneous production of heat and electricity using the same fuel, is a promising way forward for modernizing Moldova's energy infrastructure, given the continuing increase in dependence on imported energy resources and the need to improve the efficiency of their use.

Cogeneration has its primary advantages over energy production through the direct combustion of fuels, which are reflected in the reduction of greenhouse gas emissions and the subsequent reduction in costs per unit of energy produced. Due to the recovery of waste heat generated in the electricity production process, cogeneration plants achieve higher energy efficiency compared to separate energy production in different types of plants. This is particularly important in the Republic of Moldova, as energy efficiency and energy security are a priority in conditions of import dependency.

The modernization and refurbishment of existing heating plants with the aim of transforming them into cogeneration plants is a viable solution in the field of improving Moldova's energy security [3]. This process involves not only the replacement of existing equipment, but also the implementation of new cogeneration technologies that will make the efficient use of energy resources possible.

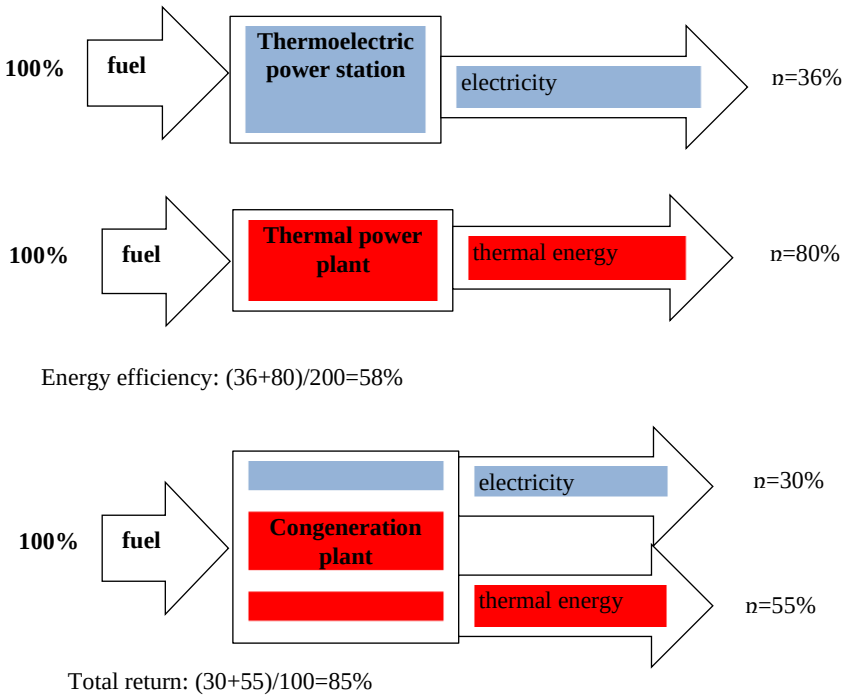

Figure 2**. Comparison of separate energy and cogeneration plants [2]**

The modernization of direct-fired heatingpower generation sources and their transformation into high-efficiency cogeneration plants is a key strategic direction for the Republic of Moldova. The analysis presented in this study can play a significant role in DHS Chisinau's development outlook and in the nation's energy transition to an energy-efficient system in line with national plans for sustainable development. Simultaneously, the Republic of Moldova may encounter various obstacles in the process of modernizing its direct heating sources and converting them into highly efficient cogeneration facilities. These issues include:

Modernization of existing plants requires substantial investments in technology and equipment, which can put pressure on the national budget and may require external financing or public-private partnerships.

1. Implementation of high-efficiency cogeneration plants requires advanced technical expertise. Moldova may face difficulties in attracting and developing qualified human resources to operate and maintain new equipment.
2. Rapid adaptation of the legislative framework and energy policies to support efficient cogeneration could be a challenge. Effective coordination between government, the energy sector and investors is needed to create a favorable environment for the development of the sector.
3. New CHP plants need to be effectively integrated into the heat and electricity distribution system. This process can be complicated by the current state of the distribution infrastructure and the need to modernize it.
4. Major technological changes require public awareness and consumer acceptance. Public reluctance may arise due to initial costs or changes in supply regimes.

5. Ensuring a stable and sustainable fuel supply for the operation of congeneration plants can be a challenge, particularly in the context of Moldova's dependence on energy imports.
6. Although cogeneration plants are more efficient, careful analysis of the environmental impacts, especially in terms of greenhouse gas emissions and use of natural resources, is needed.

Conclusions. The modernization of heating sources and their transformation into high-efficiency cogeneration plants is an essential direction for optimizing energy management and re-engineering the district heat supply system (DHS) in Chisinau. This would increase energy efficiency and reduce carbon emissions, supporting Moldova's sustainable development objectives. However, implementation involves major challenges. The need for significant investments in infrastructure and technology, the lack of local expertise in the operation of CHP plants and the need to update regulations are the major challenges that face this modernization process. Efficient integration into the energy grid and public acceptance will be critical to the success of the initiative, as will ensuring a sustainable fuel supply.

In conclusion, the modernization of the DHS and the optimization of energy management can make a significant contribution to Moldova's energy security and sustainability, if supported by clear policies and appropriate investments.

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FINANCIAL DIGITAL INCLUSION AN APPROPRIATE FRAMEWORK FOR IMPLEMENTATION OF INNOVATIONS IN THE BANKING SECTOR OF THE REPUBLIC OF MOLDOVA

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Abstract. *Digital revolution is changing the business environment and banking sector is no exception. The development of the digital economy of highly developed countries accelerates the need for increased digital financial inclusion and digital literacy as well. From a banking perspective, digital financial inclusion aims to engage the population in the digital financial system by offering digital products and services through accessible digital channels, which would facilitate secure digital financial management. Analyzing the specialized literature, were defined the three indicators of measure of digital financial inclusion: access to financial digital services, usage of financial digital services and quality of the digital products and service delivery.* ***The purpose*** *of current research is to study the degree of financial digital inclusion of the banking sector of the Republic of Moldova and the as a precondition for implementation of innovations in the context of digitalization processes in the Republic of Moldova. The specific* ***objectives*** *for achieving the research goals are: to analyze the factors that have accelerated the digital transformation in the banking sector; to study and establish new banking products and services in the Moldovan banking sector; to study the process of implementing innovations in close connection with digital transformation in the Republic of Moldova and at international level; to study and determine the deficiencies and prospects in the implementation of innovations in the banking sector in the Republic of Moldova.*

Keywords: *digitalization, banking sector, innovations, financial inclusion, digital literacy, digital services*

JEL: *G21, K42, O33*
UDC: *336.71:004(478)*

Introduction. With the emergence of new fintech technologies, the banking industry is undergoing major changes, driven primarily by changing consumer preferences and expectations. The demand for digital payment methods is growing, replacing the traditional products. This challenge entails risks, but once properly managed it can bring profits. Bank management is responsible for allocating sources to digitalize banking operations, as well as managing the risks involved. While there are many aspects of digital transformation in the banking industry, one of the most important is readiness and ability to adapt to change. Banks are often held back by security, legislation, and strict frameworks intended to protect customer data and privacy. At the same time, new digital-native banking solutions and money apps are outpacing traditional banking in terms of growth and customer acquisition. Adapting policies to meet changing consumer demand, to quickly adapt to new technologies, and to respond as the market changes is essential to digital transformation in banking.

The Fourth Industrial Revolution, is the accelerator of innovation across all fields, social, economic and biological. Advances in digital technologies allow people around the world to live physically easier lives. Today it is natural to work from home, to make a purchase by accessing online bank accounts, to transfer money around the world and even to manage personal business.

Moreover, the speed with which innovative technologies are being deployed is not surprising, as long as all people, have adapted very quickly to the innovative conditions. The open exchange of information through mobile devices and developed infrastructure instills confidence among the population. The challenge is the most important factor for both the banking sector and consumers. In this context, it is very important to identify the trends that will guide digital provisioning. Correct forecasting can pay off. Security also plays a very important role in the digital transformation of the banking sector. Open data and the risk of bank fraud are also growing. The IT and fintech sector is developing solutions to prevent digital and cyber risks.

The purpose of the research is to analyze the digital transformation in the banking sector. This involves a broad investigation of banking innovations and the factors that have accelerated their implementation. One of the most important purpose of the research is to emphasize the importance of the digitalization of the banking sector.

The object of current research is represented by studying of the implementation of innovations in the banking sector in the context of digitalization in the Republic of Moldova.

The specific **objectives** for achieving the research goals are:

- to analyze the evolution of the bank innovations in the Republic of Moldova and at international level;

- to analyze the factors that have accelerated the digital transformation in the banking sector;
- to study the process of implementing innovations in close connection with digital transformation in the Republic of Moldova and at international level;
- to analyze and establish the main strategies in adjusting the legal framework to digital innovations in the Republic of Moldova;
- to study the activity of international practices in implementation of innovation in banking sectors;
- to analyze and evaluate the impact of the digitalization on the banking sector in the Republic of Moldova;
- to study and determine the deficiencies and prospects in the implementation of innovations in the banking sector in the Republic of Moldova.

Methodology of the research is based on specialized literature, publications, the articles of local researches, national laws and regulations as well as the internet. In order to reach the research purpose is used methods of scientific research devoted to the type of analysis and synthesis method, induction and deduction, analogy. As well, we use the comparative analysis and statistical-mathematical methods.

As an informational support of the paper were used the recent research, different normative and legislative acts, the works of local and foreign scientists, as well as the other theoretical and practical materials.

International best practices in Digital Banking development. Open Banking is playing a vital role in the current digital transformation of the banking industry. Through digitalization, banks can take advantage of various opportunities such as improving customer experience, generating new revenue streams, leveraging existing assets, and participating in a mutually beneficial ecosystem. [9] Open Banking facilitates the exchange of financial data between banks and third-party providers, allowing for the expanded use of application programming interfaces (APIs). As a result, this is unlocking a wide range of new opportunities for the banking sector. Open Banking is expanding globally, with many countries exploring ways to share and manage financial data using open APIs. The approach taken by each country can vary, with some driven by regulatory requirements (like the EU, Hong Kong, and Australia), others driven by market forces (such as India, Singapore, Japan, and South Korea), and some adopting a hybrid model. [15] This involves developing a successful ecosystem of partnerships by utilizing developer portals, working closely with regulators, and educating customers. [10] To successfully implement an Open Banking strategy, banks must adopt an open platform model that allows them to seamlessly integrate into the daily financial activities of consumers, retailers, and other businesses. Implementing an Open Banking strategy involves a holistic change program that encompasses culture, systems, and capabilities.

Digitizing the customer experience. The process of digital transformation in the banking industry is not just a simple shift from traditional to digital methods. It encompasses a larger shift in the way banks and financial institutions interact with

and satisfy their customers. It involves a complete analysis of customer behavior, preferences, and demands, which is the starting point for the digitization process in the banking and fintech industries. This transformation has led to a shift from a product-centric approach to a customer-centric approach, where the primary focus is on delivering products and services that cater to the unique needs of each customer. Digital banks achieve customer service excellence by digitizing their journey through several key points of contact. Digital banks are successfully improving and digitizing their customer experience by focusing on critical points of contact, on average increasing customer satisfaction, increasing engagement and reducing churn.

Digitizing products and services. When it comes to digital transformation in banking, digital products and services are crucial to meeting the needs of customers. This involves using data and technology to develop innovative solutions that can address a range of customer needs.

Digitizing operations and technology. Digital banks are digitizing their operations and technology and achieving operational excellence through intelligent automation (IA) and robotics process automation (RPA) to streamline manual/cumbersome processes in order to improve speed, quality and volumes.

Digitizing the organization. In the present-day financial landscape, digital banks have widened their scope of attention from solely enhancing customer journeys, processes, and products to effectively transform their organizational culture and internal environment. They are persistently seeking to attract top-notch digital talents and capabilities to propel and expedite their digital innovation endeavors, amid the fiercely competitive and ever-changing fintech ecosystem.

The degree of digitalization of the banking sector of Moldova. With the advent of the internet, the digital transformation of the traditional economy has become mandatory, as the majority of consumers have switched to digital networks (see Figure 1).

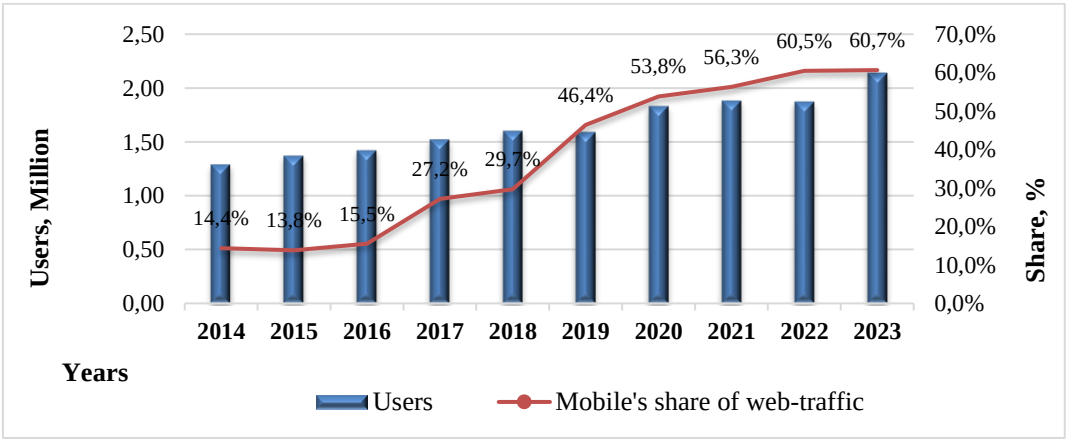


Figure 1. **Internet users in the Republic of Moldova during 2014-2023.**
Source: KEMP, S. Digital 2023: MOLDOVA [online]. Available: https://datareportal.com/reports/digital-2023-moldova.

In the last years we have an increasing evolution of transactions conducted in the Republic of Moldova and abroad with cards issued by Moldovan banks as it is seen in Figure 2 and Figure 3 where we can see that non-cash payments become more and more popular.

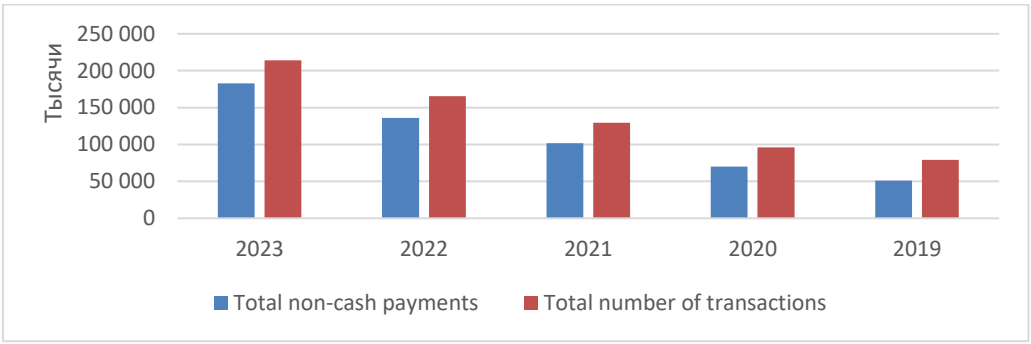


Figure 2. **Number and amount of transactions carried out with payment cards from the Republic of Moldova, 2019-2023.**
Source: Elaborated by the author based on the information from the National Bank of Moldova. [online]. Available on: https://www.bnm.md/bdi/pages/reports/drsb/DRSB6.xhtml.

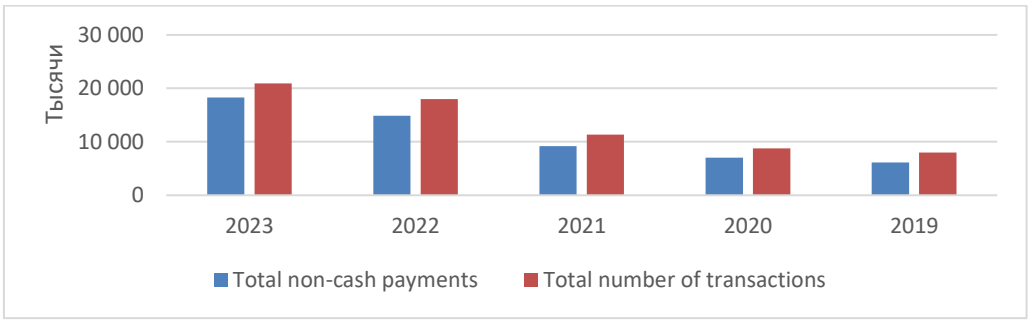
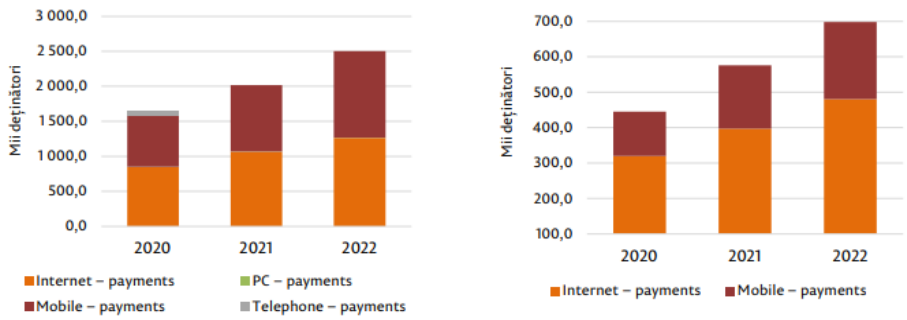


Figure 3. **The value of transactions conducted abroad with cards issued in the Republic of Moldova, 2019-2023.**
Source: Elaborated by the author based on the information from the National Bank of Moldova. [online]. Available on: https://www.bnm.md/bdi/pages/reports/drsb/DRSB6.xhtml.

Analyzing the international digital trends in banking, we can mention 5 most cut-edging trends which are widely spread and soon or later will be implemented on the moldovan market. Firstly, the most widespread trend is the personalized products and services. Big data, artificial intelligence and machine learning encourage financial marketers to offer more personalization to consumers. In this digital era, personalization does not merely refer to fundamental data such as a customer's name. Instead, it includes knowing your customers' likes and dislikes and developing unique packages of banking products and services for each customer as per their requirements and desires. Secondly, we can mention the targeted services provided through artificial intelligence. The trends in digital banking for 2023 suggest using

real-time ai-based bots to gather information about customer preferences. Financial marketers can leverage this data and advanced analytics to provide predictable personalization and delight their customers. Thirdly, the cloud computing is highly adopted by banks. There has been a massive growth in the use of cloud computing in digital banking innovation trends. We can expect a massive shift towards cloud computing in the banking industry for 2024 because it provides banks with such benefits as: cost efficiency, global scalability, increased productivity, speed, adequate security, reliability, and convenience. Furthermore, an important feature that clients look for is security and privacy. Banks and theft has a parallel relationship. With newer digital banking products and services, customers are now more exposed to the threat of losing money. Cybersecurity is now becoming a major customer demand for any digital bank.



Banks Non-Bank Payment Service Providers

Figure 4. **Automated Remote Servicing Systems in Moldova, 2020-2022.**
Source: *Elaborated by the author based on the information from the National Bank of Moldova. Available on: https://www.bnm.md/files/Raport_anual_2022_publicat_2.pdf.*

Lastly, the improvements that banks implement must be easy to use. A user-friendly and intuitive graphics interface is now a major requirement of any service. Tailored mobile banking super apps are more popular than limited functionality tools. So, we can expect newer features and functionality from banking apps in 2023.

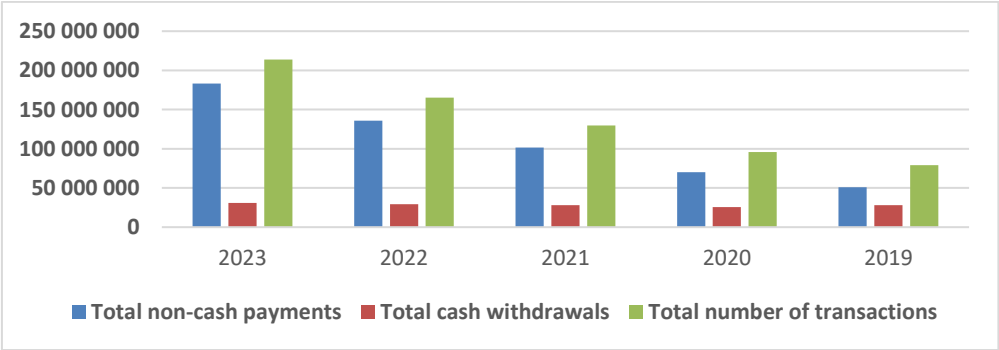


Figure 5. **Number of transactions with cards in Moldova, 2019-2023.**
Source: *Elaborated by the author based on the information from the National Bank of Moldova. [online]. Available on: https://www.bnm.md/bdi/pages/reports/dsp/DSP4.xhtml.*

Non-cash payments consistently outnumbered cash withdrawals throughout the period. The gap between the total number of non-cash payments and cash withdrawals widened over time (Figure 5), indicating a growing preference for non-cash payment methods. This trend suggests an increasing reliance on electronic payment systems and a shift away from traditional cash transactions.

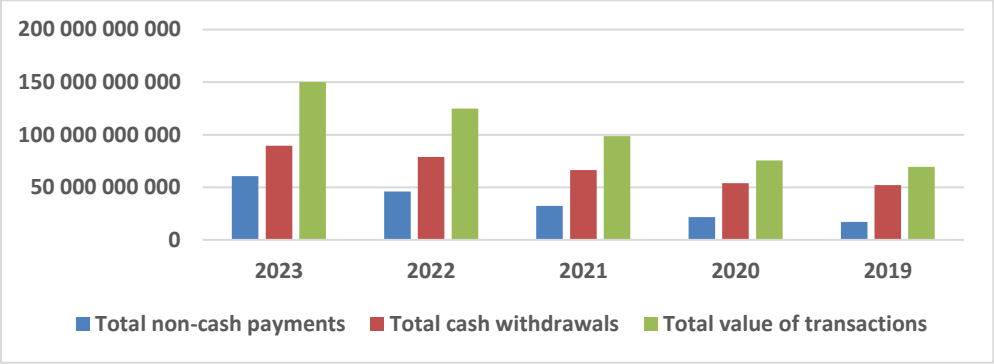


Figure 6. **Value of card transactions in Moldova, 2019-2023.**
Source: *Elaborated by the author based on the information from the National Bank of Moldova. Available on: https://www.bnm.md/bdi/pages/reports/dsp/DSP4.xhtml.*

The total value of non-cash payments consistently exceeded that of cash withdrawals throughout the period. This disparity suggests a gradual shift towards non-cash payment methods and a declining reliance on cash transactions. While both non-cash payments and cash withdrawals experienced growth in value over the years, non-cash payments exhibited a more significant increase, indicating changing consumer preferences and adoption of digital payment technologies (Figure 6).

Businesses and financial institutions may need to adapt their strategies to accommodate the rising demand for non-cash payment solutions, including enhancing digital infrastructure and security measures. Policymakers and regulators may also need to monitor these trends to ensure the resilience and integrity of the financial system amidst the evolving payment landscape.

Financial inclusion in the implementation of digital products in the banking sector. The digitalization of the banking sector in the Republic of Moldova is not so much a condition as a position in achieving financial and competitiveness goals. Development through digital transformation is a complex issue and touches on many enablers, from broadband availability to policies and sectoral e-strategies, as well as specific programs fostering digital inclusion or the development of innovation communities. [16]

In this context, *the banks developed their digital transformation by changing approach, replacing legacy frameworks, and working to develop a digital culture internally before focusing on the development of single-use digital features. Once the digital culture is achieved, digital platforms and services can offer a great deal of value to consumers, especially when supported by automation such as AI, Big data, and blockchain technologies. [14] Moreover, the development of a digital culture*

also requires a developed and digital-ready customers. In this context, the process of implementing new digital products in the banking sector faces shortcomings not only at sector level but also at national level.

In the Republic of Moldova, the banking system model is customer-centric and the implementation of new digital products largely corresponds to consumer demand. However, often the effort put into implementing new banking products does not bring the expected profit.

Financial inclusion and the luck of financial literacy skills of the population are the main deficiencies in the implementation of digital products. In the context of digital transformation, these issues are adapted to digital inclusion as well.

Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs such as transactions, payments, savings, credit and insurance, delivered in a responsible and sustainable way.

Like developing countries, Moldova faces gaps in financial inclusion and financial literacy. As the local researches related, the main reasons for the low level of financial inclusion in Moldova should be attributed, first of all, to the low-income level of the population and lack of financial literacy on the one hand, and the rapid development of financial products on the other. [12]

According to the World Bank definition, financial literacy represents the level of aptitude in understanding personal finance. It often refers to awareness and knowledge of key financial concepts required for managing personal finances and is generally used as a narrower term than financial capability. *To become more active and confident participants in the financial sector, consumers need awareness, understanding, and knowledge about various types of rapidly evolving financial products and services and associated risks, such as fraud and over in datedness. As the variety and complexity of financial products and services increases, the importance of the financial capabilities of consumers becomes even more significant for the smooth functioning of financial markets. [19]*

The concept of financial education becomes more complex with the digitalization of banking sector in Moldova. The advanced increasing of digital banking products and development of cashless economy conduct to replace both cash and banks' cards in the near future. While the years of experience with digital financial services often give providers significant advantages, the particular risks introduced by the new services result from, among other things:

- introduction of non-financial firms deploying new technologies;
- new contractual relationships between financial institutions and third parties, including the use of agent networks and other outsourcing arrangements;
- different regulatory treatment of deposit-like products (compared to deposits);
- unknown and as-yet unpredictable costs to inexperienced and vulnerable consumers;
- use of new kinds of data—and new uses of data—introducing both new privacy and data security issues.

The **key regulatory issues** raised by digital financial inclusion relate to agents, anti-money laundering and countering financing of terrorism (AML/ Combating the Financing of Terrorism CFT) rules, regulation of e-money, consumer protection, payment system regulation, and competition. Many of these issues fall within multiple regulators' competencies, requiring effective communication and collaboration among them. [18]

The development of the digital economy of highly developed countries accelerates the need for increased digital financial inclusion and digital literacy as well. From a banking perspective, digital financial inclusion aims to engage the population in the digital financial system by offering digital products and services through accessible digital channels, which would facilitate secure digital financial management. These services should be suited to the needs and requirements of individual consumers, at a price that is affordable for customers and sustainable for providers.

Analysing the specialized literature, were defined the three indicators of measure of digital financial inclusion: access to financial digital services, usage of financial digital services and quality of the digital products and service delivery. In Figure 7 was developed the causal model of financial digital inclusion that shows the importance of improving these indicators concurrently to receive an effective outcome.

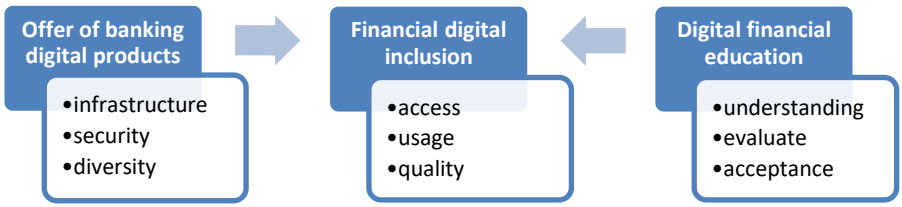


Figure 7. **The causal model of Financial Digital Inclusion.**
Source: *developed by author based on specialised literature.*

From banks' view, Digital literacy is a concept in acquiring the knowledge, skills, confidence, and competencies to safely use, digitally delivered financial products and services, ***through digital infrastructure and Internet accessing.***

ICT is a digital tool that seeks to be integrated into all levels of learning across Moldova. This is one of the strategies towards improving the learners in three different ways including literacy, skills development, and comprehension. Notably, learners will use ICT as a resource to access important information that enriches their understanding hence enabling them to perform better like other OECD countries. [16]

ICT is a digital tool that seeks to be integrated into all levels of learning across Moldova. This is one of the strategies towards improving the learners in three different ways including literacy, skills development, and comprehension. Notably, learners will use ICT as a resource to access important information that enriches

their understanding hence enabling them to perform better like other OECD countries.

In order to fill the significant gap in financial education for individuals and SMEs, one prospect would be to work together through the educational relationship between bank's customers and banks' lending practices. With additional regulations and Basel III requirements for banks, customers need to be better positioned in terms of access to finance. Specific measures could include: working with relevant parties (mainly ODA and the Chamber of Commerce and Industry) to identify critical issues related to the financial literacy of consumers, especially SMEs, to access finance; develop and deliver a literacy training program with a focus on SMEs. [21]

In the context of guiding the delivery of financial education through digital channels, the OECD, defines digital financial literacy as a combination of knowledge, skills, attitudes and behaviors necessary for individuals to be aware of digital financial services and digital technologies and to use them safely in order to contribute to their financial well-being. It also addresses the concept of a national financial education strategy that should endorse a program tailored to the needs of the population and their level of financial development. [13]

In the first quarter of 2023, the Digital Transformation Strategy of the Republic of Moldova (DTSRM) 2023-2030 was approved. To ensure its relevance keeps pace with the evolving technological landscape, the strategy will be reviewed annually. The Strategy is based on several key objectives relating to: digital society; competitive ICT environment; resilient digital economy; digital state; secure digital environment for all; advanced digital nation.

Despite the existing challenges, Republic of Moldova has significant potential for becoming an innovation-driven economy. The country is currently ranked 56th among the 132 countries surveyed by the Global innovation index in 2022. [11]

The Republic of Moldova continue as record holders by being Innovation Achievers for a 12th consecutive year. The development of cashless operations and the massive use of bank cards have led to the implementation of various electronic banking products and services: internetbanking, mobile-banking, sms-banking, ATMs, POS terminals, etc. The analysis of remote banking services shows that all licensed banks in the Republic of Moldova already offer a wide range of digital banking services to their customers. [8]

The general attitude towards digital transformation is positive, although there is not a particular social push for it the access to e-services have been increasing in the last years. In what regards attitudes towards entrepreneurial risk, Moldovan society does not seem to reward or incentivize entrepreneurial mindsets, although there is not a particular aversion to risk.

Conclusions and discussions. Banking environment has become highly competitive today. To be able to survive and grow in the changing market environment banks are going for the latest technologies. It is viewed as an instrument of cost reduction and effective communication with people and institutions associated with the banking business.

Banks engaged in digital banking deliver banking services primarily through electronic channels instead of physical branches. Fintech, revolutionized financial services through innovative technologies, products, and business models and competes against old traditional financial banking methods and long-standing institutions with new technology-thinking products and services.

Financial inclusion and new banking licenses have created many job opportunities in the banking sector. Digitalization has created numerous job opportunities in the banking sector including cyber security specialist, credit analyst, robotic programmer, blockchain architect and process modelling expert.

Digital transformation in the banking sector can be viewed as a great opportunity but brings multiple challenges also. Mobile banking and Internet banking are straightforward approaches in doing multiple financial transactions in banking digital transformation. While customers benefit from such services, the threat and possibility of cyberattacks also become a significant challenge for these digital services.

Cyberattacks, banking fraud, hacking, phishing, and security awareness are significant challenges resulting from digital transformation in the banking sector.

Technology, in the form of E-banking, has made it possible to find alternative banking practices at lower costs. More and more people are using electronic banking products and services, as a large part of the future customer base of banks will be computer literate customers.

Theoretically, digitalization of banking sector have had an positive impact on banking performance, but In the luck of data that measure of the digitalization in core, is not possible.

Subjects for discussion:

- In order to measure the impact of digitisation on the banking sector, it is necessary to establish the core values of the concept of digitisation.
- In the transition from a traditional to a digital economy, both banking and financial institutions should give attention and place in financial reporting to the implementation of digital innovations in order to be measured.
- There is a need to regulate the area of cyber attacks and money laundering by implementing EU directives and at the same time the regulation the area of personal data protection.
- Banks must be able to offer these customers products and services that allow them to bank electronically.

Note: *The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union", institutional funding.*

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SUSTAINABLE FINANCING FOR THE HEALTH SECTOR: BUILDING A RESILIENT HEALTHCARE SYSTEM

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Abstract. *Sustainable financing of the health sector is an essential pillar for ensuring a resilient and affordable medical system in the long term. This article explores the multiple facets of sustainable financing, from securing adequate resources and using them effectively, to diversifying funding sources and promoting public health. The importance of equitable access to quality health care and innovative strategies to meet future financial challenges such as an aging population and expensive new medical technologies are discussed. Through an integrated and long-term approach, sustainable financing can transform health systems, contributing to improved population health and economic stability. The Republic of Moldova, a country with different dimensions and resources compared to European states, faces multiple challenges in ensuring access to quality medical services for its citizens. In this context, it is essential that the Republic of Moldova adopts sustainable financing policies that respond to its specific needs and support the development of a resilient medical system. The article analyzes concrete measures and international best practices that can be adapted and implemented in the Republic of Moldova to optimize available resources and ensure efficient and quality medical services. Through a well-founded and future-oriented strategy, the Republic of Moldova can build a health system capable of facing current and future challenges, thus ensuring the well-being and health of its population.*

Key-words: *Sustainable financing, Resilient medical system, Public health, Financial efficiency, Equitable access to health, Diversification of funding sources, Health policies, Investments in health system*
JEL: *H51, I18*
UDC: *614.2*

Introduction. Health systems around the world face a number of issues that underline the need for a sustainable approach:

- Increased pressure on resources: The COVID-19 pandemic has exposed and amplified the pressure on health systems, highlighting the lack of resources and rapid response capabilities. Hospitals and health centers were overburdened, highlighting

the need for constant investment and adaptive financial allocations to cope with future health crises.

- Inefficiency and inequality of access: Health systems are often characterized by significant inequalities in access to health services. Rural areas and disadvantaged communities are often underrepresented in access to quality care, and inadequate funding contributes to perpetuating this inequality.
- Rising costs: Healthcare costs are constantly increasing, especially in the context of an aging population and the emergence of expensive new technologies. Health systems face the challenge of finding the balance between providing quality care and maintaining financial sustainability.
- Climate change and the impact on health: Climate change directly and indirectly influences public health, contributing to the increase in the incidence of some diseases and the deterioration of living conditions. These changes impose the need for financing strategies that integrate adaptation and prevention measures in the face of the environmental impact on health.
- Innovation and digitization: Emerging technologies such as telemedicine and digital health solutions have the potential to transform healthcare, but require substantial investment and strategic financial planning. Implementing these solutions can improve access and efficiency, but involves significant financial and logistical challenges.

In this context, sustainable financing can not only transform and strengthen the health infrastructure, but also ensure the ability of this sector to respond effectively to emerging crises and to adapt health services to the ever-changing needs of society.

This paper explores the strategies and mechanisms through which sustainable financing can support the building of a resilient health system capable of meeting contemporary challenges and ensuring equitable access to quality health services for all citizens.

In an era marked by global challenges, such as the global COVID-19 pandemic, climate change, and world population growth, they put immense pressure on healthcare systems, amplifying the need for innovative and sustainable financial solutions. Thus, ensuring the financial sustainability of the health sector becomes not only a priority, but an essential necessity for building a resilient health system. Such a system can not only cope with external shocks, but also ensures equitable access to quality health services for all citizens.

In this context, sustainable financing can not only transform and strengthen the health infrastructure, but also ensure the ability of this sector to respond effectively to emerging crises and to adapt health services to the ever-changing needs of society.

The Republic of Moldova, having different dimensions and resources compared to European states, faces significant challenges in ensuring access to quality medical services for its citizens. In this context, it is crucial that the country adopts sustainable financing policies adapted to its specific needs in order to develop a resilient health system.

The article analyzes concrete measures and international best practices that can be adapted and implemented in the Republic of Moldova to optimize available

resources and ensure efficient and quality medical services. It also examines in detail what is involved in implementing sustainability in the health sector, including the financial, organizational and strategic aspects needed to support the development of a robust health system. Through a well-founded and future-oriented strategy, the Republic of Moldova has the opportunity to build a health system capable of facing current and future challenges, thus ensuring the well-being and health of its population.

Literature review. In the context of current challenges and emerging needs of health systems, academic literature and specialized studies emphasize the importance of sustainable financing and building a resilient health system. This section reviews relevant research on the need for sustainability in the health sector, as well as key aspects of funding. Different studies highlight the severe impact of the pandemic on global health systems, underlining their fragility and the need for sustainable financing policies. The crisis highlighted deficiencies in resources and infrastructure, emphasizing the importance of adequate financial reserves and long-term planning (Thomson et al., 2009). Thus, researchers and various specialists recommend investments in prevention, the creation of emergency funds and the development of rapid response plans to build more resilient health systems and able to face future crises (Debie et al., 2024).

Other studies provide a systematic review of inequalities in access to health services in low - and middle-income countries (LMICs), as influenced by factors such as income, geographic location and socio-economic status (Langlois et al., 2015). Disadvantaged populations, including those in rural areas and marginalized communities, have limited access to quality care, which contributes to health disparities (Riley, 2012). Thus, the authors emphasize that a lack of financial resources is a key factor in perpetuating these inequalities (Frazier et al., 2023). Limited funding leads to a lack of adequate infrastructure, a shortage of medical personnel and unequal access to medicines and treatments. These deficiencies affect the ability of health systems to provide equitable and quality care for all citizens. emphasizing the financial impact on equity in care.

Some authors suggest that in order to improve access to care, strategic interventions aimed at both increasing financial resources and optimizing their use are needed (Frazier et al., 2023). Policies should focus on developing health infrastructure in disadvantaged areas, training and retaining health personnel, and ensuring equitable distribution of resources (Ogugua, Olorunsogo, Muonde, Maduka, & Omotayo, 2024). At the same time, to address inequalities in access to health services, it is essential to develop and implement financing strategies that ensure the efficient and equitable allocation of resources. These strategies may include the creation of specialized funds for disadvantaged areas and the development of public-private partnerships to mobilize additional resources (Asamani, Alugsi, Ismaila, & Nabyonga-Orem, 2021).

Other studies analyze the impact of climate change on public health, highlighting how extreme climate events and environmental degradation affect the

health of populations globally (Costello et al., 2009). The authors argue that to meet these challenges it is essential to adopt sustainable financial strategies that integrate adaptation and prevention measures. Sustainable financing is presented as a crucial element in building resilient health systems able to cope with the effects of climate change, such as rising temperatures, floods and the spread of infectious diseases.

Papers that examine various innovative financing models to ensure sustainability in health systems deserve attention. Models analyzed include results-based financing mechanisms and resilience funds. The authors explore both the advantages and disadvantages of each model, discussing how these approaches can help optimize financial resources and improve the efficiency of health systems. Studies also provide recommendations for adapting and implementing these models according to the national context, emphasizing the importance of customizing financial solutions to meet the specific needs of each health system (Atun, Knaul, Akachi, & Frenk, 2012).

The existing literature highlights the importance of adopting sustainable financing policies to build a resilient health system. The studies highlight that to meet current and future challenges, it is essential to integrate financing strategies that address both inequalities in access to services and the impacts of climate change and emerging technologies. The implementation of innovative and adaptable financing models can contribute to the creation of an efficient and equitable health system, capable of responding to the needs of the community and ensuring the well-being of the population.

Research methodology. A variety of research methods have been used in the development of this article to ensure a comprehensive and rigorous approach to the topic, facilitating robust conclusions and relevant recommendations. Thus, by means of content analysis, relevant information from documentary sources and specialized literature was investigated and synthesized. The comparison served to highlight the differences and similarities between the different models and practices in financing health systems. The explanatory method was used to interpret and explain the reasons and consequences of various aspects of health financing. At the same time, the method of data interpretation and description was used.

Main results. **Reconfiguration of Health System Financing in the Context of Global Sustainability**. In the current global context, ensuring the sustainability and efficiency of medical services is an urgent priority. The Sustainable Development Goals (SDGs) of the United Nations (UN) have positioned health at the center of the agenda, highlighting the need for universal access to quality medical services.To achieve these goals, it is crucial to reconfigure the financing of the health system, taking into account the influence of socio-demographic and environmental factors. Thus, universal access to quality medical services is one of the fundamental pillars of the Sustainable Development Goals (SDGs) and implies the implementation of appropriate policies and strategies regarding the financing of the health system. The experience of some countries that have managed to move in this

direction can provide valuable guidance for other states in the process of reconfiguring their health system financing. A notable example is that of Nordic countries such as Norway, Sweden and Denmark, which have implemented predominantly publicly funded universal health insurance systems. These countries have succeeded in ensuring universal access to quality health services through efficiently managed health funds that cover a wide range of health services, from primary care to complex treatments.

Canada's universal health insurance system is another relevant example. It is based on the principle of equal access to medical services for all citizens and permanent residents, with majority public funding and administration at the provincial level. Although it faces some challenges, such as waiting times for certain procedures, the Canadian health care system has been able to provide extensive medical coverage and treatment for a wide range of conditions.

On the other hand, there are also examples of countries that have adopted hybrid models of financing the health system, where the public and private sectors cooperate to ensure universal access to health services. For example, in European countries such as the Netherlands and Switzerland, compulsory health insurance is managed by private entities but regulated by the state to guarantee universal coverage and access to essential medical services.

Reducing health disparities is another pillar of health policies in the current global context. Reconfiguring the financing of the health system can play a significant role in reducing discrepancies in access to health services between different socio-economic and geographic groups.

The experience of countries that have addressed these disparities through specific policies and initiatives can provide valuable lessons for other states.

In Nordic countries such as Sweden and Finland, social and health policies focused on equality of opportunity have helped reduce health disparities. These countries invest in social inclusion programs, education and affordable housing, which has a positive impact on the health of the population, especially those from disadvantaged groups.

In addition to specific policies, collaboration between the public and private sectors can also play an important role in reducing health disparities. For example, public-private partnerships for the provision of health services in marginalized communities can ensure access to quality health care for disadvantaged groups.

Promoting sustainability in the health system is essential to ensure continuous and quality delivery of health services, avoiding excessive financial pressures and dependence on uncertain sources of funding (Gera, Narwal, Jain, Taneja, & Gupta, 2018).

The experience of countries that have implemented effective policies and strategies in this regard can provide valuable guidance for other states in their efforts to ensure sustainable financing of their health system.

A notable example is that of Nordic countries such as Norway and Sweden, which have adopted models of health care financing based on taxes and social contributions. These countries are constantly investing in human resources and

medical infrastructure, thus ensuring the provision of quality medical services in the long term. Moreover, they encourage innovation and research in the field of health, promoting the development and implementation of new medical technologies and practices, which contributes to increasing the efficiency of the health system (Perera, 2021).

In New Zealand, the government has placed particular emphasis on ensuring sustainable financing of the health system through efficient resource allocation and cost management policies. For example, a medical technology and drug assessment framework has been adopted to ensure judicious use of resources and avoid excessive expenditure (Roemer, 1993).

In Singapore, the healthcare system benefits from a mixed funding model involving individual and government contributions. Over the years, the Singapore government has implemented health savings and investment policies such as "MediSave" and "MediShield Life", which allow citizens to save for future medical costs and provide coverage against major financial risks associated with medical care (Roemer, 1993).

In conclusion, promoting sustainability in the health system requires the implementation of effective policies and strategies for financing and resource management. The experience of various countries in this area can provide models and examples of good practice for other states in their efforts to ensure a sustainable and quality provision of health services.

Various measures can be adopted to reconfigure health system financing in line with the Sustainable Development Goals (SDGs). Thus, the ways of reconfiguring the financing of the health system in the context of the SDGs can be mentioned:

1. Investments in Prevention and Health Education represent an effective strategy for reconfiguring the financing of the health system in the light of the SDGs, having a positive impact on the health of the population and on the costs associated with medical care. Therefore, the instruments by which the financing system can be reconfigured are:

- Reducing avoidable diseases: Investing in prevention programs, such as vaccinations, screening for chronic diseases and promoting a healthy lifestyle (eg: balanced diet, regular physical activity), can help reduce avoidable diseases and their complications. For example, Nordic countries such as Denmark and Finland have implemented school-based health education programs that promote healthy eating and physical activity for young people, thereby reducing the risk of obesity and chronic disease among adults.
- Increasing investments in prevention activities: Investments in prevention can reduce costs related to the treatment of diseases. For example, vaccination against infectious diseases can prevent outbreaks and reduce the costs associated with treating and managing these diseases. Another effective strategy is screening for early detection of diseases such as cancer and diabetes, which allows for early interventions and appropriate treatment, thereby reducing long-term treatment costs.
- Mental health promotion: Investments in mental health programs and the promotion of mental well-being can reduce the costs associated with the treatment of

mental disorders and improve the quality of life of the population. For example, New Zealand has implemented counseling and support programs for young people and adults, which have reduced suicide attempts and lowered costs associated with the treatment of mental disorders.

- Improving the quality of life: Investments in health education can improve the quality of life of the population by promoting healthy behaviors and adopting a balanced lifestyle. For example, Sweden has implemented workplace health promotion programs that have reduced absenteeism and increased employee productivity, thus contributing to economic growth and improved population health.

2. Extending Health Insurance Coverage: It is a crucial measure for reconfiguring the financing of the health system in accordance with the principles and objectives of the SDGs. This strategy can ensure access to essential health services for all members of society and help increase the coverage and effectiveness of the health system. Thus, systems that provide universal health insurance guarantee access to medical services for all citizens of a country, regardless of their socio-economic status. A notable example is the UK's healthcare system, known as the National Health Service (NHS), which provides free or low-cost healthcare to all its residents. This approach ensures extensive and equal coverage for all citizens, helping to reduce health inequalities. Also, in some countries, the social insurance system is used to provide medical coverage. For example, in Germany, the social insurance system (Gesetzliche Krankenversicherung - GKV) provides health insurance for the majority of the population. Employers and employees contribute to the insurance funds, and the government covers the costs for those who cannot pay the insurance premiums. This system ensures access to basic and specialized medical services for the majority of German citizens. In recent years, some countries have taken steps to expand health insurance coverage. For example, in the United States, the Affordable Care Act (Obamacare) expanded access to health insurance for millions of Americans through the insurance exchanges and Medicaid expansion. While this system has encountered some criticism and implementation issues, it has helped reduce the number of people without health insurance and increase access to health care for vulnerable populations (Mayes & Berenson, 2008). Expanding health insurance coverage is therefore a key measure for reconfiguring health system financing in light of the SDGs, providing access to essential health care for all members of society and contributing to reducing health disparities.

3. Improving the Efficiency and Transparency of the Health System: Implementing effective management practices and rigorous monitoring of expenditures can contribute to more efficient use of resources and reduce the risk of corruption and abuse. The instruments by which the financing system can be reconfigured are:

- Implementation of effective management practices: An effective administration of the health system can reduce the waste of resources and improve the quality of medical services. For example, Iceland is recognized for the efficient use of its limited health resources by implementing systems to manage costs and allocate resources according to the needs of the population. Rigorous monitoring of

expenditures: Careful monitoring of expenditures can help identify and eliminate inefficiencies in the health system. For example, in Australia, the Australian Health and Welfare Authority constantly monitors and evaluates the performance of the health system, identifying areas where savings and improvements can be made. The Netherlands is an example of a country that has managed to improve efficiency and transparency in its healthcare system. Through integrated IT systems and rigorous monitoring of the performance of medical institutions, the Netherlands has managed to reduce costs and improve the quality of medical services.

- Combating corruption and abuse: Transparency in the financing and management of the health system can help reduce the risk of corruption and abuse. For example, Norway is recognized for a transparent and well-managed healthcare system, which has reduced the risk of corruption and improved trust in the healthcare system.

In conclusion, we mention that the reconfiguration of the financing of the health system in the light of the SDGs is essential for ensuring the sustainability and efficiency of medical services at the global level.

By addressing socio-demographic and environmental factors and adopting appropriate financing and management strategies, it is possible to achieve significant progress in achieving the goals of sustainable development in the field of health:

- This reconfiguration of financing is crucial to meet the growing needs of changing populations and to ensure universal access to quality health care.
- By adapting health systems to demographic and environmental developments, we can create a system that is more resilient and better prepared to face future challenges.
- Investments in prevention, education and health promotion can help reduce the burden on the health system and increase the quality of life for all citizens.
- By effectively managing resources and promoting transparency, we can ensure that every dollar invested in the health system brings maximum benefit to society.

Thus, reconfiguring the financing of the health system in accordance with the principles of the SDGs is a crucial step towards a future where health is a global priority and accessible to all.

Organization and financing of the healthcare system in the Republic of Moldova: major challenges. The organization of the health system in the Republic of Moldova focuses on two horizontal dimensions: the expansion of population coverage and the diversification of medical services included in the Single Program of Compulsory Medical Insurance.

However, development in the vertical direction has been neglected for a long time. An essential priority is the involvement of the population in the financing of the health system, by creating incentives in this regard. The national medical system faces multiple constraints, and one of the most significant is the provision of sufficient financial resources.

Since 2009, public spending on health has not grown at the same rate as the growth of the Gross Domestic Product (GDP). As a percentage of the Gross Domestic

Product (GDP), these expenditures have not undergone significant changes over the same period, with some fluctuations over the years, remaining around 6% in 2000 and reaching 5.4% in 2023. As a result, the commitment to allocate 12% of the government budget to health was never realized (Ministry of Finance, 2023). Government spending, after an initial increase in the first years of implementation of compulsory health insurance (AOAM), began to decline as a percentage of GDP, and the percentage of the government budget allocated to health was gradually reduced.

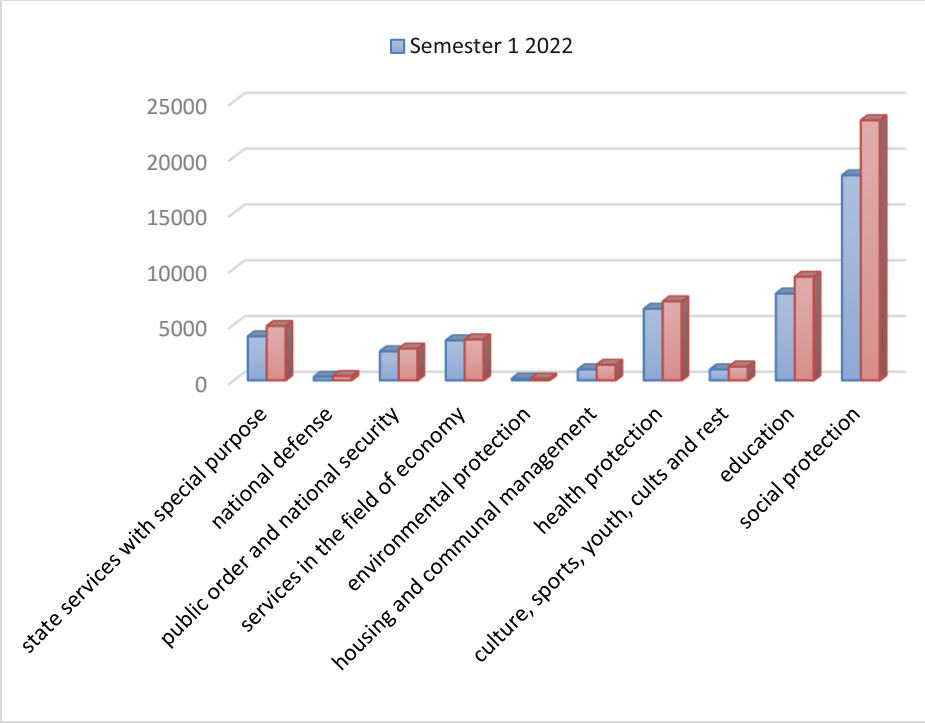

Figure 1. **The evolution of national public budget expenditures in the first semester of 2022 – the first semester of 2023 (by functional groups, million lei)**
Source: (Ministry of Finance, 2023)

From figure 1 we can see that in the first quarter of 2023, health expenses increased by 665.3 million lei, compared to the same period last year, amounting to 7076.0 million lei (Ministry of Finance, 2023).

In the Republic of Moldova, the term "health expenses" includes all funds used for the procurement of medical goods and services, whether provided by public or private institutions. These expenditures include both public and private funds, known as personal expenditures of the population. In the Republic of Moldova, in 2020, under the conditions of a share of public expenditures in GDP below 5%, out-of-pocket payments represent 31% of total health expenditures. Although these out-of-pocket payments have decreased from 47% in 2000, they remain significant in the total expenditure in the health sector, being well above the average of the European Union countries (15.5%), although in decline National Bureau of Statistics (BNS, 2022). Informal payments are widespread in the Republic of Moldova, and this aspect

reduces people's trust in the health system and increases the costs of medical services for beneficiaries.

The funds managed by CNAM (the National Medical Insurance Commission) face underfunding, which leads to limiting the access of public medical and sanitary institutions to resources for development and modernization. Currently, health insurance contributions in the Republic of Moldova are insufficient to cover the demand for medical goods and services.

The lack of clear criteria for the selection of medical service providers in the contracting process within the FAOAM (mandatory medical assistance insurance funds) affects the quality of the medical services provided and the development process of these institutions.

Currently, about 1.6 million people (1,605,831 people) are insured by the state, of which (CNAM, 2023):

- 929 441 – children, pupils, students, residents
- 476 531 - pensioners
- 132,254 – disabled people
- 24 148 – people from disadvantaged families
- 16,476 – unemployed registered with the territorial agencies
- 18 327 – other categories

For the purchase of medical services, CNAM contracts, as a rule, about 455 medical institutions, including 357 public and departmental medical and sanitary institutions.

The main share in the total FAOAM expenses in the reporting period is held by the basic fund, intended for the payment of medical and pharmaceutical services, in accordance with the concluded contracts - 98.7%, followed by the administration fund - 0.8%, the prevention measures fund - 0.3% and the public PSM development and modernization fund - 0.2% (situation of 2023).

The financial resources accumulated in the basic fund are used to cover the expenses necessary to implement the Single Program of Mandatory Medical Care Insurance (National Public Budget, 2023).

The financing of the Public Medical-Sanitary Institutes (IMSP) from the CNAM Development Fund is carried out annually on the basis of projects. These financial means are mainly used for the purchase of medical equipment, means of transport, the implementation of new heating technologies, treatment of medical waste, water supply and hygiene, the modernization and optimization of buildings and infrastructure, as well as the implementation of information systems and technologies.

From the state budget, the most is spent on the following areas (situation in 2023) (National public budget, 2023):

- Branch development programs - 1,428.5 million lei
- Current maintenance of budgetary institutions - 788.2 million lei
- Implementation of capital investment projects - 84.9 million lei
- Research, development and innovation projects - 46.5 million lei

Also, the lack of a developed private health insurance system and an adequate legislative framework to stimulate it are major challenges to a significant improvement of the health system in line with Western models.

The alarming situation of the infrastructure and equipment in public medical and sanitary institutions in the Republic of Moldova is confirmed by recent studies. The lack of a strategic vision and a sustainable funding mechanism aggravates this situation, and the technical development of these institutions is significantly affected.

Limited access to central development funds and constant underfunding lead to reduced capacity to improve infrastructure and the provision of lower quality health services. Urgent action is crucial to address these shortcomings and ensure a sustainable and efficient health financing system. In the context of the aging of the population and the increase in the demand for medical services, the sustainability of the system is threatened. Recent statistical data indicate an increase in morbidity among the population while its total number is decreasing.

According to the demographic forecast of the Demographic Research Center for the years 2019-2040, the demographic decline is predicted to continue at a rapid pace in the coming decades. According to the low scenario, the annual rate of decline will increase from 1.6% to 2.3%, and the population will decrease to 1754.6 thousand (by 34.5%) by 2040. Under the conditions of a reduction significant migration, the improvement of population health indicators and the increase of fertility, the dimensions of the demographic decline could be reduced (Găgăuz, O. Et al., 2021).

If this trend is not reversed in the near future, the number of elderly people will exceed that of young people, which will lead to a significant increase in the demand for medical services and, implicitly, in the need for financing.

We observe that the aging of the population, from the perspective of health care, raises two categories of significant problems. The first involves reconfiguring the healthcare system in the future to adequately respond to the increased demand generated by the aging process. The second category of problems refers to the increase in expenses for medical care within the public health system, as well as the increased pressure on the financial resources of families for care at home or in institutions.

We believe that a policy aimed at meeting the health needs of the elderly must be incorporated into health policy aimed at the entire population. As people in the younger age groups today will become the elderly of the future, it is essential to anticipate and manage the needs of this population segment. In this context, the growing demand for health care and social assistance needs to be properly managed.

In addition to the increasing demand for medical and social care, we must also take into account the typology of diseases specific to these categories of people, as well as the difficulties associated with carrying out daily activities. The emergence of cognitive disorders and the need to care for them add additional pressure on the health system and family budgets.

The costs of caring for the elderly are significant, especially given that many of these patients suffer from multiple conditions at the same time. Thus, current

health policies aim to control expenditure, taking into account both medical, socio-economic and human aspects.

A particularly significant phenomenon, which will inevitably influence the functioning of health systems and which is already deeply felt in medical institutions, is the massive migration of specialists to other countries with higher incomes. This migration of medical personnel leads to financial losses and reduces the efficiency of health systems in their countries of origin.

In the Republic of Moldova, a constant decrease in medical personnel is observed. Thus, in 2022 the number of doctors decreased by more than 13% compared to 2003, this trend also being attested by specialty (NBS, 2023).

The medical workforce shortage increased in 2022, bucking a trend of at least a decade. The medical system primarily lacks family doctors, anesthesiologists and radiologists.

In the absence of medical staff, doctors work overtime, and hospitals employ retirees.

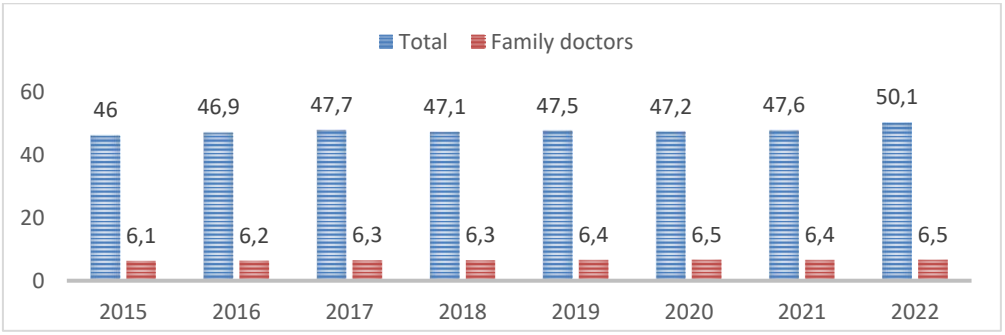

Figure 2. **The number of doctors per 10,000 inhabitants**
Source: (NBS, 2023)

For 10,000 inhabitants in 2022, there were 6.5 family doctors and 50.1 doctors in total according to the data presented by the National Bureau of Statistics (see figure 2). A precarious situation can also be seen at the district level, where the number of medical personnel involved is decreasing year by year. This phenomenon is the consequence of massive depopulation in all regions, districts and localities.

The population is concentrated in Chisinau and the central districts. In particular, the decrease of the population from the last decade in the districts of Basarabeasca, Cimișlia, Dondușeni, Soroca and Nisporeni, as well as in the municipality of Bălți, is highlighted.

The deficit of labor resources is already felt, and the demographic projections confirm the long-term risks that compromise the provision of economic growth, the improvement of the living standards of the population and the reduction of inequalities in the distribution of incomes. At the same time, the phenomenon of population aging will intensify the tendency of the decrease of taxpayers to the formation of the public budget and the increase of the number of retirees as applicants for social insurance and specialized services.

Developing strategies and professional training programs to attract the inactive population into the economic circuit, strengthening skills for all ages, ensuring the increase in the level of education of the population and the degree of concordance of qualifications with the current requirements of the labor market, increasing the level of participation in economic activities , of labor productivity and the level of technology are some of the directions that are required.

Optimizing the financing of the health system in the Republic of Moldova for a sustainable future. It is necessary to implement some structural reforms in the health system, with an emphasis on the efficiency of public spending and the improvement of the quality of medical services. Reforms should take into account non-medical factors affecting the health system and focus on including them in the decision-making process.

The implementation of structural reforms in the health system is crucial to ensure financial sustainability and improve the quality of medical services. These reforms should focus on the following aspects:

- Making public spending more efficient: A first priority should be to identify and eliminate inefficiencies in the health system that lead to a waste of resources. This may involve optimizing administrative processes, reducing bureaucracy, strengthening public procurement and implementing effective systems for monitoring and evaluating expenditures.
- Increasing access to quality medical services: Reforms should aim to improve access to medical services for all citizens, regardless of socio-economic status or geographic location. This can be achieved by expanding medical infrastructure in underserved areas, improving the provision and qualification of medical personnel, and promoting medical practices based on scientific evidence.
- Inclusion of non-medical factors in the decision-making process: It is important to recognize that health is influenced by a number of non-medical factors, such as education, environment, socio-economic conditions, etc. Reforms should therefore integrate these factors into the decision-making process and promote collaboration between different sectors to improve population health.
- Consolidation of sustainable financing: To ensure sustainable financing of the health system, it is necessary to diversify sources of income and increase the efficiency of collection and use of funds. This can be achieved by promoting private health insurance, increasing contributions to health insurance funds and exploring other sources of revenue, such as external financing and public-private partnerships.
- Effective governance and regulation: Reforms should aim at strengthening the governance and regulatory system in health to ensure effective implementation and monitoring of health policies and programs. This may include establishing a clear legislative and institutional framework, promoting high ethical and professional standards, and involving civil society and other stakeholders in decision-making and reform monitoring.

In the context of the demographic decline in the Republic of Moldova, it is crucial to adopt health sector financing policies that respond to the specific needs of

the population, including the increased needs generated by the aging of the population. In this regard, the following recommendations are welcome:

- Allocation of additional resources to long-term care services: The government should pay special attention to the financing and expansion of long-term care services to meet the increased demand generated by the increase in the number of elderly people. The allocation of additional funds for the development and modernization of infrastructure and equipment in these institutions could improve the quality and accessibility of services.
- To combat the exodus of doctors and qualified medical personnel from the country, financial incentive programs should be introduced and strengthened for medical personnel who remain in the country and choose to work in the field of elderly care. These programs could include competitive salaries, performance bonuses and professional development facilities.
- To reduce the burden on the health system and improve the general health of the population, the government should allocate funds for prevention and health promotion programs. These could include nutrition education programs, screening campaigns and programs to promote a healthy lifestyle.
- The government should ensure that funds allocated for the health sector are spent efficiently and transparently and corrupt practices are eradicated. Transparent allocation of resources and the fight against corruption can contribute to improving access and quality of health services.

By implementing these recommendations, the Republic of Moldova could improve the sustainability and efficiency of its health system, ensuring access to quality services for all citizens, including the growing elderly population.

We are aware that the implementation of the reform in the healthcare system in the Republic of Moldova can be hindered by various barriers, and taking into account the experience of other countries can provide valuable clues for overcoming these obstacles.

First of all, the Republic of Moldova faces limited financial resources for health, and the implementation of reforms may be slowed down by the lack of necessary funds. To overcome this barrier, Moldova could learn from the practice of other countries that have promoted public-private partnerships in the field of health or implemented innovative financing mechanisms, such as special health taxes or voluntary contributions.

A relevant example is Spain, which has implemented public-private partnerships in the field of health to complement public financing and improve access to medical services. In Spain, the health system is mainly financed by public funds, but there is also a private health insurance sector that offers additional services and healthcare options for those who wish to pay for them. This diversification of funding sources has allowed the improvement of access to medical services and their quality in Spain, providing additional opportunities for those who wish to benefit from private medical services. Moldova could learn from this practice and explore similar ways to promote public-private partnerships and diversify sources of health financing.

Second, medical staff and other stakeholders may resist change because of fear of loss of privileges or uncertainty about new policies or procedures. Moldova could learn from the experience of other countries that have actively involved medical staff and other stakeholders in the decision-making process and promoted awareness and education campaigns to gain their support for reforms.

A good example is Canada, which has actively involved health workers and other stakeholders in developing health policies and promoting reforms in its health system. Through professional organizations of physicians, patient associations and other interested groups, Canada was able to develop a framework for collaboration and consultation that enabled the identification of real needs and priorities in the health care system. This approach has ensured broad and sustained support for health reforms and helped improve access to and quality of health care in Canada.

Moldova could learn from this practice and actively involve medical personnel and other stakeholders in the decision-making process to obtain the necessary support for health reforms.

Fragmentation and lack of coordination between different levels and sectors of the health system can be another impediment in the process of implementing reforms, which can lead to inefficiencies and redundancies. Moldova could learn from the practice of other countries that have strengthened health governance and coordination through clear institutional mechanisms and structures, such as regional or national health authorities.

A relevant example in this regard is Sweden. Sweden has a decentralized health system, where regional authorities have a significant role in the provision and management of health services at the local level. However, there is also an institutional structure at the national level that coordinates general health policies and directives.

The regional health authorities in Sweden are responsible for managing hospitals, home care services and other health services at the regional level. They work together with local authorities and healthcare providers to ensure access to quality services for all citizens in the region.

The implementation of a more efficient and fair system of collecting health insurance contributions is essential for improving the financing of the health system. This system should aim to reduce tax evasion and provide greater coverage of the population. To achieve this, the following should be considered:

- Modernization of the Contribution Collection System: The implementation of modern technologies and effective payment monitoring practices could reduce tax evasion and improve the collection of funds needed to finance the health system.
- Introduction of a Progressive Income Tax: A system of progressive taxation, based on income, could ensure a fairer distribution of the financial burden according to the contributory capacity of citizens. Thus, those with higher incomes would pay higher contributions, while those with lower incomes would have reduced financial burdens or could benefit from tax exemptions or reductions.

Similar practices implemented in other countries, such as Sweden or Germany, have demonstrated that a progressive taxation system can be effective in ensuring

fair financing of the health system and in guaranteeing access to medical services for all citizens, regardless of their social status -economic.

Thus, the Swedish tax system includes a progressive income tax, where those with higher incomes pay higher tax rates than those with lower incomes. These funds are used to finance public services, including their health system, which provides access to high-quality medical services for all citizens.

In Germany, the tax system also includes a progressive income tax, with increasing tax rates for higher incomes. Tax revenues are used to fund public health insurance, which provides health coverage for all residents, including those with lower incomes.

Discussion and conclusions. The conclusions that emerged from the conducted research emphasize the need for better structured and more efficient financing in order to develop a resilient and sustainable health system in the Republic of Moldova:

- Adequate and sustainable funding is essential to create a resilient health system capable of responding effectively to both day-to-day needs and future challenges. In the case of the Republic of Moldova, optimizing the allocation of resources is crucial to improve access and quality of medical services.
- Increasing investments in health infrastructure, in the education and training of medical personnel, but also in technological innovation can strengthen the ability of the health system to deal with crises and provide quality care. In the Republic of Moldova, public and private investments must be aligned to support the transition to a more efficient and fair system.
- Implementing effective partnerships between the public and private sectors can attract financial resources and expertise, contributing to the creation of a more sustainable system. In Moldova, such partnerships could facilitate the development of prevention and primary health care programs.
- A resilient health system requires transparent and responsible management of funds. Increasing public trust in health institutions in Moldova can be achieved by implementing strict mechanisms for monitoring and reporting the use of resources.

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THE EXTENT OF MOLDOVAN ECONOMY'S DIVERGENCE FROM THE EUROPEAN UNION UNDER THE CURRENT ECONOMIC UNCERTANTIES

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Abstract.*The Republic of Moldova has been having the aspiration to join the European Union (EU) since 1999, when the European integration was established as the main strategic objective of its foreign policy. After periods of democratic reforms and important steps towards aligning to the European requirements, the Republic of Moldova finally obtained the status of a candidate country for the EU in June 2022. However, current geopolitical and economic uncertainties determined by the pandemic crisis and amplified by the Ukrainian war make more difficult the European integration path of the Moldovan economy. Moreover, there are significant economic and financial gaps between Moldovan economy and the EU that need to be approached in order to increase its capacity to cope with competition and market forces and to achieve a high degree of sustainable economic convergence. Against this background, this paper aims to uncover the divergence of the Moldovan economy from the EU member states under the economic uncertainties.*
Key-words: *European integration, Republic of Moldova, European Union, economic convergence*
JEL: *E30, E58, E61, F15*
UDC: *338(4:478)*

Introduction. After periods of democratic reforms and important steps towards aligning to the European requirements, the Republic of Moldova signed the Association Agreement with the EU in June 2014 and obtained the status of a candidate country for the European Union in June 2022. However, there is a long way to achieve economic convergence with the EU. According to the European Commission, once the Association agreement is signed, a candidate country must comply with accession criteria, i.e., Copenhagen criteria, to become a member state of the EU. More exactly, it must fulfil the political and economic criteria, by ensuring the stability of democratic institutions, the functioning of the market economy, and

an adequate level of competitiveness to deal with the European competition. In addition, the candidate should consolidate its institutional capacity to implement the acquis and to take on the related obligations. The acquis also stipulates that Member States must comply with the nominal convergence criteria (Maastricht criteria) in order to be able to adopt the euro in due course after accession, i.e., the achievement of a high degree of price stability, the sustainability of the government financial position, the observance of the normal fluctuation margins of the national currency against the euro and the durability of convergence in the long-term interest-rate levels.

Besides nominal convergence criteria fulfilment, the real convergence must be achieved in the medium and long term, i.e., the recovery of economic and social gaps in terms of living standards compared to the EU member states being essential for increasing the degree of integration. From the very beginning, the aim of the EU project was to reduce economic and social gaps between member states and to ensure a high level of economic and social integration, while in the Treaty of Rome, among the objectives was the development of the poorer regions. The goal of real convergence between member states was a fundamental pillar of the Lisbon strategy and remains a basic element of the EU.

Currently, the Republic of Moldova has the lowest GDP per capita compared to the EU countries, only 31% of the EU average (IMF, 2024), one of the lowest levels of financial intermediation, only 31% of GDP (World Bank, 2024), and one of the most underdeveloped stock markets in the EU, of 3.4% of GDP (National Financial Market Commission, 2024). In this instance, a major step towards fulfilling the accession criteria is to uncover economic divergences between Moldovan economy and the EU for consolidating its ability to absorb potential asymmetric shocks arising during the process of European integration, its capacity to cope with European market forces and to achieve a high degree of sustainable economic convergence. Moreover, current geopolitical and economic uncertainties determined by the pandemic crisis, post-pandemic inflationary shock and by the Ukrainian war make more difficult the European integration path of the Moldovan economy.

Literature review. Economic convergence is an essential component of the economic policy in the EU, being one of the main goals in the process of European economic integration. Numerous studies have approached the concept from various perspectives, with a focus on the EU integration and the progress of member countries in terms of economic and monetary convergence, on how much convergence is necessary and what actions should be taken to improve convergence in the EU, and on how much convergence can be achieved by improving the economic performance in underdeveloped regions, etc. According to the European Commission, the concept of convergence is defined as the process whereby the real GDP per capita levels of lower-income economies catch up, on a durable basis, with those of higher-income economies (Diaz del Hoyo et al., 2017).

Numerous studies confirm that the expansion of the EU has benefited its members by maintaining stable economic growth rates, and new accession countries

from Central and Eastern Europe have, in particular, increased competitiveness in domestic and international markets (Vojinović et al., 2010; Strielkowski and Höschle, 2016; Campos et al., 2019; Dobrzanski & Olszewski, 2019; Rapacki and Próchniak, 2019; Szczepańska-Woszczyna et al., 2022). Vojinović et al. (2010) observed that around the time of EU accession, beta convergence accelerates among EU members as new and poorer EU member states grow faster than old and wealthier states, and the income gap decreases but remains significant. Strielkowski and Höschle (2016) divided the EU countries into groups based on their EU accession and investigated whether they converge towards each other, with their conclusions moderately supporting the hypothesis of economic convergence within the EU. Szczepańska-Woszczyna et al. (2022) analyzed the presence of economic benefits in the EU for countries that joined the EU in 2004. It was found that at the level of each EU country, as well as in newly acceded countries as a group, membership was correlated with a significant increase in the GDP growth rate compared to the rest of the Community, while export volumes, productivity, capital market structure, investment flows, etc., have also improved.

The Republic of Moldova has followed the European integration path for several decades. One of the biggest steps towards political and economic integration with the EU was the signing of the Association Agreement with the EU in 2014. Accordingly, the Deep and Comprehensive Free Trade Area (DCFTA) started to be available, leading to an increase in exports to the EU, with the quotas eliminated in 2014.

However, the Republic of Moldova faces the challenge of competing with more developed economies of the EU while maintaining trade relations with non-EU states (Sandu, 2014). While some criteria align with the EU requirements, there are significant divergences, especially in the standard of living, average salary, the level of financial intermediation, the level of capital market development, etc. Modest growth rates and an accentuation of income differences between the old EU member states and the Republic of Moldova raises questions about the prospects for achieving the goal of economic alignment in the short term (Holobiuc, 2021).

Against this backdrop, the article has the objective to unveil the current level of economic divergences of the Moldovan economy from the EU member states under the economic and geopolitical uncertainties.

Research methodology. Having in mind to uncover the economic divergence of the Republic of Moldova from the EU, we employed a mixed methodology, based on qualitative and quantitative analyses. We have conducted a comparative analysis of several important real convergence indicators of the Moldovan economy with the EU member states, i.e., the GDP per capita, the nominal hourly labour cost, the GDP growth rate, and the trade integration, during the period 2014-2023. The data on the GDP per capita and the GDP growth rate were gathered from the International Monetary Fund database, while the data for the average nominal labour cost were retrieved from the official database of the International Labour Organization.

Moreover, the data for the trade convergence were taken from the National Bureau of Statistics of the Republic of Moldova.

Main results. We will further analyse the degree of several important real convergence indicators of the Moldovan economy with the EU member states, i.e., the GDP per capita, the nominal hourly labour cost, the GDP growth rate, and the trade integration. Currently, the Republic of Moldova has a particularly low convergence of GDP per capita, 32% of the EU average, showing that there is a long way towards assuring an economic alignment with other member states (Figure 1). For instance, countries from Central and Eastern Europe have recorded significantly higher values, e.g., the Czech Republic with 91% of the EU average, Hungary with 79%, Poland with 78%, and Romania with 72%.

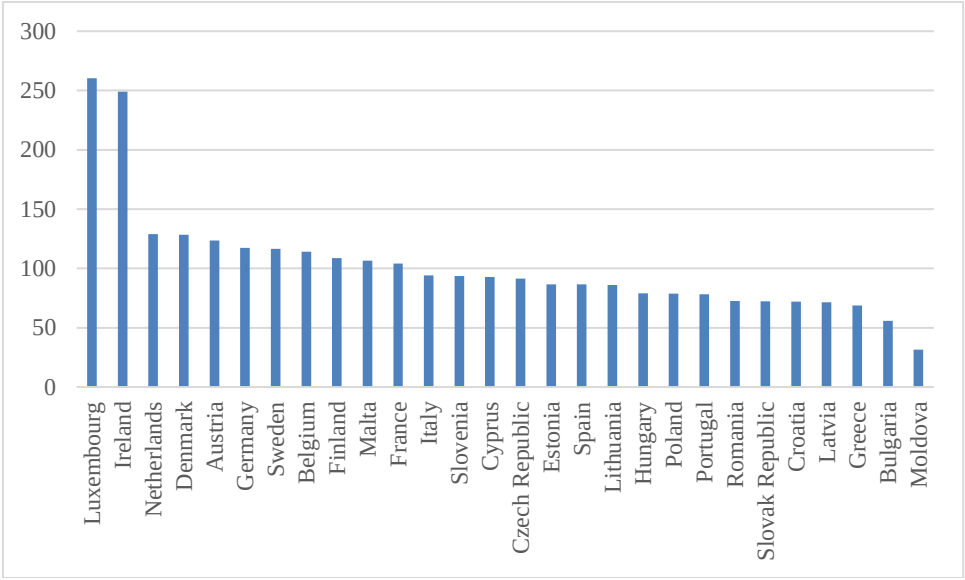

Figure 1**. The economic convergence of the Republic of Moldova with the EU member states (GDP per capita), in 2023 (%, UE=100)**

Source: Representation of the authors based on IMF data (2024).

Data related to the hourly labour cost in the Republic of Moldova are quite pessimistic, this convergence indicator reached in 2023 a level of only 10 dollars when adjusted by purchasing power parity (PPP) (Figure 2). At the same time, Central and Eastern European states stand much better, confirming the presence of a catching up process.

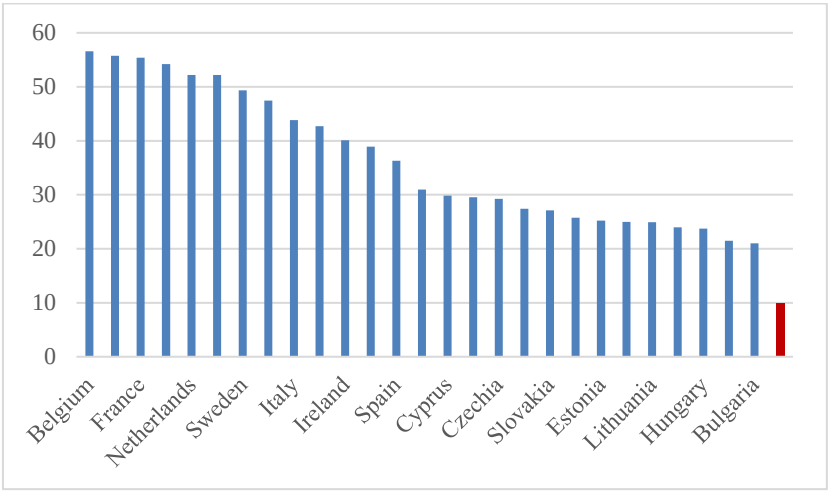

Figure 2. **The convergence of the labour cost of the Republic of Moldova with the EU member states in 2023 (nominal hourly labour cost per employee expressed in 2021 PPP $)**

Source: Representation of the authors based on ILO data (2024).

In a positive way, Figure 3 reveals a high degree of synchronization of economic cycles between the Republic of Moldova and the EU. Also, although the Moldovan economy was more severely affected than the EU by the global financial crisis, the sovereign debt crisis, and the pandemic, shrinking by 9% in 2009, by 0.6% in 2012 and by 8.3% in 2020, it increased more pronounced in positive cycles. This development could facilitate the catching up process towards the EU.

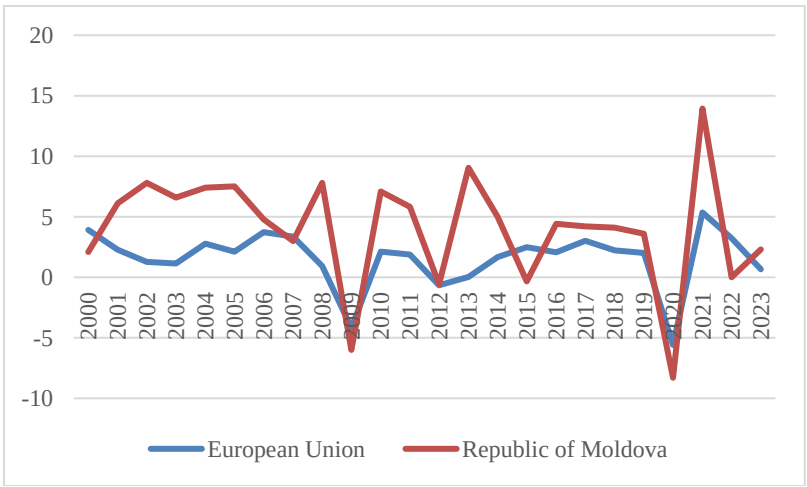

Figure 3. **Synchronization of economic cycles, in the period 2000-2023 (GDP growth rate, %)**

Source: Representation of the authors based on IMF data (2024).

Another important convergence indicator is the level of trade integration with the EU. Once the Association Agreement with the EU was signed in 2014, and,

accordingly, the DCFTA started to be available, the trade integration with the EU has climbed.

More exactly, the Moldovan exports to the EU rose from 46% in 2013 to 65% in 2023 (Figure 4). On the other hand, the share of Moldovan imports remained stable during the period, evolving from 45% in 2013 to 48% in 2023, uncovering that the country has quite a low degree of dependence on imports from the EU.

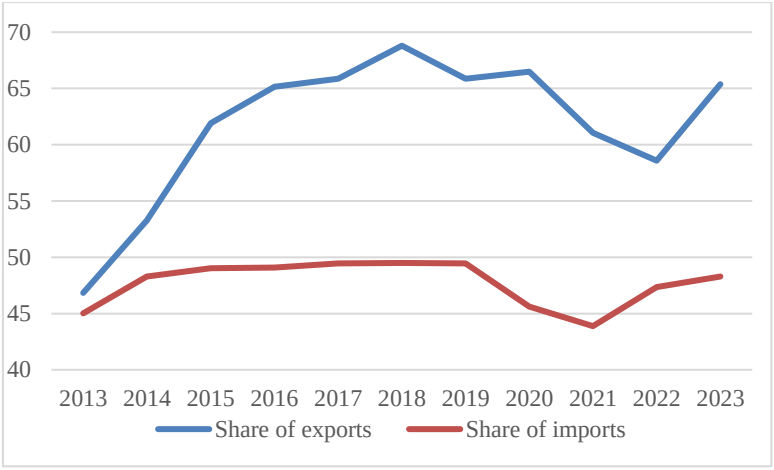

Figure 4. **Degree of trade integration with the EU, during the 2013-2023 period (% of total Moldovan exports/imports)**

Source: Representation of the authors based on NBS data (2024).

The establishment of the European integration path visibly increased the role of the EU as a trade market for the Republic of Moldova. The Moldovan exports to the EU overpassed those to the Russian Federation, which used to be the main export destination of the Republic of Moldova (Clichici and Iordachi, 2019).

Moldovan exports to the Russian market have decreased from a share of 18% in the year the Agreement with the EU was signed to only 3.5% in 2023 (Figure 5). At the same time, the creation of a complex and comprehensive free trade area with the EU generated important opportunities for the Republic of Moldova, so that the EU member states have become the main destination of Moldovan exports.

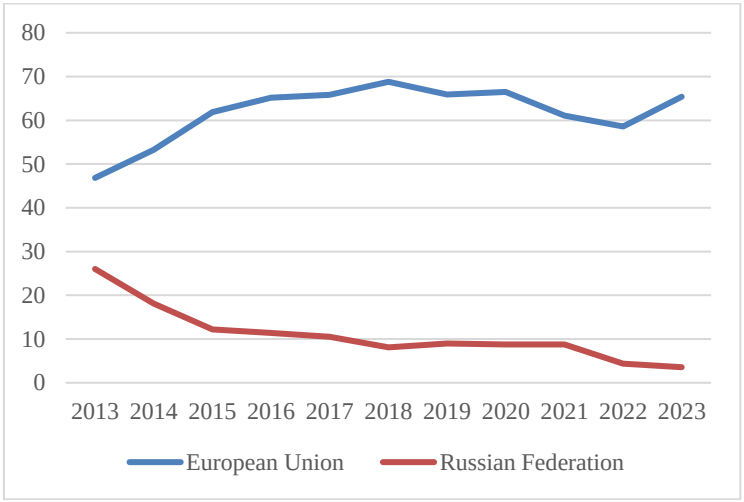

Figure 5. **Reorientation of exports of the Republic of Moldova, during the 2013-2023 period (% of total Moldovan exports)**
Source: Representation of the author based on NBS data (2024).

At the same time, the EU member states represent the main source of Moldovan imports, holding a share of 48% of the value of the total imports of the Republic of Moldova, compared to the Russian Federation, of only 3.7% in 2023 (Figure 6).

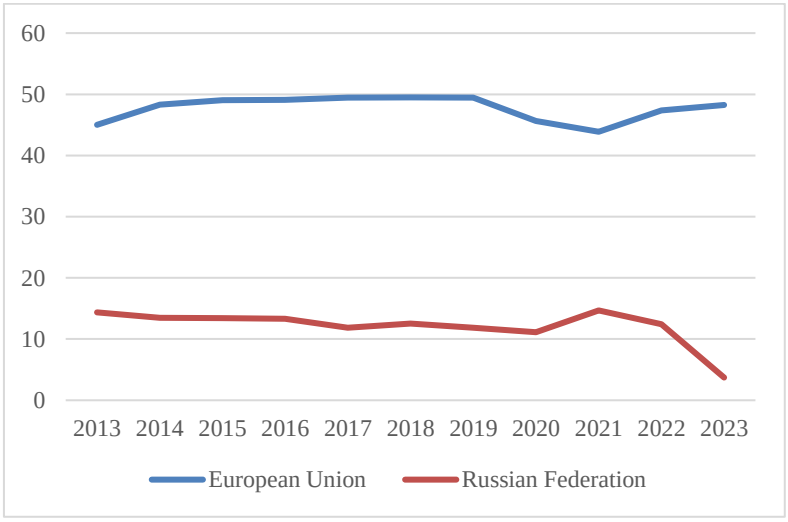

Figure 6. **Reorientation of imports of the Republic of Moldova, during the 2013-2023 period (% of total Moldovan imports)**
Source: Representation of the author based on NBS data (2024).

Despite these positive developments, the European integration could be further hindered by the shocks generated by the military conflict in Ukraine. This ongoing conflict represents a serious threat to the national security of the Republic of Moldova, both from an economic and social point of view, given its immediate proximity to this state, which stretches over 1,200 km. More than that, Moscow still

maintains a military base and a stockpile of approximately 20,000 tons of ammunition in the secessionist region of Transnistria, which can be used at any time in this conflict by the Russian state.

One of the largest repercussions of the military conflict is being felt in the Republic of Moldova through the massive wave of refugees from Ukraine, whose number has dramatically exceeded the capacity of the government to offer them shelter and care. In addition, a severe economic impact has been determined by the collapse of imports from Ukraine, but also by the decrease in investor confidence. Under these conditions, the EU has a major role in providing financial and technical support to Moldovan authorities towards European integration, but also in strengthening the political and economic cooperation.

Discussion and conclusions. After periods of democratic reforms and important steps towards aligning to the European requirements, the Republic of Moldova finally obtained the status of a candidate country for the EU in June 2022. However, the country faces the challenge of competing with more developed economies of the EU while maintaining trade relations with non-EU states. Moreover, current geopolitical and economic uncertainties determined by the pandemic crisis and amplified by the Ukrainian war make more difficult the European integration path of the Moldovan economy. In this instance, the research had the aim to uncover economic divergences between Moldovan economy and the EU for consolidating its ability to absorb potential asymmetric shocks arising during the process of European integration, its capacity to cope with European market forces and to achieve a high degree of sustainable economic convergence.

The main results of the research uncover, firstly, that the Republic of Moldova has a particularly low convergence of GDP per capita compared with other EU countries, showing that there is a long way towards assuring an economic alignment with the EU. Secondly, data related to the average labour cost in the Republic of Moldova are quite pessimistic, while Central and Eastern European states stand much better, confirming the presence of a catching up process. Thirdly, positively, the analysis uncovered a high degree of synchronization of economic cycles between the Republic of Moldova and the EU, which could facilitate the catching up process towards the EU. Fourthly, once the DCFTA started to be available, the trade integration with the EU has climbed. The Moldovan exports to the EU overpassed those to the Russian Federation, which used to be the main export destination of the Republic of Moldova, and the EU member states represent now the main source of Moldovan imports. Despite these positive developments, the European integration could be further hindered by the shocks generated by the military conflict in Ukraine.

In conclusion, important economic gaps between the Moldovan economy and the EU depicted in this analysis need to be approached in order to increase its capacity to cope with competition and market forces and to achieve a high degree of sustainable economic convergence.

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THE IMPORTANCE OF GROWTH POLES IN CIRCULAR ECONOMY

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Abstract. *The concept of growth poles interconnected to circular economic frameworks has received increasing attention from both policymakers and academic circles. Growth poles are designated areas which induce economic progress, acting as a nucleus for innovation, capital infusion, and employment generation. When examining the circular economy on these perspective, these growth poles play a pivotal role in driving sustainable methodologies and optimizing resource utilization. The objective of this research is to explore the importance of these growth poles in promoting the shift towards a circular economy while pinpointing the fundamental factors contributing to their effectiveness. By comprehending mechanisms through which growth poles suitable integrate circular economy methodologies within regional progression paradigms, policymakers are enabled to harness such zones to advance sustainability aims and stimulate economic proliferation. The study highlighting the essentiality of growth poles in advancing circular economy ventures and provides insights into their strategic deployment to aid in the transition towards a more sustainable economic structure.*
Key-words: *globalization, growth poles, circular economy, development*
JEL: *O10, O30, F60, F63, Q53, Q56*
UDC: *338*

Introduction. In recent years, the discourse surrounding sustainable development has increasingly highlighted the pivotal role of growth poles within the framework of a circular economy. This concept, rooted in regional development theories, posits that certain innovative hubs can stimulate economic activity and drive environmental sustainability by maximizing resource efficiency. By concentrating investments and spurring local enterprises, growth poles can effectively mitigate waste while fostering collaboration among stakeholders, thus creating a network of interdependent economic activities. Furthermore, literature indicates that these hubs are instrumental in facilitating the transition from linear to circular models, allowing for synergistic relationships between production and consumption. By elucidating the importance of growth poles, this paper aims to clarify their contributions not only to economic resilience but also to the broader goals of a sustainable future, ultimately advocating for strategic policy frameworks that promote their development within the circular economy paradigm.

The notion of the circular economy has, in recent epochs, garnered considerable notice as a sustainable substitute for the conventional linear economic

paradigm. The antecedents of the circular economy are discernible in the pioneering endeavors of academics like Walter Stahel and entities such as the Ellen MacArthur Foundation, who underscored the criticality of transitioning from a take-make-dispose schema to one that accentuates resource efficiency, diminution of waste, and systems characterized by closed loops. This emergent economic archetype espouses the principle of resource and material regeneration to engender a more enduring and circular system. By reorienting the approach to product design, manufacture, consumption, and disposal, the circular economy endeavors to curtail environmental detriment and optimize resource utilization. Apprehending the historical milieu and the progression of the circular economy conception is paramount for devising efficacious strategies for sustainable growth vectors in the forthcoming epochs (Zhang, 2021).

A fundamental notion in the field of regional development pertains to growth poles, referring to geographic locales approximately serving as catalysts for economic expansion and development. Typically, such areas exhibit heightened levels of productivity, innovation, and infrastructure, thus drawing businesses, investment, and competent workforce. Growth poles can incite economic engagements in nearby areas through spillover influences, generating a ripple impact of economic progression. (Alann, 2024) .These poles hold substantial importance in fostering sustainable development and in shaping the geographical distribution of economic pursuits. As per, growth poles are pivotal in advancing regional competitiveness and spearheading economic metamorphosis. Policymakers, by channeling investments into these pivotal areas, can stimulate growth, generate employment, and nurture innovation, thereby contributing significantly to a region's overall economic well-being. Hence, comprehending the definition and relevance of growth poles is crucial for devising efficacious regional development schemata within the ambit of the circular economy.

Literature review. The exploration of growth poles within the framework of a circular economy reveals a complex interplay between urban systems and regional disparities that warrants a closer examination. Policymakers have often targeted the city system as a strategic focus for promoting regional development, positing that polycentric urban structures can mitigate disparities by fostering economic activity across multiple hubs rather than concentrating it in a single locale (Balducci, 2020). However, while this perspective suggests that diversified growth poles can drive sustainable development by enhancing resource efficiency, reducing waste, and encouraging localized production models that are essential for a circular economy, it also raises questions about the effectiveness and equity of such approaches across different contexts. (Baporikar, 2020). These models not only contribute to environmental benefits but also catalyze job creation and enhance overall community well-being. Moreover, it is essential to critically assess whether the benefits of localized production are evenly distributed among all community members or if certain groups continue to be marginalized. (Evert, 2022). Additionally, the significance of return migration, particularly in post-Brexit contexts, highlights

potential human capital contributions to emerging economic systems through knowledge transfer and innovation. Individuals returning home often bring back experiences and resources that can stimulate local economies and foster entrepreneurial activities (Filimonau, 2019). Nevertheless, it is vital to analyze whether these contributions are adequately harnessed and supported by existing policies to ensure sustainable growth. Understanding the dynamics of both urban polycentricity and migration patterns enriches the literature on growth poles by illustrating how these elements interact to shape regional development.(Evert, 2022).Moreover, this understanding underscores their vital role in facilitating innovation, regional integration, and the transition to more sustainable economic practices inherent in a circular economy. By critically examining these interconnected themes, researchers can provide deeper insights into the mechanisms through which urban centers function as engines of growth while addressing systemic inequalities and fostering an inclusive economic environment that benefits a broader population (Ren, 2022). This approach not only elucidates the complexities of regional development but also challenges us to consider how well these strategies serve the diverse needs of communities.

Research methodology. In examining the critical role of growth poles within the framework of a circular economy, an analysis research methodology is imperative to uncover the intricate connections between economic development and sustainability. Employing a mixed-methods approach facilitates a comprehensive and multifaceted analysis, integrating quantitative data derived from various economic indicators alongside qualitative insights gathered through stakeholder interviews. This dual lens enables us to cultivate a nuanced understanding of how growth poles can effectively catalyze sustainable practices across diverse sectors and industries. For instance, a detailed study on South Africa's land redistribution policy illuminates the effectiveness of targeted interventions that focus on elevating the incomes of impoverished households, even in the face of broader economic shifts (Makombe, 2017). Similarly, investigations into social housing initiatives in Italy underscore the paramount significance of robust user engagement and a thorough assessment of community needs, which are critical elements in mitigating obsolescence and driving meaningful urban renewal efforts (De Medici, 2020). Importantly, research into the recycling and repurposing of waste materials, such as the innovative use of discarded Glass Fiber Reinforced-Polymer (GFRP) pipes and panels for new infrastructure, exemplifies how growth poles can serve as catalysts for sustainable development while addressing environmental challenges (Alann, 2024). These varied methodological frameworks not only enrich the existing empirical literature but also provide valuable insights that can inform the practical implications of implementing growth poles strategically to achieve overarching circular economy objectives. Furthermore, the juxtaposition of these different case studies allows for a deeper exploration of the contextual factors that can influence the success of growth poles, paving the way for future research and practical applications aimed at harmonizing economic growth with environmental

sustainability. Thus, a well-rounded research methodology is essential for capturing the full spectrum of dynamics involved in this vital area of study.

Benefits of growth poles in circular economy. A notable upside of growth poles within the circular economy framework is their capacity to incite innovation and cooperation across diverse sectors and stakeholders. By clustering resources, know-how, and infrastructure in select geographic zones, these growth poles can engender synergies that propel research and development, culminating in novel technologies and business models. Such a cooperative atmosphere not only hastens the shift towards a circular economy but also amplifies the competitive edge of enterprises within these locales. Moreover, growth poles can function as centers for knowledge dissemination and capability enhancement, luring talent and investments globally. Illustratively, in the European Union, the smart specialization initiative has been advocated to utilize growth poles as catalysts for sustainable economic expansion. Through capitalizing on these innovation and expertise hubs, nations can situate themselves at the lead of the circular economy movement, obtaining both economic and environmental dividends.

In pressing forward the circular economy initiative, acknowledging the essential role of instigating innovation and entrepreneurship within growth poles holds significance. Innovation stands central to the shift towards more sustainable methodologies, whereas entrepreneurship underpins the commercialization and proliferation of these fresh concepts. By nurturing an atmosphere conducive to creativity, risk acceptance, and cooperative efforts, growth poles can emerge as hotspots of innovation, drawing skilled individuals and enterprises keen on crafting and actualizing pioneering solutions. Evidence from research suggests that such settings not only bolster economic advancement but also enhance societal welfare by addressing ecological issues (Ren, 2022). Governments and policymakers are pivotal in fostering conditions favorable to innovation and entrepreneurship via dedicated investments, incentives, and regulatory structures that back experimentation and new business models' evolution. Thus, growth poles can act as accelerators for sustainable progress and circular economy endeavors, propelling beneficial transformations on both local and global levels.

The transformation of traditional economic models into circular frameworks is significantly informed by the concept of growth poles, which serve as vital engines of regional development. These strategic hubs not only drive regional economic expansion but also significantly foster innovation and sustainability, thereby aligning economic growth with environmental responsibility. By concentrating resources, expertise, and talent, growth poles create essential synergies that facilitate the effective implementation of circular economy practices, ultimately promoting resource efficiency and waste reduction across industries. This concentration of knowledge, particularly in areas related to recycling, renewable energy, and sustainable design, enhances collaboration among businesses, researchers, and policymakers. Furthermore, the role of educational institutions within these poles is crucial; universities and research centers act as catalytic forces for technological

transfer and knowledge dissemination. These institutions are essential for nurturing a circular economy mindset within the business ecosystem, encouraging entrepreneurial ventures that focus on sustainable practices and innovative solutions that reflect circular principles (Bejinaru, 2023). This dynamic relationship not only serves to enhance local economies but also supports broader systemic change by making it easier for businesses to adopt sustainable practices more effectively and engage with circular economy frameworks. In this context, growth poles emerge not only as powerful enablers but also as incubators of innovative ideas and practices, ensuring that circular economy initiatives can thrive and generate long-lasting benefits across various sectors. Consequently, they reinforce their relevance in contemporary economic policies, shaping a more sustainable future. (Faridi, 2021)

Attempting enhancement of resource efficiency and promotion of sustainable practices remains pivotal in realizing a circular economy. Highlighting the significance of growth poles within this framework, these concentrated sectors of economic activity might function as epicenters for innovation, collaboration, and resource interchange. By centering on these growth poles, entities could exploit economies of scale and scope to optimize resource usage and cut down waste generation. Moreover, by embracing sustainable practices such as eco-design, product lifespan extension, and resource recovery, growth poles might aid in steering the transition towards a more circular and regenerative economy. Research suggests that embedding resource efficiency and sustainable methods into the design and operation of growth poles might result in noteworthy environmental advantages and economic prospects for involved stakeholders. Consequently, encouraging the incorporation of sustainable tenets within growth poles appears critical for pushing forward the circular economy initiative (Ren, 2022).

Challenges and limitations of growth poles in circular economy. Within the domain of circular economy, the notion of growth poles operates as key points for enduring development and resource stewardship. Nevertheless, their possibilities for advantageous outcomes are curtailed by obstacles and constraints that impede their complete potential. Integrating circular economy tenets such as eliminating waste and pollution into the structure of growth poles necessitates an exhaustive reconsideration of established linear economic frameworks. Joint efforts, creativity, and inter-sectoral collaborations, as highlighted in (Solomon, 2024), are imperative to surmount regulatory challenges, technological confines, and cultural impediments. Additionally, the case analysis illustrated in (Faridi, 2021) accentuates the significance of having a defined strategy and novel approaches in managing the intricacies of launching and expanding enterprises within a circular economy framework. Tackling these difficulties directly and utilizing cooperative innovation, growth poles can promote sustainable development and value production while reducing environmental repercussions.

To efficaciously surmount impediments to the execution of growth poles within a circular economy, it is imperative to address principal challenges which may obstruct advancement. A prominent hindrance is the deficient coordination and

collaboration amongst stakeholders such as governmental bodies, businesses, and local communities. (Makombe, 2017) Encouraging partnerships and fostering dialogue amid these varied groups can achieve a more wholly integrated approach to planning and execution. Additionally, financial limitations frequently obstruct the progression of sustainable growth poles, underscoring the necessity for novel funding mechanisms and investment prospects. By investigating alternative financing models and utilizing public-private collaborations, the financial strain can be mitigated, thus facilitating the successful execution of growth poles within a circular economy. Furthermore, legal frameworks and policy incentives are crucial in enabling the shift towards a more sustainable economic paradigm, highlighting the significance of supportive governmental actions. Policymakers, in this regard, must endeavor to fashion an environment that incentivizes sustainable practices and better remunerates businesses for their circularity commitments. Through strategic planning, stakeholder involvement, financial creativity, and supportive policies, impediments to the execution of growth poles within a circular economy can be successfully addressed, yielding long-term economic and environmental advantages (Dagmara 2023).

Addressing social and environmental impacts. Mitigating the social and environmental impacts occupies an essential role in the execution of growth poles within a circular economy structure. Through the strategic placement of these economic activity centers, there is a potential to lessen the adverse effects associated with conventional linear economic models on both society and the environment. Growth poles serve as important locations for adopting sustainable practices, such as innovations in green technology, the production of renewable energy, and strategies to reduce waste. Such initiatives generate economic opportunities while also fostering social well-being and environmental responsibility. Moreover, growth poles can act as driving forces for community development, boosting social unity and providing avenues for inclusive growth. For instance, the establishment of eco-industrial parks within growth poles can enhance resource efficiency, generate employment, and improve local living standards. It is crucial to give precedence to these social and environmental considerations during the planning and development stages of growth poles to ensure positive impacts on both the economy and society at large (Schröder, 2019).

Conclusions. In synthesizing the role of growth poles within the framework of a circular economy, it becomes evident that their strategic positioning is essential for facilitating sustainable development. By concentrating resources, knowledge, and innovation in specific geographic areas, growth poles can create synergies that not only enhance economic performance but also promote environmental stewardship. This dynamic fosters a network of interlinked businesses and communities eager to adopt circular practices, thereby reducing waste and maximizing resource efficiency. Additionally, the collaborative environment nurtured within these growth poles enables the exchange of ideas and best practices, which can amplify the benefits of

circularity across various sectors. Furthermore, the interactions generated within these zones can lead to the creation of local and regional policies that prioritize sustainability, effectively transforming market structures to support a circular model. Concentration on strategic evolution of principal sectors and regions renders growth poles capable of propelling innovation, pulling in investments, and engendering employment prospects. Nevertheless, the effectiveness of growth poles hinges on proficient governance, cooperation among different parties involved, and the amalgamation of environmental deliberations. Moreover, it is imperative for decision-makers to ascertain that growth pole strategies are inclusive, fair, and environmentally sustainable. Prospective research must delve into the potential of growth poles in advancing circular economy tenets and pinpoint effective practices for actualization. Exploiting growth poles' potential holds the promise of expediting nations' movement towards an economic framework that is more sustainable and robust (Zhang, 2021)

By aligning the interests of businesses, governments, and communities, growth poles can play a pivotal role in redefining economic activities to be more sustainable and resilient. Ultimately, the integration of growth poles into circular economy frameworks could serve as a catalyst for broader systemic change, demonstrating that localized initiatives can have far-reaching implications for sustainable development on a global scale. As the world increasingly grapples with pressing environmental challenges, the commitment to fostering growth poles that embody circular principles becomes not only necessary but also urgent. In this context, embracing the potential of growth poles can pave the way for innovative solutions that ensure economic vitality while safeguarding the planet for future generations.

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REPUBLICA MOLDOVA ÎN PROCESUL INTEGRĂRII ECONOMICE INTERNAȚIONALE

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Abstract. *The article studies various aspects regarding the international division of labor; the essence of the process of international economic integration, the objectives, forms and stages of development and its contribution to the economic growth of the Republic of Moldova. A general characteristic of the main integrationist groupings of countries at international and regional level is presented; the role of the European Union (EU) as an advantageous form of economic integration of countries; Moldova's relations with the EU; Moldova's cooperation with the main international and regional economic and financial bodies; participation of the country in the development of regional and cross-border cooperation.*
Keywords. *International division of labor; the essence, forms and stages of economic integration; specialization and international and regional economic cooperation; the EU's role in the global economy; integration of the Republic of Moldova into international and regional economic and financial structures, the impact of this process on the economic growth and development of the country*
JEL: *F00, F15, F50, H70, O10*
CZU: *339.924(478:4)*

Introducere. *Integrarea economică internațională* reprezintă o formă specială de relații economice între diferite țări, care s-a dezvoltat după cel de-al Doilea Război Mondial. Acest proces poate fi considerat ca o formă de cooperare economică internațională mai avansată, ce presupune crearea de către două sau mai multe țări a unui spațiu economic comun care asigură: *dezvoltarea schimburilor reciproce.* Conceptul *de "integrare economică internațională*" poate fi definit ca proces obiectiv, conștient și consistent de convergență, adaptare reciprocă și creștere a sistemelor economice naționale. Acest proces acoperă mai multe categorii economice, fiind utilizat atât la nivel macroeconomic, cât și microeconomic. Integrarea economică internațională este determinată de mulți factori, care se bazează pe: *crearea condițiilor care stimulează schimburile economice între țări; progresul științific și tehnologic modern, care necesită din ce în ce mai multe resurse financiare; oportunități limitate ale piețelor naționale și creșterea concurenței pe piața* mondială.

O caracteristică importantă a timpului nostru este consolidarea interdependenței economiilor diferitelor țări, dezvoltarea proceselor internaționale la nivel macro și micro, tranziția intensivă a țărilor de la o economie națională închisă la una liberă deschisă întregii lumi [12, p.107]. Acest proces se datorează *dezvoltării și aprofundării diviziunii internaționale a muncii* (DIM), fiind elementul principal al integrării economice mondiale ca rezultat al specializării țărilor în producția și vânzarea de bunuri economice pentru schimb pe piața mondială care reprezintă principalul element în integrarea economica mondiala. Potrivit lui I.Ignat și S.Pralea, DIM exprimă relațiile care se stabilesc între economiile naționale în ceea ce privește distribuția activităților economice între ele și arată locul lor în economia mondială [8, p. 48].

Specializarea și cooperarea ca etape ale integrării economice. *Specializarea economică internațională* este una dintre condițiile prealabile și pilonii formării și dezvoltarii economiei mondiale. Se disting diverse tipuri de specializare: intra-sectorială, intersectorială, intra-firmă, organologică și tehnologică. Fiecare dintre ele se desfășoară în forme diferite, de la o țară la alta. Fiecare țară își dezvoltă propriul concept de creștere economică. *Cooperarea economică internațională* este înțeleasă ca cooperare sub diferite forme între două sau mai multe țări, inclusiv în: *comerțul internațional; cooperarea în producție (sub formă de întreprinderi mixte, companii transnaționale etc.); în domeniul investițiilor internaționale; cooperare științifică și tehnică; energie; turism; relații financiare și credite externe; migrarea resurselor forței de muncă; transport internațional; furnizarea de servicii* etc. Cooperarea și integrarea în economia mondială sunt modalități intensive de dezvoltare care permit întreprinderilor locale să obțină acces la tehnologii avansate [14, p. 235].

Tendințe și perspective pentru dezvoltarea economiei mondiale. Nivelul de dezvoltare economia a țărilor se caracterizează în mai multe domenii, dintre care cel mai important *este participarea lor la crearea produsului brut mondial, cota lor pe piața mondială de bunuri și servicii, piața mondială de capital, nivelul produsului intern brut pe cap de locuitor* etc. Potrivit estimărilor FMI, PIB-ul global s-a ridicat la aproximativ 174,5 trilioane de dolari în 2023. Primele 10 țări în ceea ce privește acest indicator sunt: China (peste 33,0 trilioane de dolari), Statele Unite (aproximativ 26,9 trilioane), India (13,0 trilioane), Japonia (aproximativ 6,5 trilioane), Germania (5,5 trilioane), Rusia (4,99 trilioane), Indonezia (4,4 trilioane), Brazilia (4,0 trilioane), Franța (aproximativ 3,9 trilioane de dolari) și Marea Britanie (3,85 trilioane de dolari). Pe lângă acestea, în topul primelor zece economii la nivel global, conform PIB-ului ajustat la paritatea puterii de cumpărare (PPC), se află și Turcia (aproximativ 3,6 trilioane de dolari), Italia (3,2 trilioane), Mexic (3,1 trilioane), Coreea de Sud (peste 2,9 trilioane) și Canada (aproximativ 2,4 trilioane de dolari). [11, p. 32]. În același timp, menționăm că serviciile joacă un rol important în producție și servesc funcționării lanțurilor valorice globale, accelerând astfel dezvoltarea economică globală [7, p. 20-21] (tabelul 1).

Tabelul 1. **Top 10 cele mai mari țări din lume după PIB în 2023,** potrivit estimărilor FMI

Țara	**PIB** (nominal), miliarde dolari	**PIB (PPC)** nominal), miliarde dolari	**PIB** la un locuitor, în dolari	**Numărul populației,** milioane persoane	**Teritoria (km²)/ % din Global**	**Volumul exportului ,** miliade dolari, 2022
Global	**105.569**	**174471,3**	**770,148.3**	**8.000.000**	**148.940.000/=29,1%** din suprafața uscată a Pământului	**24.611,2**
SUA	26.855	26.854,6	80.034	334.378	9.629.091/6,5%	2.063
China	19.374	33.115,0	13.721	1.411.750	9.596.961/6,4%	3.593,6
Japonia	4.410	6.456,5	35.385	124.630	377.930/0,25%	752,1
Germania	4.309	5.545,7	51.383	83.784	357.114/0,24%	1.658,4
India	3.737	13.033,4	2.601	1.425.776	3.287.263/2,3%	452,7
Regatul Unit	3.159	3.846,9	46.371	68.103	242.900/0,16%	530,5
Franța	2.923	3.872,7	44.408	65.361	640.294/0,43%	606,9
Italia	2.170	3.195,5	36.812	60.408,3	301336/0,20%	700,3
Canada	2.090	2.385,1	52.722	39.609, 7	9.984.670/ 6,7%	598,6
Brazilia	2.081	4.020,4	9.673	217.385	8.514.877/5,7%	334,5
	Informații suplimentare					
UE (2024г.)	19340	26640	59.050	448.400	4.324.782/ cca 4,5%	
Țările de Jos	1.081	1290, 9	61.098	17.157,8	37.354/0,03%	770,3
Rusia	2.063	4.988,8	14.403	146.424,7	17.124.424/ cca 13%	580,1
Turcia	1.029	3.572,6	11.931	85751,9	783.562/0,53%	254,2
Ucraina	148.7	444,2	4.654	43576,9	557.500/0,38%	>44,4
România	348,9	783,9	19.054	19.161,1	238.397/0,16%	>96,8
Moldova	15.8	42,0	6.342	2.681,7	33.846/0,02%	>4,3

Sursa: Elaborat de autor conform surselor statistice [vezi: 11, p. 35].

Se poate observa diversitatea economiilor mondiale, fiecare stat promovând o politică economică distinctă. Astfel, devine evident că dezvoltarea economică a unui stat este influențată nu atât de disponibilitatea resurselor, cât de calitatea unui management administrativ eficient. Un exemplu elocvent este Japonia, o țară devastată complet în timpul celui de-al Doilea Război Mondial, care, în ciuda lipsei de resurse semnificative și a unui teritoriu limitat, a devenit unul dintre liderii mondiali în dezvoltarea economică. De asemenea, se preconizează că, în următorul deceniu, China va depăși Statele Unite, iar competiția dintre aceste puteri va reprezenta un test de rezistență pentru întreaga lume. Și totuși, care sunt cele mai bogate țări din lume? Majoritatea oamenilor cred că răspunsul la această întrebare ar trebui să fie Statele Unite ori China. Este adevărat că atât China, cât și Statele Unite sunt foarte prospere, dar, din păcate, nu sunt neapărat cele mai bogate țări din lume. Statisticile vă pot surprinde. Tabelul 2 prezintă clasamentul **celor mai bogate 10 țări** din lume la sfârșitul anului 2023.

Tabelul 2. **Clasamentul top 10 cele mai bogate țări din lume după totalurile anului 2023.**

Locul	**Țata**	**PIB (per), $ pe individ**	**locul**	**Țata**	**PIB (per), $ pe individ**
10	Australia	63.490 $	**5**	Singapore	87.880 $
9	Danemarca	71.400 $	**4**	Norvegia	99.270 $
8	Islanda	68.840 $	**3**	Elveția	102.870 $
7	S U A	69.380 $	**2**	Irlanda	112.250 $
6	Qatar	81.970 $	**1**	**Luxembourg**	**135.610 $**
Sursa: https://financer.com/ro/blog/cele-mai-bogate-tari-din-lume/ [23].					

Problemele globale ale economiei mondiale moderne sunt provocări care afectează întreaga planetă sau majoritatea regiunilor acesteia. Acestea nu țin cont de granițele naționale și necesită cooperare internațională pentru a fi soluționate. Problemele globale includ o gamă largă de domenii, de la mediu și economie la sănătate și securitate în muncă. **Principalele probleme globale** includ domeniile: *mediul, demografia, pacea și dezarmarea, alimentația, energia și materiile prime, sănătatea umană, utilizarea oceanelor, problema explorării spațiului etc.* Fiecare problemă globală are un conținut specific, dar toate sunt strâns interconectate. În ultima perioadă, centrul de greutate al acestor probleme s-a mutat către țările în curs de dezvoltare, unde criza alimentară a devenit cea mai gravă. Situația dificilă a majorității acestor țări reprezintă o problemă umanitară și globală serioasă. Principala soluție constă în implementarea unor transformări socio-economice radicale în toate domeniile vieții și activității acestor state, promovarea progresului științific și tehnologic, precum și intensificarea cooperării și a cooperării internaționale.

Una dintre principalele probleme sunt **datoriile externe** cu care se confruntă majoritatea țărilor. Chiar și cele mai dezvoltate și mai bogate țări au datorii externe uriașe. De exemplu, Statele Unite au cea mai mare datorie externă din lume (peste 32,9 trilioane de dolari în 2023), iar în comparație cu PIB-ul, aceasta este de 122%, Canada – 127%, Marea Britanie – 287%, Japonia – 98%, Italia – 143%, Elveția – 285%, Olanda – 382%, Hong Kong – 504%, Grecia – 323%, Monaco – 240%, Malita – aproximativ 700% etc. Datoria externă a României este de 45%, cea a Ucrainei – 81%. China nu are practic datorii externe (13,5%), la fel ca Rusia (13,7%) în termeni de PIB. Țara cu cea mai mare datorie externă în PIB a fost Mauritius, a cărei datorie s-a ridicat la 1368%, de peste 13 ori mai mare decât PIB-ul țării [11, p. 46]. Republica Moldova în iulie 2023 avea datorii externe de 5654,8 milioane USD, cu o rată a datoriei externe per locuitor de 1600 USD, ponderea din PIB – 70%, iar ponderea în avuția națională de 8,7% [11, p. 271]. Așa dar, situația în țară cu problema data nu este așa de critică, comparativ cu majoritatea țărilor lumii. Necesetă realizarea unor măsuri concrete în sectoarele de bază, asigurând dezvoltarea economiei naționale și creșterea competitivității produselor și serviciilor autohtone pe piața internațională.

Perioada istorică actuală, marcată de fenomene precum globalizarea și regionalizarea, de noi mijloace de comunicare, cum ar fi internetul și rețelele sociale precum Facebook și Twitter, de schimbările politice și sociale din interiorul statelor, precum și de transformările din organizațiile internaționale, alături de interconexiunile și interdependențele dintre toate aceste elemente, va provoca, la rândul său, schimbări semnificative în economia mondială. Potrivit experților în acest domeniu, pe fondul dependenței tot mai mari de anumite resurse, dintre care multe sunt limitate și apropiate în ceea ce privește epuizarea în timp, activitatea economică va fi reorientată către alte sfere, cum ar fi spațiul, lumea, intrând astfel într-o nouă etapă - interplanetară. Pe de altă parte, economia mondială se va confrunta cu numeroase dezechilibre, crize și un grad ridicat de instabilitate, în special în zonele care se confruntă cu probleme politice, economice și sociale. Potrivit lui Matthew Burrows, lumea trece prin vremuri dificile. El compară situația de astăzi cu alte puncte de cotitură din istorie, cum ar fi 1789, 1815, 1919, 1945 sau 1989, când sistemele politice, sociale și economice s-au prăbușit. Fie ne asumăm responsabilitatea și direcționăm schimbările în direcția corectă, fie vor cădea asupra noastră... [2, p. 11-14].

Experiența mondială ne dă multiple exemple, că anume în rezultatul promovării unei politici economice bazate pe argumemntarea științifică a deciziilor se poate asigura o dezvoltare economică durabilă. Pot fi aduse multe exemple, dar ne vom referi la experența Japoniei. Planificarea economică japoneză este fundamentată într-o economie de piață, în care principiul major îl reprezintă mecanizmul prețurilor, de aici și marile diferențe între acestea și planurile economice din economiile planificate totalitare. *Primul* rol al planificării economice japoneze este de a distinge condițiile dorite și posibile de atins pentru economie și societate, prin prognozarea viitorului cu un grad ridicat de consistență. *Cel de al doilea* rol al planificării economice este de a defini politicile pe termen mediu și lung ale activităților economioce ale Guvernului, stabilirea obiectivelor prioritare și elaborarea modelurilor de realizare ale acestora. *În al treilea rând*, planificarea economică oferă orientările pentru activitățile de afaceri și ale populației [13, p. 80]. Exemplu Japoniei, în domeniul planificpării dezvoltării economice ar fi bine de aplicat în majoritatea țărilor.

Aprofundarea procesului de integrare economică între state. În ultimele decenii, aprofundarea procesului de integrare economică între state a jucat un rol special în dezvoltarea economiei mondiale. Potrivit lui I. Ignat și S. Pralea, din punct de vedere economic, *integrarea este un proces prin care două sau mai multe piețe naționale de dimensiuni unitare, evaluate anterior separate, ca fiind insuficiente, sunt combinate într-o piață unică (piață comună) de dimensiuni mai eficiente.* Pentru a atinge acest obiectiv cu costuri sociale minime, este necesar să se pună în aplicare o serie de măsuri de ajustare a structurilor naționale pe care le implică integrarea. De obicei, acest lucru necesită o perioadă de tranziție mai lungă [8, p. 223]. V. Bârdan menționează că un motiv important pentru integrare este factorul politic: dorința statelor de a câștiga o mai mare autoritate și greutate politică în comunitatea mondială

prin integrare, rezolvându-și astfel rapid problemele economice pe această bază [3, p. 15].

La nivel internațional au fost formulate diferite tipuri de integrare economică, care reprezintă anumite etape ale procesului de integrare economică în evoluția sa [11, p. 50-52]: *acord comercial preferențial; zonă de liber schimb; uniune vamală; zonă de cooperare economică; piață comună; uniune economică și monetară; integrare economică generală; integrare politică și socială (de exemplu, Uniunea Europeană)*. În special, integrarea economică între state este de natură regională. *Regionalizarea* implică faptul că statele-națiune dezvoltă relații interdependente din ce în ce mai pronunțate, de diferite grade de complexitate.

Caracteristicile unor grupări de țări de integrare internațională și regională [vezi: 11, p. 53-66]. În prezent, în lume există mai mult de 20 de asociații economice de integrare internațională, care includ principalele regiuni și continente ale globului. Acordul de liber schimb nord-american (**NAFTA),** creat în 1991 de Statele Unite, Canada și Mexic, care acoperă o piață de 375 de milioane de consumatori și o suprafață de 21,3 milioane km², cu perspectiva extinderii în sudul continentului american. Domeniile de activitate sunt: comerțul cu bunuri și servicii materiale; investițiile directe – liberalizate; alte prevederi privesc: normele de concurență, proprietatea intelectuală, reședința temporară a oamenilor de afaceri, anumite aspecte ale protecției mediului etc. Sunt și alte grupuri de țări active în America, cum ar fi *Comunitatea Statelor din America Latină și Caraibe* (**CELAC),** un bloc regional format din state din America Latină și Caraibe, creat la 23 februarie 2010. Acesta include 33 de state suverane reprezentând aproximativ 600 de milioane de oameni. Statele Unite și Canada nu fac parte din blocul comunitar. În America de Sud, există o organizație internațională **MERCOSUR,** fondată în 1991 de Argentina, Brazilia, Uruguay, Paraguay și Venezuela. Bolivia, Chile, Columbia. Ecuador și Peru au statutul de membri asociați. Obiectivele generale ale MERCOSUR sunt*: creșterea eficienței și productivității prin deschiderea piețelor și accelerarea dezvoltării economice; îmbunătățirea perspectivelor de utilizare mai eficientă a resurselor disponibile; conservarea mediului; îmbunătățirea comunicațiilor; armonizarea și coordonarea politicilor macroeconomice și completarea diferitelor sectoare.*

Activ se dezvoltă cooperarea între țările cu acces la Oceanul Pacific. *Cooperarea Economică Asia-Pacific* (**APEC**), fiind un forum al unui grup de 21 de țări, reprezentând aproximativ 60% din economia globală, unde sunt discutate probleme de economie regională, cooperare, comerț și investiții. În Asia Centrală, de asemenea, activ activează Organizația de Cooperare de la Shanghai (OCS)**,** ca organizație internațională înființată la 15 iunie 2001 de liderii Chinei, Rusiei, Kazahstanului, Tadjikistanului, Kârgâzstanului și Uzbekistanului, cărora li s-au alăturat apoi India și Pakistan (în 2017), Iran (în 2022) și Belarus (în 2024). Teritoriul total al țărilor OCS este de peste 35 de milioane de km², adică 65% din teritoriul Eurasiei, iar populația totală a acestor țări este de aproximativ 3,5 miliarde de oameni, ceea ce reprezintă jumătate din populația lumii. Principalele sarcini ale OCS sunt consolidarea stabilității și securității într-un spațiu larg care unește statele membre,

lupta împotriva terorismului, separatismului, extremismului, traficului de droguri și dezvoltarea cooperării economice, energetice, științifice și culturale [18].

În Africa, există *Comunitatea Economică Africană* [vezi 11, p. 55-57]**,** care este compusă din toate țările africane și este formată din blocuri regionale, cunoscute și sub numele de pilonii săi: *Comunitatea Economică a Statelor din Africa de Vest, Comunitatea Economică a Statelor din Africa de Vest (ECOWAS), Comunitatea Africii de Est, Comunitatea Economică a Statelor din Africa Centrală, Comunitatea de Dezvoltare a Africii de Sud (SADC) și Organismul Interguvernamental pentru Schimbările Climatice***,** un bloc economic care cuprinde Cornul Africii; *Comunitatea Statelor Sahel-Sahariene,* una dintre cele mai mari organizații economice din Africa; blocul țărilor din Africa de Est *și de Sud* (cu acronimul COMESA); *Uniunea Maghrebului Arab,* care acoperă nord-vestul Africii.

Un rol special în dezvoltarea economiei mondiale și a relațiilor economice internaționale îl joacă grupul țărilor industrializate (**G7**) și grupul țărilor în curs de dezvoltare (**G20**) [11, p. 57-59]. **G7** este un forum internațional al guvernelor țărilor dezvoltate din punct de vedere economic, tehnologic și militar: *Canada, Franța, Germania, Italia, Japonia, Regatul Unit și Statele Unite ale Americii*. Între 1997 și 2014, G7 a fost cunoscut sub numele de **G8**, format din țările G7 plus *Rusia*. 2 martie 2014 din cauza invaziei în Ucraina, Rusia a fost exclusă din acest grup până când și-a schimba cursul. Din 2014, grupul G8 include cele șapte state și UE.

Grupul celor 20 de țări **(G20** sau **G20+)** este un bloc de țări în curs de dezvoltare fondat pe 20 august 2003. Grupul a fost format la cea de-a cincea Conferință Ministerială a Organizației Mondiale a Comerțului, care a avut loc la Cancún, Mexic, în perioada 10-14 septembrie 2003. G-20 acoperă 60% din populația lumii, 70% din fermieri și 26% din exporturile agricole globale. În prezent, grupul include 23 de țări: Argentina, Bolivia, Brazilia, Chile, China, Cuba, Ecuador, Egipt, Guatemala, India, Indonezia, Mexic, Nigeria, Pakistan, Paraguay, Peru, Filipine, Africa de Sud, Tanzania, Thailanda, Uruguay, Venezuela, Zimbabwe. La cea de-a optsprezecea reuniune a șefilor de stat ai Grupului celor Douăzeci (G20), care a avut loc în perioada 9-10 septembrie 2023 în India, în orașul New Delhi, nu au participat președintele rus Vladimir Putin și președintele chinez Xi Jinping. În cadrul summitului s-a ajuns la acorduri privind clima și biocombustibilii etc.

Gruparea țărilor este BRIC [15; 11, p. 59-64], țări în curs de dezvoltare: Brazilia, Rusia, India și China, care sunt identificate ca puteri economice în creștere. Din iunie 2006, Africa de Sud (**BRICS)** a fost inclusă în această organizație. Următoarele țări sunt, de asemenea, invitate să se alăture acestei organizații: Egipt, Iran, Emiratele Arabe Unite, Arabia Saudită, Indonezia, Argentina și Etiopia etc., atunci numărul membrilor poate crește la zece și mai mult. Lista țărilor interesate să se alăture clubului este lungă, peste 23 de țări. Practic, relațiile bilaterale dintre țările BRICS sunt construite pe principiile neamestecului, egalității și beneficiului reciproc. Pe lângă summituri, au loc întâlniri la nivelul miniștrilor de externe, miniștrilor de finanțe și alții. Economiile acestor țări se dezvoltă într-un ritm ridicat (vezi fig. 1).

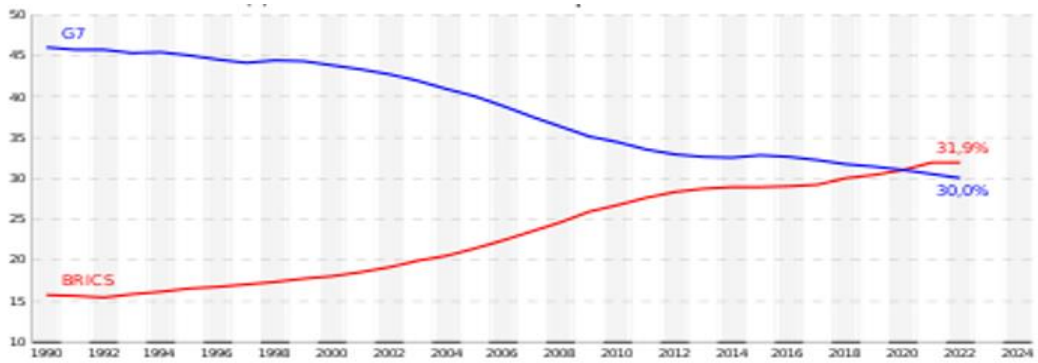

Figura. 1. **Ponderea PIB-ului G7 și BRICS în economia globală** [15].

Comunitatea Statelor Independente a fost formată la 8 decembrie 1991 ca urmare a semnării Tratatului privind înființarea Comunității Statelor Independente (CSI) de către președinții Republicii Belarus, Federației Ruse și Ucrainei. La 21 decembrie 1991, la Almata, președinții republicilor: Azerbaidjan, Armenia, Belarus, Kazahstan, Kârgâzstan, Moldova, Federația Rusă, Tadjikistan, Turkmenistan, Uzbekistan și Ucraina, au semnat **Declarația privind înființarea CSI.** *Sarcinile CSI sunt:* cooperarea în domeniile politic, economic, de mediu, umanitar, cultural și de altă natură; dezvoltarea economică și socială cuprinzătoare și echilibrată a țărilor membre în cadrul unui spațiu economic comun, cooperarea și integrarea interstatală; asigurarea drepturilor omului și a libertăților fundamentale etc. În primii ani, de la crearea sa, activitățile în CSI s-au desfășurat relativ normal, dar după intervenția Rusiei în Georgia în 2008, crearea republicilor autonome Abhazia și Osetia de Sud, anexarea Crimeei în 2014, crearea republicilor Dombas și Lugansk și includerea lor în Federația Rusă, intervenția militară a Rusiei în Ucraina în februarie 2022 și alte momente negative, activitățile CSI au fost blocate, în mare parte înlocuită de *Uniunea Vamală Eurasiatică*.

Uniunea vamală eurasiatică (UVEA) [11, p. 64-66], formată din Rusia, Kazahstan, Belarus etc., în cadrul căreia au fost eliminate taxele vamale pentru comerțul reciproc și a fost introdus un sistem unic de impozitare a importurilor. La 1 ianuarie 2010 a intrat în vigoare Tariful Comun, iar la 1 iulie 2010 – Codul Vamal al Uniunii Vamale și, eventual, Uniunea Economică Eurasiatică (UEEA). Acesta este mai mult un proiect politic decât unul economic. Conducerea rusă a solicitat în mod repetat partenerilor estici să adere la uniunea vamală în detrimentul zonei de liber schimb aprofundat și cuprinzător (ZLSAC) cu UE. Această "invitație" a fost însoțită de motive atât pozitive, cât și negative, cum ar fi prețurile scăzute la energie, amenințările cu tarife mai mari sau bariere comerciale etc. Moldova a ales calea integrării în UE, dezvoltând în același timp relații bilaterale reciproc avantajoase cu orice țară, inclusiv cu Federația Rusă.

Este bine cunoscut faptul că Federația Rusă este o țară bogată în resurse naturale. Se află pe locul 1 în lume în ceea ce privește resursele de gaze (32%), cărbune și resurse forestiere (23%), minereu de fier (aproximativ 28%), aluminiu, îngrășăminte azotate, resurse de pește, apă potabilă, sare și multe altele. *Țara se află*

pe locul 1 în lume în ceea ce privește bogăția națională, dar se află pe locul 67 în lume în ceea ce privește standardele de viață; pe locul 70 în ceea ce privește utilizarea tehnologiilor avansate ale informației și comunicațiilor; pe locul 72 în ceea ce privește cheltuielile publice pe cap de locuitor; pe locul 97 în ceea ce privește venitul pe cap de locuitor; pe locul 127 în ceea ce privește sănătatea publică; pe locul 134 în ceea ce privește speranța de viață a bărbaților; pe locul 159 în ceea ce privește drepturile și libertățile cetățenilor; pe locul 175 în ceea ce privește siguranța fizică a oamenilor; pe locul 182 – în termeni de mortalitate etc., din 207 țări analizate de UNESCO [11, p. 165-166]. Toată lumea ar trebui să știe acest lucru pentru a trage concluzii obiective și corecte.

Fundamentele instituționale ale integrării economice internaționale [11, p. 66-81]. Integrarea economică internațională se realizează prin anumite instituții și organizații internaționale: *financiar*, prin **FMI și BIRD** etc.; în *sfera comercială*, prin **GATT/OMC.** În același timp, asistăm la apariția multor alte structuri de integrare economică cu obiective diferite, în special la nivel regional, care joacă un rol important în dezvoltarea proceselor de integrare economică internațională.

De exemplu, principalele obiective ale **Fondului Monetar Internațional (FMI)** sunt: *promovarea cooperării monetare internaționale; promovarea dezvoltării și creșterii echilibrate a comerțului internațional; crearea unui sistem multilateral de soluționări între țările membre etc.*

Banca Mondială, care este o instituție formată din alte cinci instituții financiare internaționale, este implicată activ în dezvoltarea procesului de integrare economică internațională: *Banca Internațională pentru Reconstrucție și Dezvoltare (BIRD), Corporația Financiară Internațională (IFC), Asociația Internațională de Dezvoltare (IDA), Agenția Multilaterală de Garantare a Investițiilor (MIGA) și Centrul Internațional pentru Soluționarea Diferendelor Investiționale (ICSID).* Fiecare instituție are un rol de jucat în combaterea sărăciei și îmbunătățirea condițiilor de viață ale populației, țărilor în curs de dezvoltare. În prezent, are 190 de țări membre, inclusiv Republica Moldova (la 12 august 1992).

Un rol deosebit de important în dezvoltarea relațiilor economice internaționale îl joacă **Organizația Mondială a Comerțului (OMC),** care supraveghează un număr mare de acorduri care determină "regulile comerțului" între statele membre. OMC a fost înființată în 1995 ca succesor al ***Acordului General pentru Tarife și Comerț*** **(GATT)** și lucrează pentru reducerea și eliminarea barierelor comerciale internaționale, îndeplinind două funcții principale: este un forum de negociere pentru discutarea normelor comerciale noi și existente și ca organism al acordului privind litigiile. Toți membrii OMC sunt încurajați să-și acorde reciproc statutul de <u>națiune cea mai favorizată</u>, astfel încât (cu puține excepții) concesiile comerciale oferite de un membru OMC unei țări ar trebui să fie oferite tuturor membrilor OMC. În același timp, există și critici la adresa OMC prin faptul că favorizează mai mult țările dezvoltate și companiile transnaționale. La sfârșitul anilor 1990, OMC a devenit principala țintă a protestelor anti-globalizare.

Multe organizații internaționale au avut un impact pozitiv asupra aprofundării procesului de integrare economică internațională, cum ar fi: *Organizația Națiunilor Unite pentru Dezvoltare Industrială (UNIDO); Organizația Națiunilor Unite pentru Alimentație și Agricultură (FAO); Programul Națiunilor Unite pentru Dezvoltare (PNUD); Asociația Internațională pentru Dezvoltare (IDA); Agenția Statelor Unite pentru Dezvoltare Internațională (USAID); Organizația Internațională a Turismului (OIT), Organizația pentru Cooperare și Dezvoltare Economică (OCDE), Banca Europeană pentru Reconstrucție și Dezvoltare (BERD), Banca Europeană de Investiții (BEI) și multe alte organizații internaționale și regionale în anumite domenii.*

Rolul corporațiilor transnaționale (TNC) în procesul de integrare [11, p. 75-78]. Astăzi, companiile transnaționale ocupă o poziție de lider în economia mondială, având o putere mai mare chiar și decât unele țări dezvoltate. 247 Wall St., LLC este clasată anual printre cele mai profitabile companii din lume. În 2015, acest titlu a fost preluat de Apple Inc., care a obținut un profit de 39,5 miliarde. **$,** cu o cifră de afaceri de 182,8 miliarde.**$**., depășind astfel Exxon Mobil, care a avut un profit de 33,6 miliarde de dolari. **$** (cifră de afaceri 369,4 miliarde.**$**). Pe poziția a treia Co.Ltd Samsung Electronics, cu un profit de 21,4 miliarde. **$**. Urmează Berkshire Hathaway Inc. (20,2 miliarde de dolari). **$**). Chevron Corporation (19,3 miliarde). **$**), Toyota Motor Corporation (19,2 miliarde. **$**), PetroChina Co. Ltd (19,2 miliarde. **$**), China Mobile Limited (17,6 miliarde). **$**), Wal-Mart Stores Inc. (16,8 miliarde). **$**), Jonson & Jonson (16,3 miliarde de dolari). **$**) [6, p. 33-34]. Dintre cele mai mari 500 de companii transnaționale în ceea ce privește veniturile, 161 au sediul în UE.

Uniunea Europeană ca formă avansată de integrare economică [11, p. 82-153]. UE este o uniune politică și economică formată din 27 de state membre, situată în principal în Europa. Are o suprafață de 4 233 262 km2 și o populație estimată la aproximativ 447 de milioane de persoane. UE a dezvoltat o piață internă unică printr-un sistem standardizat de legi care se aplică în toate statele membre. Adoptarea legislației în domeniul justiției și afacerilor interne, precum și menținerea unei politici comune în domeniul comerțului, agriculturii, pescuitului și dezvoltării regionale. Controlul pașapoartelor a fost eliminat pentru călătoriile în spațiul Schengen. Uniunea monetară a fost creată în 1999, a intrat în vigoare în 2002 și este formată din 19 state membre ale UE care utilizează moneda euro.

Membrii inițiali ai *Comunității Europene* au fost: *Belgia, Franța, Italia, Luxemburg, Țările de Jos și Germania de Vest*. În anii următori, Comunitatea a fost extinsă prin aderarea unor noi state membre, în mai multe etape: în 1973 i s-au alăturat: *Danemarca, Irlanda și Regatul Unit*; în 1981 – *Grecia*; în 1986 – *Portugalia și Spania*; în 1995 – *Austria, Suedia și Finlanda*; în 2004 s-au alăturat 10 țări: *Ungaria, Polonia, Republica Cehă, Slovacia, Slovenia, Estonia, Letonia, Lituania, Cipru, Malta*; în 2007 – *România și Bulgaria* și în 2013 – *Croația*. În ianuarie 2020, *Regatul Unit* a părăsit Uniunea în urma unui referendum din iunie 2016. În prezent, **UE** include 27 de țări.

Multe țări și-au exprimat dorința de a adera la UE (*Turcia, Macedonia, Serbia, Albania, Bosnia și Herțegovina*). La 15 decembrie 2023, UE a decis să înceapă negocierile de aderare între *Ucraina și Moldova*, iar *Georgia* a primit statutul de țară candidată la aderarea la UE. Astfel, procesul de extindere a UE se dezvoltă. Există patru țări care sunt membre ale Asociației Europene a Liberului Schimb (AELS), dar nu sunt membre ale UE, însă sunt parțial angajate în politica și reglementarea economică a UE: *Islanda, Liechtenstein, Norvegia și Elveția*. UE menține, de asemenea, relații cu microstatele europene *Andorra, Monaco, San Marino și Vatican,* care utilizează o monedă unică și cooperează în anumite domenii.

Criterii de aderare. În UE au fost stabilite următoarele **criterii de convergență** pentru țările care utilizează ***moneda unică, euro***, și pentru țările candidate la implementarea acesteia: *rata inflației nu trebuie să depășească 1,5% din media înregistrată în primele 3 țări cu cei mai buni indicatori; rata dobânzii pe termen lung nu trebuie să depășească cu mai mult de 2% nivelul primelor trei cu cea mai scăzută inflație; deficitul bugetar nu ar trebui să depășească 3 % din PIB; datoria externă nu ar trebui să depășească 60 % din PIB*. Pentru țările care aderă la UE (cum ar fi Ucraina, Republica Moldova etc.), sunt stabilite ***următoarele condiții***: *stabilitatea instituțiilor democratice și a statului de drept, respectarea drepturilor omului, inclusiv a drepturilor minorităților etnice; existența și funcționarea unei economii de piață; capacitatea de a face față presiunilor concurențiale și forțelor pieței în cadrul Uniunii; capacitatea de a-și asuma obligațiile impuse membrului UE; inclusiv angajamentul față de obiectivele uniunii politice, economice, monetare și juridice.* Aceste condiții sunt susținute de criterii de convergență, atunci când se evaluează un studiu înregistrat de o anumită țară pentru aderarea la UE.

Avantajele integrării sunt: libera circulație a persoanelor (lucrătorilor) care au posibilitatea de a lucra în orice stat membru al UE; libera circulație a mărfurilor - exportul de mărfuri în țările UE fără taxe vamale; libera circulație a capitalurilor și serviciilor; posibilitatea cetățenilor de a realiza proiecte de finanțare pentru a primi sume semnificative de la UE, în vederea susținerii afacerilor; beneficiile apartenenței la o familie numeroasă a țării și siguranța pe care o oferă această apartenență; oportunitatea de a participa la cea mai mare piață unică din lume, cu toate oportunitățile asociate cu creșterea economică și crearea de locuri de muncă; consolidarea ireversibilă a reformelor economice și politice întreprinse începând cu 1989; facilitarea accesului la fondurile structurale pentru dezvoltarea regiunilor mai puțin prospere ale Uniunii.

Simplul fapt că din 1957 până în prezent, doar o țară din 28 care s-a alăturat acestui proiect a cerut să părăsească Uniunea, în ciuda restricțiilor impuse de normele și standardele Comunității, este de mare importanță, ceea ce dovedește longevitatea acestui concept. Dacă analizăm doar situația din Irlanda, Grecia, Spania și Portugalia, unde la momentul aderării PIB-ul mediu pe cap de locuitor era de aproximativ 50%, din media la nivelul UE, atunci se poate vedea cu ușurință saltul economic uriaș pe care l-au făcut aceste țări de la aderarea la Uniune. La momentul aderării României

și Bulgariei, PIB-ul acestor țări era de 38% și, respectiv, 35% din PIB-ul mediu la nivelul UE. Această perspectivă este încurajatoare pentru țările din Europa Centrală și de Est, care au aderat sau sunt pe cale să adere la UE. Dar apartenența la UE nu înseamnă automat integrarea în Uniune. Integrarea este un proces mult mai complex și consumator de timp [3, p. 26].

Dezavantajele integrării. Mulți cred că aderarea la UE va duce la pierderea suveranității și a identității naționale sau se tem că țara va deveni mai vulnerabilă la concurența pe piața unică europeană. În general, dezavantajele integrării sunt legate de costurile care vor fi suportate atât de stat, cât și de cetățeni. Acestea sunt atât cheltuieli publice, care vor fi acoperite de la bugetul de stat, cât și cheltuieli private, care vor fi suportate de agenții economici, și cheltuieli individuale, care vor fi plătite pentru diverse reforme. Că migrația va lua o amploare și că va fi mai dificil să se deplaseze în țările CSI.

De exemplu, și în România, mulți s-au temut că în primii cinci ani de la aderare țara va trebui să cheltuiască mai mult de 25 de miliarde de euro pentru a atinge standardele UE. Da, fiecare stat membru al Uniunii participă la formarea bugetului și a fondurilor europene corespunzătoare (în proporții diferite, care sunt – 10, 15 sau 20%, iar unele țări – 1, 2, 3% sau chiar mai puțin de 0,5%, dar, în același timp, primesc sume financiare mult mai mari din fonduri europene pentru implementarea programelor de dezvoltare economică. În Ungaria, de exemplu, aproape toate proiectele publice de construcții sunt finanțate din fonduri UE. În Grecia este la fel. Sau un alt exemplu: România a contribuit cu circa 39,3 miliarde de lei la bugetul UE în trei ani (2022, 2023, 2024). Totodată, în cei 15 ani de la aderare, țara a primit resurse financiare în valoare de circa **70 de miliarde de euro (***euro, nu lei***)** din fonduri UE pentru implementarea diferitelor proiecte [11, p. 86]. Așa că, theoretic sunt multe dezavantaje explicate de oamenii de știință și de cei care lucrează în acest domeniu – unele dintre ele au fost deja menționate mai sus, dar în practică aderarea la UE nu a afectat țara.

Trebuie remarcat faptul că în procesul promovării politicilor economice în UE, este asigurată respectarea principiilor democratice în activitățile instituțiilor europene. **UE** a dovedit și dovedește că este cea mai viabilă organizație de integrare, cea mai avansată formă a acesteia. În activitatea sa, UE se bazează pe instituții speciale: *Consiliul Uniunii Europene, Parlamentul European (**720** de deputați,* aleși în 2024), *Consiliul European de Miniștri, Comisia Europeană, Curtea de Justiție a Comunităților Europene (CEJ), Curtea de Conturi, Banca Centrală Europeană* etc. Există, de asemenea, o serie de organisme subsidiare ale UE ce activează în anumite domenii. Fiecare instituție își desfășoară activitățile pe baza tratatelor adoptate de țările member.

Rolul unor instituții din UE de natură economică și financiară. Bugetul UE. În mod tradițional, veniturile bugetare includ: o parte din taxele la importul de bunuri în UE (până la 25%); venituri din TVA (dar nu mai mult de 50% din VNB-ul țării membre); veniturile din impozitul pe salarii pentru angajații care lucrează în

diverse organizații ale UE etc. Fiecare stat membru participă la formarea bugetului UE cu o cotă de circa 1,3% din venitul național brut (calculat la prețurile din 2018), iar ponderea fiecărei țări în veniturile totale ale bugetului UE este diferită. Însă, în majoritatea țărilor membre noi a UE, mai sărace, sumele financiare primite din fondurile europene pentru realizarea anumitor proiecte cu mult depășesc sumele cu care fiecare țară a contribuit la formarea bugetului.

E de menționat că din totalul cheltuielilor prevăzute în bugetul UE pentru perioada 2014-2020 în sumă de **1082** miliarde de euro, **32,5%** au fost prevăzute pentru finanțarea politicii de coeziune (**351,8** miliarde de euro) și **67,5 %** pentru finanțarea altor politici: agricultură, cercetare, politică externă etc. (**730,2** miliarde euro). Bugetul pe termen lung al UE pentru **perioada 2021-2027**, împreună cu Instrumentul de redresare de generație următoare (NGEU), sprijină redresarea în urma pandemiei de COVID-19 și prioritățile pe termen lung ale UE în diverse domenii, prevede o finanțare de **2,02 mii de miliarde euro** (la prețuri curente) [21]. Mai mult de jumătate din finanțarea UE este furnizată prin intermediul a 5 fonduri structurale și de investiții europene: *Fondul european de dezvoltare regională (FEDR); Fondul social european (FSE); Fondul de coeziune (FC); Fondul european agricol pentru dezvoltare rurală (FEADR) și Fondul european pentru pescuit și afaceri maritime (FEPAM).* În timpul unei crize economice și financiare sau al unei pandemii, se creează fonduri speciale.

Politici comune în Uniunea Europeană: concluzii generale [11, p. 102-132]. Politica economică a UE se caracterizează printr-un proces mai bun de cooperare între statele membre în ceea ce privește procedurile de armonizare a intereselor, ajungerea la consens, dezvoltarea și aplicarea de noi forme de comportament economic etc. Ca formă avansată de înțelegere, UE demonstrează că armonizarea instituțională devine insuficient de eficientă, ceea ce dictează necesitatea transferului competențelor decizionale de la nivelul național la nivelul instituțiilor UE. La nivel comunitar, politicile comune au apărut, s-au dezvoltat și au devenit mai complexe ca răspuns la interdependența crescândă dintre economiile statelor membre din anumite motive: atenuarea externalităților negative care rezultă din libera funcționare a mecanismului pieței; stabilirea normelor de funcționare a pieței prin eliminarea obstacolelor de orice fel pentru libera circulație a factorilor; bunuri și servicii [3, p. 8-11; 4, p. 7-11].

Uniunea Europeană ocupă un loc esențial în dezvoltarea economiei mondiale și a relațiilor economice internaționale. Cu 7,3 % din populația lumii, UE este a treia cea mai mare economie din lume în termeni nominali și în ceea ce privește paritatea puterii de cumpărare (PPC). De exemplu, în 2024, PIB-ul nominal al UE este estimat la 19,34 mii de miliarde de dolari SUA [17]. În plus, toate cele 27 de țări ale UE au un indice de dezvoltare umană foarte ridicat conform Programului Națiunilor Unite pentru Dezvoltare. UE reprezintă peste 14 % din comerțul mondial cu bunuri și servicii. UE, China și Statele Unite sunt cei mai importanți trei actori mondiali în comerțul internațional. În 2012, UE a primit **Premiul Nobel pentru Pace**. Prin politica sa externă și de securitate, UE joacă un rol important în relațiile

internaționale și în apărare. Uniunea are misiuni diplomatice permanente în întreaga lume și este reprezentată în cadrul ONU, OMC, G7 și G20.

UE depune eforturi majore pentru a depăși crizele economice cauzate de pandemia *de COVID-19* și pentru a crea condiții favorabile dezvoltării unei economii mai competitive, cu un nivel mai ridicat de ocupare a forței de muncă. În acest scop, UE, împreună cu statele membre, a elaborat și pune în aplicare anumite strategii. De exemplu, în ultimii ani cu success s-a realizat **Strategia Europa 2020** cu obiectivele: *mai inteligent*, prin investiții mai eficiente în educație, cercetare și inovare; *dezvoltarea durabilă* – prin tranziția către o economie cu emisii scăzute de dioxid de carbon; și *incluziv* – prin concentrarea pe crearea de locuri de muncă și reducerea sărăciei [11, p. 132-135]. Un alt exemplu ar fi **Strategia o economie durabilă Europa 2030**, în care obiectivele de dezvoltare durabilă (ODD) ale ONU sunt un punct de referință, un document de politică care identifică elementele-cheie pentru tranziția către dezvoltarea durabilă [20]. Obiectivele strategiei au fost aprobate la cel mai înalt nivel politic al UE, oferind o bază pentru politicile și activitățile viitoare. Instituțiile UE și statele membre, inclusiv autoritățile regionale și locale, vor colabora mai strâns pentru a asigura o bună coordonare în realizarea obiectivelor care trebuie atinse până în 2030 [20].

Mai jos sunt prezentați câțiva indicatori ai dezvoltării economice și sociale în țările membre ale Uniunii Europene și rolul acestora în economia mondială [17].

PIB (nominal): 2024	▲ **$19,34** trilioane;
PIB (PPC): 2024	▲ **$26,64** trilioane;
PIB la un locuitor:	▲ **$43,300**(nominal); ▲ **$59,050 (PPC);**(2024);
Export	**8.705** trilioane de dolari (2021);
Import	**8.037** trilioane de dolari (2021);
Inflația (CPI)	**7.5%** (Martie 2022);
Salariul mediu brut	**€2,792** lunar (2021);
ISD stoc	**€5.2** trilioane (spre exterior, 2012);
Datoria externă brută	**$13.05** trilioane (31 Decembrie 2014);
Total investiții din exterior	▲ **−€2,557.4** miliarde; 17.5% din PIB (2015)
Ajutor economic (Donații)	**ODA, $87.64** miliarde.

Cooperarea Republicii Moldova cu instituțiile economice și financiare internaționale [vezi: 11, p. 154-184]. Realizând realitățile sistemului de relații economice internaționale, după proclamarea independenței, Republica Moldova și-a concentrat eforturile pe promovarea unei politici economice externe active. Din 1992, Republica Moldova a devenit membră a celor mai autoritare organisme financiare și economice internaționale. Acest lucru a marcat începutul afirmării de sine a țării pe arena internațională, i-a permis să obțină împrumuturi şi credite publice favorabile etc. Actorii din domeniul managementului monetar și financiar internațional *(FMI, BM, OMC, BERD, BEI* etc.) prezintă un interes deosebit pentru orice țară, deoarece aceștia sunt chemați să accelereze procesul de armonizare a cooperării economice internaționale și implementarea consensului la nivel regional,

putând contribui în timp util la diseminarea corectă a obiectivelor globale la scară macroeconomică. În acest context, Republica Moldova contribuie la cooperarea cu principalele organisme economice și financiare internaționale și regionale.

Relațiile Republicii Moldova cu FMI [11, p. 155-158]. Fondul Monetar Internațional este o organizație internațională al cărei scop este de a promova cooperarea monetară internațională, extinderea și creșterea echilibrată a comerțului internațional, precum și de a promova stabilitatea monedei. Republica Moldova a adoptat Actul Constitutiv al FMI prin hotărâre a Parlamentului, iar la 12 august 1992 a devenit membră ca agenție financiară la FMI și este autorizată să desfășoare toate operațiunile și tranzacțiile autorizate de FMI în conformitate cu statutul FMI. În prezent, cota Moldovei în FMI este de 172,5 milioane de drepturi speciale de tragere (DST). De la aderarea la FMI, țara a beneficiat de asistența financiară a acestei organizații pentru susținerea diferitelor programe și politici economice ale autorităților naționale, precum și de asistență tehnică într-o serie de sectoare, inclusiv politica monetară/organizarea băncii centrale, sistemul de raportare monetară, supravegherea bancară etc. Potrivit lui Mark Horton (director adjunct al Departamentului European al FMI), parteneriatul este bun, menționând că FMI are un program important cu Republica Moldova de sprijin financiar substanțial. Am avut astfel de programe în anii precedenți, dar acest Program este pe termen lung și va dura - din decembrie 2021 până în octombrie 2025.

Relațiile Republicii Moldova cu Banca Mondială (BM). În 2023, Republica Moldova a sărbătorit 30 de ani de parteneriat cu Grupul Băncii Mondiale. Această cooperare a început la doar un an de la declararea independenței țării și la câteva luni de la încheierea conflictului militar de pe Nistru. De atunci, Banca Mondială pledează pentru o mai bună guvernanță și transparență, susținând reforme importante, investind în drumuri, energie, agricultură, școli, unități de sănătate, contribuind astfel la îmbunătățirea nivelului de trai al cetățenilor. În total, peste 1,5 miliarde de dolari au fost alocați pentru peste 70 de operațiuni în Moldova. În opinia *Inguna Dobrazhi, director de țară al Grupului Băncii Mondiale în Moldova* [11, p. 158-162], de-a lungul anilor au fost implementate o serie de proiecte, asigurând progrese semnificative în multe domenii, dar viteza reformelor ar putea fi mai mare. **Programul actual al Băncii Mondiale pentru Moldova** include **12 proiecte** cu un angajament total de **650 milioane** USD. Domeniile de sprijin includ reforma reglementărilor și dezvoltarea afacerilor, modernizarea serviciilor publice, administrarea fiscală, înregistrarea cadastrală, educație, drumuri, sănătate, agricultură, apă, salubritate și energie. BM a aprobat recent noul Cadru de parteneriat cu țara noastră pentru perioada 2023-2027, susținând eforturile Guvernului de tranziție către un nou model economic bine aliniat cu *prioritățile Planului Național de Dezvoltare al Republicii – "Moldova Europeană 2030".*

Relațiile Republicii Moldova cu OMC [11, p.163-173]. Scopul aderării la Organizația Mondială a Comerțului a fost de a accelera procesul de integrare a țării în economia mondială, care să permită crearea unei societăți democratice cu o

economie de piață. **La 26 iulie 2001, după 7 ani de negocieri în cadrul GATT și OMC, țara a devenit membru cu drepturi depline al OMC.** De mai bine de 20 de ani, impactul aderării la OMC a fost extrem de important atât din punct de vedere economic, cât și social. Aderarea la OMC, împreună cu procesul de integrare europeană, a devenit un catalizator pentru transformarea economică și reformele din țară, crescând semnificativ comerțul cu mărfuri prin taxe reduse, bariere comerciale minime și reglementări previzibile parteneri și tipuri de produse. Aderarea la sistemul comercial internațional în cadrul OMC a contribuit la dezvoltarea socială a țării și sporirea exportului (vezi tabelul 3).

Tabelul 3. **Comerțul exterior al Republicii moldova în ultimii ani.**

Anul	**EXPORT (mil. $)**	**UE**	**CSI**	**Celelalte țări**	**IMPORT (mil. $)**	**UE**	**CSI**	**Celelalte țări**
2000	▲471.5	35,05%	**58,56 %**	6,39%	▲776.4	**53,22 %**	33,46%	13,32%
2010	▲1.541.5	**47,29 %**	40,48%	12,23%	▲3.855.3	**44,20 %**	32,60%	23,20%
2015	▼1.966.8	**61,90 %**	25,03%	13,07%	▲3.986.8	**49,01 %**	25,53%	25,46%
2020	▲2.467.1	**66,5%**	15,2%	18,3%	▲5.416.8	**45,3%**	24,1%	30,6%
2021	▲3.144.5	**61,0%**	14,8%	24,2%	▲7.176.8	**43,9%**	29,6%	26,5%
2022	▲4.332.1	**58,6%**	24,0 %	17,4%	▲9.219.0	**47,3%**	23,7%	29,0%
2023	▲4.048.6	**65,4%**	22,2%	12,4%	▲8.673.7	**48,3%**	18,6%	33,1%

Sursa: Elaborat de autor în baza datelor BNS din Republica Moldova [22].

Datele denotă că în ultimele decenii, orientarea geografică a comerțului exterior al țării s-a schimbat semnificativ, devenind predominant orientată spre UE. În același timp, există o situație alarmantă în acest domeniu, de mulți ani importurile depășesc semnificativ exporturile de bunuri și servicii.

Relațiile Republicii Moldova cu BERD [11, p.173-175]. Republica Moldova a devenit membră a BERD la 5 mai 1992. Capitalul subscris de țară este de 30,01 milioane EUR. În această perioadă, republica a primit și continuă să primească sprijin financiar din partea BERD. De la aderarea la Republica Moldova, au fost implementate 163 de proiecte, cu o investiție totală de peste 2 milioane de euro. BERD va oferi sprijin financiar pentru modernizarea infrastructurii feroviare, oferind un împrumut de 23 de milioane de euro în două tranșe pe parcursul a 15 ani.

Cooperarea dintre Republica Moldova și BEI. Banca Europeană de Investiții este interesată de dezvoltarea relațiilor de cooperare cu Guvernul Republicii Moldova [11, p. 176-179]. **În ultimii ani, Republica Moldova intenționează să se concentreze pe proiectele de dezvoltare a infrastructurii, iar în acest sens, rolul BEI este important în implementarea acestor obiective ale guvernării.** În

procesul de susținere a proiectelor investiționale, este important ca o parte semnificativă a împrumuturilor oferite de BEI să fie însoțite de granturi din partea UE. În prezent, *în Republica Moldova sunt implementate 10 proiecte BEI cu un buget de peste 423 de milioane de euro.* De exemplu, *BEI Global va investi 41,2 milioane de euro în reabilitarea infrastructurii feroviare a Moldovei.* De menționat că de la începerea activităților sale în Moldova în 2007, BEI a alocat **peste 1,19 miliarde de euro** pentru **33 de proiecte**, sprijinind obiectivele politicii UE în următoarele sectoare: transporturi, energie, întreprinderi mici și mijlocii, agricultură, infrastructură municipală [11, p. 176-179].

În Republica Moldova, o serie de proiecte sunt implementate cu suportul financiar al altor organizații economice și financiare internaționale și regionale, cum ar fi: Programul Națiunilor Unite pentru Dezvoltare (**PNUD),** cu care lucrează în aproape 179 de țări și teritorii; **Organizația Națiunilor Unite pentru Alimentație și Agricultură (FAO),** care în ultimii ani a oferit sprijin și asistență țării noastre prin **15 proiecte** în valoare **de circa 2 milioane de dolari și în alte 5 proiecte regionale**, țara noastră a fost și ea beneficiară; **USAID** (Agenția Statelor Unite pentru Dezvoltare Internațională), care contribuie la consolidarea Republicii Moldova ca țară europeană competitivă și democratică, contribuind la creșterea economică a țării.

R. Moldova în cooperarea regională și transfrontalieră [11, p.186-200]**.** În politica externă a țării, cooperarea regională este o dimensiune suplimentară a agendei de integrare europeană ca parte integrantă a diplomației economice. Republica Moldova, aflându-se la intersecția mai multor structuri regionale, a participat activ la o serie de organizații și inițiative internaționale în ultimii ani – Consiliul Europei, Comisia Economică pentru Europa a Națiunilor Unite, Parteneriatul Estic cu UE, Organizația de Cooperare Economică a Mării Negre, cooperarea regională cu țările din Europa de Sud-Est, cooperarea transfrontalieră etc. Regiunea Mării Negre este un subiect de interes prioritar, pe termen lung, în politica externă a țării. În *perioada 2007-2013*, în cadrul OCEMN au fost finanțate în total *40 de proiecte comune* cu parteneri din Republica Moldova. Un alt exemplu de cooperare regională este interacțiunea țărilor GUAM **(**Georgia, Ucraina, Azerbaidjan și Republica Moldova). Inițial, au existat cinci state (inclusiv Uzbekistan) cu numele GUUAM. Cu toate acestea, în realitate, activitatea acestei structuri regionale lasă de dorit. În același timp, trebuie remarcat faptul că încă de la început autoritățile și experții ruși au avut o atitudine negativă față de GUAM, văzând în el o amenințare la adresa intereselor lor, dorind foarte mult să mențină controlul politic în regiune prin metode foarte specifice. *structuri de cooperare transfrontalieră în cadrul Euroregiunilor cu* România și Ucraina.

R. Moldova – candidat la aderarea la UE; procedura de aderare la UE a început. Odată cu implementarea Acordului de Asociere, liberalizarea regimului de vize și integrarea treptată în piața internă a UE, Republica Moldova se integrează efectiv în spațiul politic și economic european. La 28 noiembrie 1994 a fost semnat Acordul de Parteneriat și Cooperare (APC). Următorul pas a fost adoptarea Planului

de acțiuni elaborat în cadrul Politicii Europene de Vecinătate, adoptat în februarie 2005. înlocuită cu Agenda de asociere convenită pe baza Acordului de asociere dintre R.Moldova și UE. Este demn de remarcat faptul că, din cauza instabilității politice din republică, în anumite etape aceste relații de cooperare nu au fost menținute la nivelul adecvat. Odată cu alegerea doamnei ***Maia Sandu*** în funcția de președinte al țării în 2022, totul s-a schimbat radical. În prezent, UE și Moldova dezvoltă relații mai strânse. În ultimii ani, au avut loc o serie de evenimente importante în sprijinul parcursului european. La 21 mai 2023, la Chișinău a avut loc Marea Adunare Națională, cu participarea a zeci de mii de persoane, la care a fost adoptată rezoluția, privind integrarea europeană a Republicii Moldova – "**Moldova europeană**". La 1 iunie 2023 în R.Moldova a avut loc **Summitul Comunității Politice Europene,** la care au participat circa **50 de lideri din Europa,** unde au fost discutate teme de securitate a țărilor europene, cooperare și probleme energetice. Acest summit a avut un impact pozitiv în contextul aderării Republicii Moldova la UE. În perioada 2023-2024, mulși președinți și șefi de guverne, șefi a factorilor de decizie și alți oficiali de rang înalt ai UE au vizitat oficial Republica Moldova, susținând parcurul European al țării noastre.

În 2014, Republica Moldova, împreună cu toate statele membre UE, a semnat Acordul de Asociere, la 23 iunie 2022, Consiliul European a acordat țării statutul de țară candidată, iar la 15 decembrie 2023, UE a decis să demareze negocierile de aderare cu Republica Moldova și Ucraina. La 21 iunie 2024, Președintele Republicii Moldova a semnat un decret privind demararea negocierilor de aderare la UE. Parlamentul R.Moldova a decis organizarea în octombrie 2024 a unui referendum pentru a stabili în mod obiectiv dorințele cetățenilor cu privire la procesul de integrare a țării în Uniunea Europeană.

Concluzii. Integrarea economică internațională este o formă specială în relațiile economice internaționale. Procesul de integrare economică internațională poate fi considerat ca o metodă calitativ superioară de cooperare economică între țări, care se desfășoară sub diferite forme pe baza anumitor acorduri. De obicei, acest lucru necesită o perioadă de tranziție pentru a face ajustările necesare între țările partenere. În prezent, există peste 20 de asociații economice de integrare internațională în lume, care includ principalele regiuni și continente ale globului (NAFTA, CELAC, MERCOSUR, APEC, G7, G20, UE, BRICS, SCO, CIS, UVEA, GUAM etc.) etichetă. *UE se consideră cea mai avansată formă de integrare, fiind* o uniune politică și economică a 27 de state membre. Un rol special în dezvoltarea procesului de integrare economică internațională îl joacă organismele economice și financiare ale Națiunilor Unite (FMI, IBRD, OMC etc.), companiile transnaționale și diverse alte organizații internaționale și regionale.

În iunie 2024 Republicii Moldova official a început demararea negocierilor de aderare la UE. Sarcina principală este de a desfășura cu succes aceste negocieri, asigurând implementarea sarcinilor stabilite pentru a promova reformele necesare în țara noastră. Este necesar să se consolideze societatea țării pentru a-și asigura cu succes calea spre aderarea la UE. Fiecare cetățean trebuie să fie conștient de

necesitatea de a participa la referendumul din octombrie curent, astfel încât majoritatea dintre noi să își poată exprima sprijinul consolidat pentru aderarea Republicii Moldova la UE. Aprofundarea integrării țării în structurile economice internaționale și regionale și, în primul rând, integrarea sa în UE vizează dezvoltarea economică și îmbunătățirea nivelului de trai al populației.

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ROLUL BĂNCILOR ÎN FINANȚAREA ECONOMIEI CIRCULARE

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Abstract. *The circular economy represents an organizational model of production and consumption that involves sharing, renting, reusing, repairing, reconditioning, and recycling existing materials and products as far as possible, thus extending the life cycle of products. The purpose of the research was to highlight the particularities of the activity of commercial banks to support the circular economy. In order to complete this work, official statistical data, policy documents from different countries, as well as the views of experts in the addressed field, were examined. The study of these sources allowed the formation of a complex image of the opportunities for the development of banking services intended for the circular economy. Today, banks are interested in financing the circular economy because they want to present themselves as socially responsible financial institutions to gain the trust of community members and authorities. Circular economy financing also helps banks avoid financing companies' activities that harm the environment and society. Also, the financing of the circular economy is part of the activity of green banks, which are institutions based on the promotion of innovative financing to accelerate the transition to clean energy and fight against climate change. Supporting the circular economy is also interesting for institutions, which promote themselves as sustainable banks and deal with the strategic planning and execution of banking operations and business activities, taking into account environmental, social, and governance impacts.*
Key-words: *circular economy, green bank, sustainable banking*
JEL: *G21, G28, O44, Q01, Q56*
UDC: *336.717.061*

Introducere. Economia circulară are drept scop minimizarea deșeurilor și promovarea utilizării durabile a resurselor naturale. Ea aplică proiectarea mai inteligentă a produselor, utilizarea mai îndelungată, reciclarea și multe altele, precum și regenerarea naturii. (UNDP, 2023). Potențialul economic global al tranziției la economia circulară este exprimat prin atingerea unui volum de producție economică anuală de 4,5 trilioane USD până în 2030. (World Economic Forum, 2024). Pentru a

valorifica această oportunitate, este esențial ca instituțiile bancare să-și dezvolte expertiza și să creeze produse și servicii adaptate cerințelor economiei circulare. Domeniile considerate prioritare pentru finanțarea circularității includ următoarele ramuri: construcțiile, industria chimică, electronica, alimentația și agricultura, producția, îmbrăcămintea și moda, mineritul și energia, precum și inovațiile în tehnologiile digitale. Implementarea economiei circulare necesită inovare, schimbare structurală a sistemelor de producție și consum și schimbarea tehnologică corespunzătoare. Pentru aceasta sunt necesare resurse financiare substanțiale pentru a susține o creștere economică mai rezilientă, care sporește eficiența economică la nivelul întregului sistem și utilizarea optimă a capitalului financiar.

Scopul prezentului articol constituie prezentarea modalităților de contribuție a băncilor la dezvoltarea economiei circulare prin oferirea finanțării aferente.

Revizuirea literaturii. Literatura la tema abordată este relativ modestă ca volum și surse bibliografice. În acest context pot fi menționate următoarele.
În primul rând, este vorba de rapoartele CGRi (2023), Ellen MacArthur Foundation (2020), MarkNtel Advisors (2023), UNDP (2023) și UNEPFI (2020), precum și articolele companiilor NRDC, PricewaterhouseCoopers, World Economic Forum (2024). Autorii Peterson K. Ozili și Francis Opene (2021) au cercetat rolul băncilor în economia circulară. Experții Luchian Ivan și Filip Angela (2022) au examinat oportunitățile financiare ale economiei circulare.

Metodologia cercetării. Baza informațională a cercetării a fost formată în urma examinării rapoartelor unor instituții internaționale și a unor companii specializate, precum și articolele experților în domeniul abordat. Informația acumulată a fost supusă analizei și sintezei pentru crearea uni tablou complex al contribuției băncilor comerciale la constituire economiei circulare.

Rezultatele principale. Experții Programului Națiunilor Unite pentru Dezvoltare estimează că, la nivel global, doar 7,2% din materialele utilizate sunt refolosite, ceea ce generează o povară semnificativă asupra mediului, contribuie la crizele climatice și afectează biodiversitatea și poluarea (UNDP, 2023). Experții de la CGRi au publicat următoarele date: „Extracția de materiale în creștere a redus circularitatea globală: de la 9,1% în 2018, la 8,6% în 2020 și acum 7,2% în 2023. Acest lucru lasă un imens decalaj de circularitate: globul se bazează aproape exclusiv pe materiale noi (virgine)” (CGRi, 2023). Iar specialiștii de la MarkNtel Advisors (2023) afirmă: „Extracția de materiale în creștere a redus circularitatea globală: de la 9,1% în 2018, la 8,6% în 2020 și acum 7,2% în 2023. Acest lucru lasă un imens decalaj de circularitate: globul se bazează aproape exclusiv pe materiale noi (virgine)”. În opinia lor, creșterea pieței respective va fi alimentată în mare parte de creșterea îngrijorărilor legate de degradarea mediului și de generarea importantă de deșeuri în diferite categorii de produse, în mare măsură atribuite creșterii exponențiale a populației globale. Un factor important va deveni inovația, deoarece întreprinderile moderne dezvoltă tehnologii, materiale și modele de afaceri pentru a

facilita tranziția la circularitate. Rolul băncilor în economia circulară poate fi abordat prin prisma următoarelor concepte:

- *Conceptul finanțării circulare sau finanțării economiei circulare* se referă la orice formă de deservire financiară sau instrument financiar, care integrează factorii economiei circulare în deciziile de afaceri sau de investiții pentru a a contribui la tranziția către o economie circulară ca piatră de temelie a dezvoltării durabile. (PwC)
- *Conceptul băncii sustenabile* se referă la o strategie, care urmărește profitul nu în detrimentul durabilității mediului, al responsabilității sociale sau al guvernanței corporative de încredere. Acești trei factori sunt cunoscuți ca ESG (Environmental, Social, and Governance). Pentru activitatea bancară, aceasta poate include inițiative specifice de la programe de creditare specializate până la produse centrate pe client, care sunt legate de acțiunile climatice prin promovarea transparenței și a consumului conștient. (Honzik Max, 2023)
- *Conceptul băncii social responsabile* este legat de luarea în considerare de către bănci a impactului social și de mediu atunci când se iau decizii de creditare și investiții. Aceste bănci caută să genereze profit din operațiunile lor, punând întotdeauna accent pe practicile etice. (Sharda, 2022)
- *Conceptul băncii verzi*. O bancă verde este o instituție financiară specializată destinată să faciliteze investițiile în proiecte cu emisii scăzute de carbon și rezistente la climă, care accelerează tranziția climatică. Băncile din această categorie pot fi entități publice, quasi-publice sau non-profit, care sunt înființate pentru a depăși barierele investiționale și pentru a spori impactul resurselor publice disponibile prin mobilizarea mijloacelor financiare private. (NRDC)
- Potrivit autorilor Ivan Luchian și Angela Filip (2022), în prezent băncile din multe țări sunt supuse unor presiuni pentru a asigura o finanțare suficientă afacerilor circulare existente. În special, este vorba de finanțarea întreprinderilor, care doresc să desfășoare tranziția de la un model de economie liniară la un model de economie circulară.

În opinia autorului Peterson K. Ozili (2021) interesul băncilor față de susținerea economiei circulare este determinată de patru argumente de bază:

1. *Existența oportunităților importante de diversificare a activității*. Întreprinderile circulare sunt în general considerate a fi afaceri cu risc scăzut. Finanțarea afacerilor circulare oferă băncilor o oportunitate alternativă de diversificare. Băncile pot adăuga afaceri circulare la portofoliul lor de credite existent pentru a-și reduce profilul general de risc;
2. *Promovarea activității acestor instituții financiare drept responsabilă și durabilă*. În această postură instituțiile bancare se implică în proiecte durabile. Conceptul de bancă sustenabilă este o abordare a activității bancare, care se conduce de criteriile de mediu, sociale și de guvernanță. De asemenea, finanțarea economiei circulare de către instituția bancară o înscrie în modelul de bancă sustenabilă prin aderarea la principiile unei activități bancare responsabile. Astfel băncile se angajează în activități de finanțare, care promovează un mediu durabil și o societate mai bună pentru generațiile actuale și viitoare;

3. *Mărirea activității de creditare din contul deservirii clienților circulari și sectorului de reciclare, ceea ce înseamnă un spor suplimentar de profit*. Băncile identifică clienții corporativi care au nevoie de o schimbare în structura lor de finanțare în tranziția către o economie circulară. Băncile trebuie să colaboreze cu astfel de clienți pentru a le acorda împrumuturi suplimentare. De asemenea, odată ce tot mai multe companii recurg la tranziția către economia circulară, băncile pot câștiga noi clienți circulari și pot câștiga o cotă mare de piață a clienților în economia circulară, iar acest lucru va însemna mai mult profit pentru băncile respective;
4. *Îmbunătățirea imaginii băncilor în fața societății*. Băncile sunt interesate să finanțeze economia circulară, deoarece doresc să schimbe percepția despre ele ca entități pur orientate spre profit. Prin finanțarea economiei circulare băncile speră să câștige încrederea membrilor comunității și a autorităților locale. Finanțarea economiei circulare de către bănci le ajută să-și formeze imaginea drept instituții contribuitoare la păstrarea mediului ambiant.

Experții Peterson K. Ozili și Francis Opene (2021) au prezentat rolul băncilor în economia circulară prin prima următoarelor aspecte:

- *Băncile trebuie să contribuie la o înțelegere comună a economiei circulare,* ceea ce poate ajuta băncile să identifice, să selecteze și să finanțeze proiecte bazate pe modele de afaceri circulare. Această activitate poate încuraja și alte instituții financiare să participe la finanțarea economiei circulare;
- *Băncile trebuie să elaboreze orientări privind finanțarea economiei circulare*. În acest scop băncile pot colabora cu alți parteneri pentru a dezvolta un complex de linii directoare privind finanțarea economiei circulare.
- *Adaptarea modelelor financiare existente sau elaborarea modelelor financiare noi pentru o economie circulară*. Modelele de finanțare ale băncilor trebuie să se adapteze la schimbările impuse de finanțarea economiei circulare. Băncile ar trebui să-și perfecționeze modelele financiare existente sau să dezvolte noi modele de stabilire a prețurilor, care să includă costuri și beneficii de mediu și sociale.
- *Oferirea liniilor de credit pentru afacerile circulare*. Băncile pot oferi credite pe termen mediu și lung pentru proiecte de economie circulară. De asemenea, băncile comerciale mari și băncile internaționale, precum Banca Mondială și Banca Europeană de Investiții, pot oferi finanțare prin linii de credit băncilor locale și altor intermediari, pentru a le permite să acorde credite întreprinderilor mici și mijlocii circulare, startup-urilor și tinerilor antreprenori.
- *Crearea băncilor verzi*. Aceasta poate contribui la creșterea rentabilității investițiilor ecologice și reducerea riscului investițional, precum și costului capitalului privat pentru proiectele ecologice prin valorificarea economiilor de scară și a serviciilor și operațiunilor specializate ale băncilor verzi.
- *Antrenarea personalului bancar*. Băncile trebuie să instruiască personalul său, inclusiv managerii de risc și personalul de conformare. Managerii de risc trebuie să fie instruiți pentru a înțelege sursele riscului circular, efectul și interconexiunile dintre riscul circular și alte elemente tradiționale de risc.

Personalul de conformare al băncii trebuie să cunoască toate reglementările, legile și politicile economiei circulare și să se asigure respectarea lor.

- *Promovarea culturii de reducere a deșeurilor și a reutilizării materialelor la toate nivelurile băncii*. Managementul de vârf al băncilor trebuie să asigure ca personalul băncilor de la toate nivelurile să înțeleagă valoarea deșeurilor. Personalul băncii trebuie să depună eforturile necesare pentru a reduce risipa ca cultură a muncii.
- *Asigurarea competenței membrilor comitetului de risc al băncii (CRB) sunt competenți în gestionarea și controlul riscurilor circulare*. CRB trebuie să elaboreze politici și proceduri adecvate referitoare la guvernanța, practicile și controlul de gestionare a riscurilor în economia circulară pentru bancă în ansamblu. CRB trebuie să asigure existența proceselor și sistemelor pentru identificarea și raportarea riscurilor din economia circulară. CRB trebuie să asigure, de asemenea, ca managementul, autoritatea și independența angajaților să-și îndeplinească responsabilitățile de gestionare a riscurilor în economia circulară. CRB trebuie, de asemenea, să asigure ca managerii de risc să integreze riscurile asociate cu economia circulară în obiectivele lor de management și control al riscurilor.

Rezultatele unor cercetări efectuate de Ellen MacArthur Foundation (2020) au demonstrat că unele bănci de tip diferit au susținut afacerile circulare. În acest context, pot fi menționate anumite activități ale *băncilor investiționale* (Ellen MacArthur Foundation, 2020):

- *Susținerea ofertelor publice inițiale (OPI) ale companiilor care contribuie la economia circulară*. Spre exemplu, Bank of America, Credit Suisse și UBS au participat la desfășurarea OPI a The RealReal, vânzătorului online de bunuri de lux în consignație.
- *Structurarea și subscrierea instrumentelor cu venit fix, care sprijină companiile și guvernele în diferite etape ale tranziției lor*:

- Banca IMI și Crédit Agricole CIB au fost consultanți în structurarea ecologică și împreună cu ING și Société Générale, au avut calitatea de contabili pentru obligațiunile de sustenabilitate de 750 milioane EUR (885 milioane USD) ale Intesa Sanpaolo destinate refinanțării împrumuturilor în cadrul facilității de credit pentru economia circulară;
- Bank of America, Barclays, Citi și HSBC au activat în calitate de contabili obligațiunile de tranziție ecologice de 500 de milioane USD ale BERD;
- HSBC a fost consilierul principal în structurare pentru obligațiunile Henkel de 70 de milioane USD pentru reducerea deșeurilor de plastic;
- Morgan Stanley, Goldman Sachs și Mizuho Financial Group au subscris contractul de obligațiuni de 1 miliard USD al PepsiCo. Morgan Stanley a fost consilierul și asiguratorul principal.

➢ *Efectuarea expertizei interne și crearea echipelor de lucru cu clienții înțelegători ai oportunităților economiei circulare și modului în care aceasta poate fi implementată în diferite sectoare:*

- Barclays a creat o echipă de activitate bancară sustenabilă cu economia circulară în calitate de unul dintre cei patru piloni cheie;
- ING a dezvoltat expertiză internă în domeniul economiei circulare în cadrul activității lor comerciale.

➢ *Desfășurarea cercetărilor și publicarea rezultatelor despre economia circulară ca o oportunitate de investiție:*

- Bank of America, Barclays, Citi, Credit Suisse, HSBC și Morgan Stanley au publicat rezultatele cercetărilor și analizelor legate de economia circulară;
- Din 2015, BEI și ING au publicat mai multe rapoarte și articole privind finanțarea economiei circulare.

Băncile comerciale întreprind acțiuni pentru a profita de oportunitățile economiei circulare prin următoarele modalități (Ellen MacArthur Foundation, 2020):

➢ *Examinarea posibilităților de finanțare a proiectelor circulare:*

- ABN Amro și-a stabilit obiectivul de a finanța activele comerciale circulare în sumă minimă de 1 miliard EUR și de a finanța cel puțin 100 de propuneri de afaceri până la sfârșitul anului 2020;
- ING și-a asumat un angajat de 100 de milioane EUR pentru afacerile, care au un impact pozitiv asupra mediului, inclusiv legate de economia circulară;

➢ *Adaptarea soluțiilor de finanțare și prestarea serviciilor de consultanță pentru a asistarea corporațiilor în tranziția lor prin creditare și colaborarea cu centrele de cunoaștere a economiei circulare sau rețelele bancare cu efect de pârghie:*

- ING a colaborat cu Philips pentru a organiza o facilitate de credit revolving de 1 miliard EUR cu o rată a dobânzii legată de performanța companiei în materie de sustenabilitate, așa cum a fost evaluată de Sustainalytics;
- Șaisprezece bănci, inclusiv ABN Amro, Bank of America Merrill Lynch, BNP Paribas, Citi, Deutsche Bank, Goldman Sachs, HSBC, ICBC, JP Morgan, Mizuho Bank, Morgan Stanley, MUFG, Rabobank și Société Générale ING, a contribuit la crearea Circular Supply Chain Accelerator ca parte a Platforma Forumului Economic Mondial pentru Accelerarea Economiei Circulare în scopul sprijinirii dezvoltării și finanțării soluțiilor circulare de către marii producători;
- Intesa Sanpaolo a lansat o facilitate de credit de 5 miliarde EUR pentru companiile care adoptă modele circulare de afaceri.

➢ *Dezvoltarea expertizei și a soluțiilor noi de finanțare pentru a face modele circulare inovatoare de afaceri apte de primirea finanțării:*

- BNP Paribas Leasing Solutions a lansat Kintessia, prima platformă, care permite profesioniștilor să închirieze și să vândă echipamente pentru agricultură, transport, construcții și lucrări publice și au colaborat cu 3 Step IT;
- China Development Bank Leasing și China Construction Bank Financial Leasing a dat în chirie autobuze electronice companiilor, care operează autobuze din Shenzhen;
- Grupul DLL, cu sprijinul BEI, a oferit programe de finanțare pentru a doua viață și servicii de leasing pentru active recondiționate sau refabricate;

➢ *Integrarea conceptului de economie circulară în evaluările riscului (de credit) și în criteriile de creditare*:

- Reglementarea facilității de credit pentru economie circulară de către Intesa Sanpaolo prin proceduri obișnuite de creditare și respectarea unui set de criterii de eligibilitate bazate pe circularitate;

➢ *Implicarea clienții corporativi și instituționali în economia circulară ca factor important al transformării industriei lor:*

- BNP Paribas Leasing Solutions angajează companii și instituții pe trecerea de la o economie de „proprietate" la o economie de „acces" și impactul acesteia asupra finanţare.

➢ *Stimularea activă a inovației pentru economia circulară:*

- Barclays în parteneriat cu Unreasonable Group a co-fondat Unreasonable Impact un program care sprijină întreprinderile aflate în stadiul de creștere și care intenționează să dezvoltate afaceri circulare;
- ING a devenit partenerul principal al programului Investment Ready al Impact Hub de cinci luni de învățare pentru start-up-uri circulare;
- Intesa Sanpaolo a lansat Programul Startup Initiative destinat să dezvolte start-up-urile în economia circulară la stadiu incipient cu potențialii investitori.

Băncile prestatoare de servicii pe piața retail și private banking dezvoltă și promovează finanțarea economiei circulare și produse și servicii de investiții adaptate clienților. De exemplu, UBS, Morgan Stanley, Credit Suisse, JP Morgan, BNP Paribas, HSBC oferă oportunități de investiții legate de tematica economiei circulare. (Ellen MacArthur Foundation, 2020)

Experții de la UNEP Finance Initiative au elaborat recomandări pentru bănci pentru a accelera finanțării circularității (UNEPFI, 2020):

1. Gestionarea riscurilor și oportunităților circulare prin aplicarea principiilor conceptului de circularitate (9-R): Refuzați, Reutilizați, Reduceți, Reproiectați, Reutilizați, Remanufacturați, Reparați, Renovați, Reciclați;
2. Integrarea circularității în strategiile de mediu, sociale și de guvernanță;
3. Stabilirea reperelor privind eficiența folosirii resurselor;
4. Reorientarea împrumuturilor și investițiilor către tehnologiile și modelele de afaceri durabile;
5. Dezvoltarea cunoștințelor și competențelor pentru identificarea celor mai bune practici pentru modelele de afaceri ale economiei circulare;
6. Sporirea gradului de cunoaștere cu privire la eficiența resurselor, piața economiei circulare, fluxurile de materiale și cererea în schimbare a consumatorilor și în rândul clienților, precum și entităților care sunt finanțate;
7. Examinarea modificările legilor de mediu și politicilor fiscale legate de consumul de resurse și deșeurile pot afecta licența de funcționare și competitivitatea companiilor;
8. Crearea și monitorizarea oportunităților de angajare financiară în scopul creșterii economiei circulare;
9. Evaluarea contribuției la finanțarea tranziției în cadrul cadrelor cheie ale industriei financiare;

10. Evaluarea și extinderea finanțării economiei circulare în produsele de creditare, investire și asigurare.

Discuții și concluzii. Economia circulară reprezintă un model de producție și consum, care se concentrează pe utilizarea și reutilizarea valorilor materiale într-o buclă continuă, minimizarea volumului de deșeuri și evitarea risipei în măsura posibilității. Implementarea economiei circulare poate aduce efecte ecologice și economice benefice, ceea ce determină promovarea ei de natură socială, politică și legislativă în diferite țări.

În același timp, o astfel de reformare economică fundamentală necesită alocarea de mijloace financiare importante. În acest context, de mare importanță pot deveni băncile de tip diferit, care au acceptat politici de susținere a economiei circulare. Această activitate poate aduce beneficii acestor instituții financiare de la sporirea profitului până la fortificarea imaginii de afaceri. În vederea asigurării financiare a economiei circulare au desfășurat activități complexe, principalele din care reprezintă oferta de produse specializate companiilor orientate spre implementarea modelului de afaceri cu buclă închisă.

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IDENTIFICATION OF THE POTENTIAL TO REDUCE GREENHOUSE GASES IN THE ROMANIA ECONOMY

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Abstract. *This paper aims to analyze the economic sectors and the ways in which circular models can be introduced, for decarbonization and increasing economic competitiveness in Romania. The purpose of this study is to identify the strategies, the effective circular measures that can be implemented and to evaluate the potential of their implementation, given that the Romanian economy is still going through a structural transformation. These strategies aim at more efficient productions and uses, extending the lifetime of the product and component parts, and optimal use of materials. The decarbonization of the country to achieve the "Net Zero" objective, which means achieving a balance between the amount of emissions produced and those removed from the atmosphere, can be achieved through the transition to a circular economy and will result in global economic benefits, through the circular interventions implemented, through the application of a regenerative production, the elimination of waste and the valorization of waste. The long-term sustainability of the economy, and the ability to provide products and services, can be achieved through drastic changes in the way we produce and consume to meet the goals of the Paris Agreement.*
Keywords: *circular economy, greenhouse gases emissions, decarbonization, pontential, climate goals*
JEL: *Q01, Q10, Q53, Q54, Q56*
UDC: *502.15(498)*

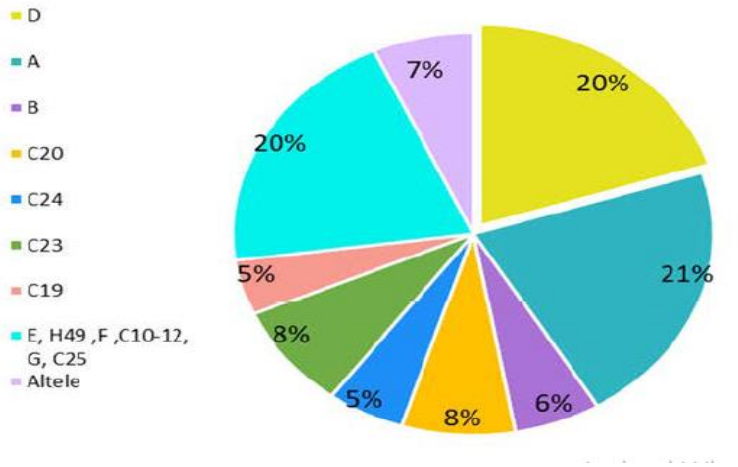
Introduction. The transition from the linear to the circular economy involves a major transformation of current production and consumption patterns that will have a significant impact on the economy, the environment and society. Understanding these effects is important for decision makers involved in developing future policies in the field. In recent years, the concept of the circular economy has attracted particular interest. The circular economy has been presented in various studies as a concept with promising prospects for generating profit in new ways, capable of ensuring the achievement of the European objectives of sustainable economic development in the restrictive conditions of the environment.

Although the circular economy has a multitude of definitions of the concept, the aspects they measure are often varied, and the way to implement the circular

model in the activity of companies is not clear. There is also uncertainty regarding the sectors and processes that fall under the scope of the circular economy.
Moreover, this field of research is still in its initial phase, and therefore the applied quantitative models are sometimes based on simplifications and assumptions that could be challenged. Thus, it could be questioned whether circular models sufficiently take into account many challenges related to the transformation of linear structures and models that have existed for several decades in the economy.

Circular economy actions within the production chain. The analysis and understanding of the link between climate change mitigation and circularity cannot be independent from understanding the structural characteristics of the final use of products and massive GHG emissions and high energy consumption in some of the economic sectors. The intensity of GHG emissions in 2023 has been reduced to almost half compared to 1990, at a faster pace than the EU average, which suggests the decoupling of the Romanian economy from carbon dioxide emissions, although the reductions can be considered in many situations as unintended consequences of some economic restructuring. The distribution of greenhouse gas emissions by main economic activities in 2023 is presented as in Figure 1. The largest share of GHG emissions belongs to the activities of production and supply of electricity and thermal energy, gas, hot water and air conditioning (CAEN D), followed by agriculture, forestry and fishing activities (CAEN A).

Figure 1. **Share of emissions from polluting sectors**



Source: INS (2023)

All these subcategories of the main polluting sectors of the economy, representing 91% of the total national GES (Table 1), in Romania the package of circular measures was carried out as in Table 2.

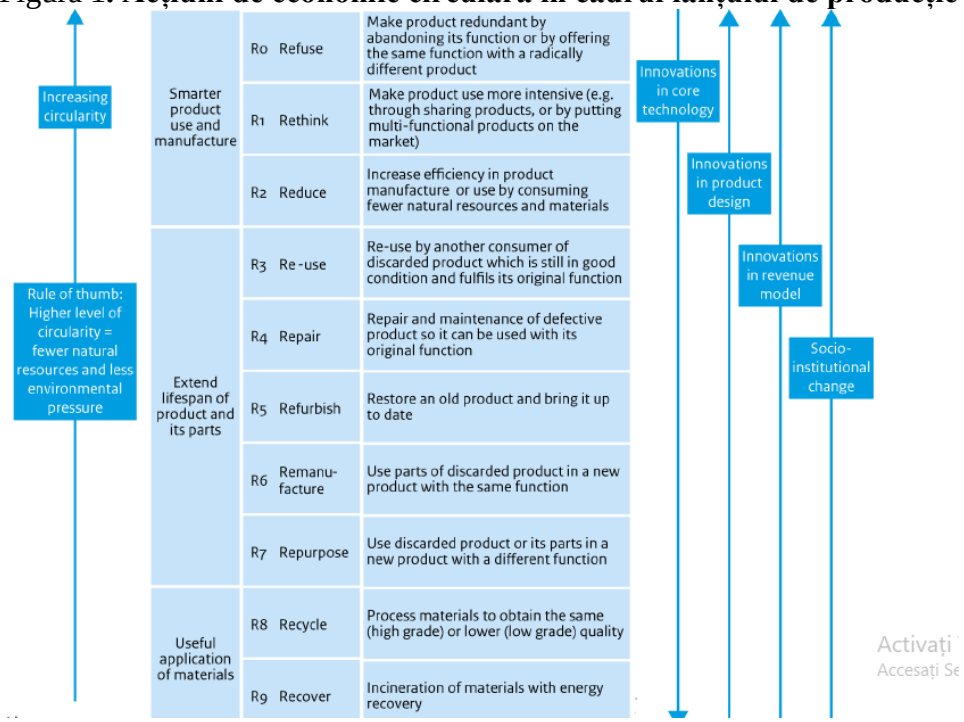
Tabel 2. **List of economic activities that produce GHG (CAEN code)**

Categories of activity	**The name of the categories of activities**
A	Agriculture, forestry and fishing
B	Extractive industry
C10-12	Manufacture of food products, beverages and tobacco products
C19	Manufacture of coke oven products and products obtained from crude oil processing
C20	Manufacture of chemical substances and products
C23	Manufacture of other products from non-metallic minerals
C24	Metallurgical industry
C25	The industry of metal constructions and metal products, excluding machinery, equipment and installations
D	Production and supply of electricity and thermal energy, gas, hot water and air conditioning
E	Water distribution; sanitation, waste management, decontamination activities
F	construction
G	Wholesale and retail trade; motor vehicle and motorcycle repair
H49	Land transport and pipeline transport
Altele	Other economic activities

Source :INS (2023)

For these categories of polluting activities we will choose circular economy actions within the production chain. These have as their main purposes refusal, rethinking, reduction, reuse, repair, recovery, remanufacturing, reorientation and recycling, the 9 key elements in circular economy thinking (Figure 1).

Figura 1**. Acțiuni de economie circulară în cadrul lanțului de producție**



Source : RLI 2015, edited by PBL

Reviewing the specialized literature of EC strategies that have the ability to mitigate the emissions of critical sectors, the relevant measures are identified. In this sense, we propose the following circular economy actions for the categories of polluting activities (Table 2).

Table 2. **Categories of polluting activities**

The name of the activity category	Circular economy strategies
Electricity production	The "no coal" scenario (1/5 of capacity), electricity generated by coal replaced by renewable energy
	Copper removal losses during and after use
	Electricity savings during production in pulp and paper
Pulp, paper and printing	Decrease in demand for paper
Mining (excluding fuels)	Energy efficiency for mining operations
	Elimination of copper losses during and after use
Unspecified industry	No mitigation potential was identified
Domestic aviation	Advanced technological systems to improve efficiency
	Improved airframe design and propulsion
	Use of alternative fuels
machinery	Various low-carbon measures on the transport system
	Various low-carbon measures on the transport system
	Various low-carbon measures on the transport system
Commercial/institutional	No mitigation potential was identified
Residential	Reduction potential due to thermal improvement after construction, refurbishment
Extractive industry	Thermal efficiency
	Slag production
Production of iron, steel and metallurgical coke	Circulation of materials
	Circular production
Refrigeration and air conditioning	Process changes, including alternative refrigerants
Enteric fermentation	Diet modification
Garbage management	Maximum implementation of anaerobic digestion
Direct emissions of N2O from soils	changes in food
Waste disposal management	Optimized process parameters for low N2O yield
Treatment and disposal of domestic wastewater	Optimized process parameters for low N2O yield
	Anaerobic treatment with gas recovery or combustion

Source: data processed by the author

The energy sector is identified as one of the major sectors emitting GHG emissions. Thus, the energy transition offers Romania the opportunity to create competitive advantages by investing in new industries and technologies, and it is found that there is a need for a reconfiguration of the energy field in relation to the new strategic approaches at the national, European and global level.

Implementation of the circular economy in romanian agriculture. Agriculture is unique in that the sector relies on natural resources and cycles as primary inputs for crop and livestock production. High levels of dependence on

natural resources and cycles can undermine the sustainability of the natural systems that support agricultural production. Resource efficiency and consumer product reuse are one way to make agricultural business models more sustainable.
The transition to a circular economy in agriculture requires a move away from the use of technical nutrients towards the use of biological nutrients. This transition to biological nutrients can be seen in Europe, with a greater focus on the development and use of biogas and organic fertilizers. Regenerative agriculture is based on principles such as preserving soil health, minimal use of pesticides and inorganic fertilizers, and combining crop and animal production to create a regenerative agricultural system that preserves the integrity of the natural system.

As a result, some of the major risk factors facing commercial agriculture today are:

- degradation of natural capital,
- increasing vulnerability to climate change,
- the volatility of input prices for agricultural products,
- long-term pressure on agricultural production.

For the development of the circular, regenerative agricultural system, which preserves the integrity of the natural system, practices such as crop rotation, and minimum reduction to cover are used. Also, livestock and crop production are often combined to create additional nutrient loops. Circular agriculture can increase the efficiency of conventional farming systems and has shown good potential for combination with regenerative practices. The use of IT (Intelligent Technology) in agriculture, real-time remote sensing of environmental data can optimize crop yields while reducing environmental externalities. Realigning food production and consumption through peri-urban and urban agriculture reduces food transport and associated costs (such as food waste, fuel and environmental externalities). Also, specialized urban farming techniques (vertical farming, hydroponics and aquaponics) can be more resource efficient, saving energy, water and fertilizers.
Supporting sustainable agricultural development within the circular economy involves securing and maintaining productive capacity for the future and increasing productivity without damaging the environment or endangering natural resources. In addition, it requires respect and recognition of local knowledge and local management of natural resources and efforts to promote the capabilities of current generations without compromising the prospects of future generations.
Consequently, economic and environmental sustainability, adequate incomes for farmers, productive capacity for the future, improved food security and social sustainability are important elements of agricultural development within the circular economy of countries.

Circular business models in agriculture and forestry. In agriculture and forestry, new circular business models can be created by optimizing the use and reuse of resources, and residues from initial harvesting activities and co-products from the transformation of raw materials in other commercial activities can be reused.

The circular economy represents a real opportunity for the development and efficient management of alternative processes and products, as well as for gaining access to new markets. The circular economy approach must become more attractive to small and medium-sized enterprises, supporting them to maximize their innovation potential, identify commercial opportunities for co-products and by-products, enabling them to become more competitive, guaranteeing employment and generating economic growth and new jobs in rural areas. In this sense, the bioeconomy represents an intelligent, sustainable and inclusive use of renewable resources, in the form of agricultural and forestry co-products and by-products. By using these resources and maximizing their value, the bioeconomy places itself at the heart of the circular economy. This contributes to the reduction of raw materials of fossil origin and the promotion of bioenergy and bioproducts that are complementary to food production.

In accordance with this orientation, farmers and agricultural cooperatives have launched themselves into the development and use of alternative energy sources, especially biogas, wind and solar energy. The transformation of existing food production models into circular models in a more sustainable, resilient and productive agriculture will lead to reduced food loss and waste, improve the efficiency of the food system and, at the same time, reduce pressure on natural resources and reduce greenhouse gas emissions. The agricultural sector employs billions of people worldwide, is a major user of the planet's fresh water and mineral resources, including petroleum products, transforms soils, landscapes, forests and biodiversity, and influences climate change.

Ecosystems and resources used by farmers are under constant pressure from other users with conflicting interests and approaches. However, their sustainable management is vital for the livelihood of future generations. In this sense, farmers have both the responsibility to play a major role as stewards in protecting, maintaining or restoring the environment and ecosystems in which they operate.

The threat of land degradation - or desertification, in cases where land degradation occurs in arid, semi-arid and dry sub-humid areas - persists and adversely affects the living conditions of over one billion people. Unsustainable agricultural practices, overgrazing, deforestation and overexploitation of water, together with climate change, are the main causes of land degradation in rural areas. Land degradation also means that more people have to share increasingly scarce resources. This trend leads to conflicts over land, water and energy and compounds poverty. Also, biological nutrients should be returned to nature and agricultural systems through composting and anaerobic digestion. Dutch households are reported to waste 13.6% of edible food, while UK households waste almost 20%.

These international trends suggest that household food waste is increasing as countries become more developed. Also, changes in consumption patterns due to the rise of the middle class are already being reported.

Development of circular agriculture value chains. Many entrepreneurs have difficulty accessing local and regional agricultural markets. This issue needs to be addressed to combat price volatility, reduce poverty and enable small farmers to help meet the growing demand for food. The EU supports the development of inclusive value chains – an effective way of linking small farmers to markets – and promotes regional integration. It also helps farmers to organize themselves, as this can increase their links with other actors in the value chain. The EU aims to improve the competitiveness of commodity chains by improving support services at producer level to establish links between competitive markets, by strengthening partner countries' capacities to implement commodity chain strategies and by developing regional support services. Also, the E.U. aims to increase governments' capacities to support and strengthen the links between rural growth, rural business development services and local, national and regional food markets

Farmer organizations play a key role in reducing poverty and improving food security and nutrition. They should be involved at all levels, from local to international, allowing farmers to be heard and involved in the decision-making process. Farmers' organizations also help empower women and youth in agricultural production, and at the E.U. fair distribution of investment returns is promoted so as to enable small farmers to overcome their systemic weaknesses.

Therefore, the EU supports:

- promoting agricultural practices and technologies that are environmentally sustainable and increase rural incomes, such as integrated pest management, soil and water conservation methods, agro-ecological approaches and agro-forestry;
- improving access to productive assets such as land and capital and measures to ensure better provision of essential services;
- initiatives that improve incomes and reduce vulnerability for producers through capacity building and a comprehensive value chain approach.

In the broader context of agricultural development, particular attention is focused on animal husbandry, fisheries, agricultural aquaculture and commodities.

The livestock sector contributes to economic and social development as well as food security. Because of its strong positive relationships with agricultural production, livestock production is generally an integral part of agricultural systems.

The EU provides support by improving the structural, organizational and technical framework to develop effective sector strategies. The activities are aimed, more precisely, at:

- strengthening the skills of veterinary services to respond quickly and manage animal diseases, as well as the implementation of good practices for animal production for increased competitiveness;
- promoting regional and international cooperation for the coordination and implementation of the livestock sector and related policies;
- improving the national capacity to develop livestock production, while protecting natural resources and the environment.

Addressing weak points along the agri-food chain. The return on investment in countries' agriculture can have a powerful multiplier effect on development, especially if it is channeled through productive investments that focus on addressing vulnerabilities along the agri-food chain. Value chains involve a complex interaction between actors, and the nature of these links defines the creation of value along the chain. The objective of interventions in this context is to achieve a fair distribution, balancing wealth and power. Farmers and their organizations, agricultural workers, commodity suppliers and small and medium-sized enterprises (SMEs) need support in this effort to improve value chain governance. For example, it can help foster dialogue and trust, develop long-term agreements that provide better guarantees and strengthen beneficiaries' skills to negotiate fair terms.

Local SMEs can add value by handling part of the processing, accessing innovative financing schemes, accessing markets directly and moving up the value chain. Finance in the value chain should take into account the needs of farmers and propose adaptive financial products such as insurance schemes, microcredit, venture capital and seed funds. The objective is to link contractual relationships between producers and buyers with financial products, to facilitate contractual arrangements based on a secure supply of inputs (including outgrower schemes), to work with customers with a more attractive risk profile and to encourage mechanisms quasi-equity finance appropriate to the medium and long-term needs of farmers and other small and small enterprises. Providing quality agricultural inputs, quality post-harvest infrastructure, improved storage and distribution systems, can help smallholders add value, meet quality standards and reduce post-harvest losses, thereby encouraging distribution.

The development of agricultural value chains adds value to agricultural commodities through local micro, small and medium-sized enterprises (SMEs) and can be both a job generator and a major factor in a more equitable distribution of income. equitable economic growth.

The efforts they must make to overcome the systemic challenges they face must also consider entrepreneurial action to help farmers develop in the value chain. The establishment of farmers' organizations creates an opportunity to defend the interests of small agricultural owners.

Conclusions. The energy sector is identified as one of the major sectors emitting GHG emissions. Thus, the energy transition offers Romania the possibility to create competitive advantages through investments in new industries and technologies, and it is found that there is a need for a reconfiguration of the energy field in relation to the new strategic approaches at the national, European and global level. In agricultural production provides income, jobs and affordable food, as well as raw material for the processing industry and foreign exchange from exports.

Creating a sustainable agricultural development path means improving the quality of life in rural areas, ensuring sufficient food for present and future generations, and generating sufficient income for farmers.

Food security and prices are a growing concern worldwide. Apart from the risks associated with natural disasters and droughts (which can be mitigated by land insurance), concerns about price fluctuations between the purchase of seeds and equipment and the harvesting and sale of a product can have a beneficial effect on farmers.

There is a growing demand now for products that enable control of price risk in food production. Although the products exist in emerging markets, often the upfront costs for companies are prohibitively high, preventing their widespread use. The EU supports global food security and develops a principled voluntary framework for responsible agricultural investment. Such a framework of internationally agreed principles is needed to guide investors, host countries and intermediaries towards investments in agriculture that respect human rights, livelihoods and natural resources.

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GRADUL DE INFORMARE A CONSUMATORULUI AUTOHTON PRIVIND ÎMBRĂCĂMINTEA RECICLATĂ ÎN REPUBLICA MOLDOVA

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Abstract. *This article discusses the main trends in EU policies related to the textile industry, as well as the level of consumer awareness in the Republic of Moldova regarding recycled clothing. The research is based on an empirical analysis of the situation in the Republic of Moldova. The aim of this research is to conduct a survey to assess the level of knowledge and awareness regarding the use of recycled clothing in the Republic of Moldova. To achieve the proposed objective, general scientific methods were applied, including analysis, synthesis, clustering, surveys, interviews, statistical processing of empirical data, graph methods, comparison, grouping, etc. The data presented in this study were collected through telephone interviews based on a questionnaire and systematized on the Google Forms platform. The data collection period was from February 1, 2024, to May 20, 2024. The number of respondents was 662.*
Keywords: *circular economy, recycling, textiles, recycled clothing*
JEL*: L67, Q01 Q02, Q53, Q56*
UDC: *502.174:687(478)*

Introducere. Agenția Europeană de Mediu indică faptul că producția globală de fibre textile s-a triplat din 1975. În prezent, 60% dintre aceste fibre sunt sintetice, poliesterul fiind cea mai utilizată, iar majoritatea fibrelor naturale sunt din bumbac (EEA, 2023). Conform Comisiei Europene, Uniunea Europeană are aproximativ 171.000 de companii în industria textilă, inclusiv producători de îmbrăcăminte, care angajează 1,7 milioane de oameni. În 2017, UE a produs 7,4 kg de textile pe persoană, dar a consumat aproximativ 26 kg per persoană, indicând că UE este un importator net de textile, importând în principal produse finite din Asia. În schimb, exporturile UE constau în mare parte din produse textile intermediare, cum ar fi fibre tehnice și țesături de înaltă calitate, domenii în care industria europeană este deosebit de specializată (Parlamentul European, 2023). Astfel, protecția mediului a devenit unul din obiectivele principale ale omenirii pentru viitorul curat, care poate fi asigurată doar prin eforturile comune ale tuturor. Intrările de resurse și impactul asupra mediului și climei în sistemul textil apar în fiecare etapă: de la producția de fibre și produse textile, la distribuție și retail, utilizarea textilelor, colectare, sortare și reciclare, până la gestionarea finală a deșeurilor.

În acest articol, se vor reflecta o parte din rezultatele studiului empiric realizat în cadrul Subprogramului 030101 „Fortificarea rezilienței, competitivității și durabilității economiei Republicii Moldova, în contextul procesului de aderare la Uniunea Europeană", finanțare instituțională". Înțelegerea comportamentului consumatorilor este o sarcină complexă și multifacetică. Primul aspect care contribuie la complexitatea înțelegerii comportamentului consumatorilor este identificarea gradului de informare și conștientizare a persoanelor. Scopul principal al acestei cercetări este de a realiza un sondaj de opinie pentru evaluarea gradului de cunoștințe, conștientizare privind utilizarea îmbrăcămintei reciclate.

Literatura revizuită. În anul 2019, Comisia Europeană a identificat textilele (îmbrăcămintea și țesăturile) ca fiind o „categorie de produse prioritare pentru economia circulară" în cadrul produselor sustenabile într-o economie circulară. Deoarece îmbrăcămintea reprezintă cea mai mare parte a consumului de textile în UE (81%), tendințele de utilizare a hainelor pentru perioade tot mai scurte înainte de a le arunca, contribuie cel mai mult la modelele de comportament nesustenabile și de supraproducție și supraconsum (AEM, 2023). Aceste tendințe au devenit cunoscute sub denumirea de fast fashion, atrăgând consumatorii să cumpere în continuare îmbrăcăminte de calitate inferioară și la prețuri mai mici, produse rapid ca răspuns la cele mai recente tendințe. Deși între anii 1996 și 2018, prețurile hainelor în UE au scăzut cu peste 30% în raport cu inflația, cheltuielile medii ale gospodăriilor pentru îmbrăcăminte au crescut. Acest comportament nesustenabil al consumatorilor se bazează pe modelul liniar caracterizat prin rate scăzute de utilizare, reutilizare, reparare și reciclare și care, adesea, nu prioritizează calitatea, durabilitatea și reciclabilitatea. (Parlamentul European, 2023).

Producția de fibre naturale (cum ar fi bumbacul, lâna sau inul) necesită mari cantități de apă, teren agricol și alte resurse. De exemplu, producția de bumbac este cunoscută pentru consumul său intens de apă și pentru utilizarea pesticidelor și a îngrășămintelor chimice care pot afecta calitatea solului și apa subterană. Cultivarea intensivă a fibrelor naturale poate duce la pierderea biodiversității din cauza conversiei terenurilor naturale în terenuri agricole. Producția de fibre sintetice, cum ar fi poliesterul și nylonul, implică utilizarea de substanțe chimice toxice și petrochimice, care pot elibera compuși organici volatili (COV) și alte poluanți în atmosferă și ape. Conform AEM (2023), îmbrăcămintea, încălțămintea și textilele pentru uz casnic reprezintă a patra categorie cu cea mai mare presiune după alimente, locuințe și transport, în ceea ce privește utilizarea totală a materiilor prime primare în lanțul de aprovizionare pentru consum în UE.

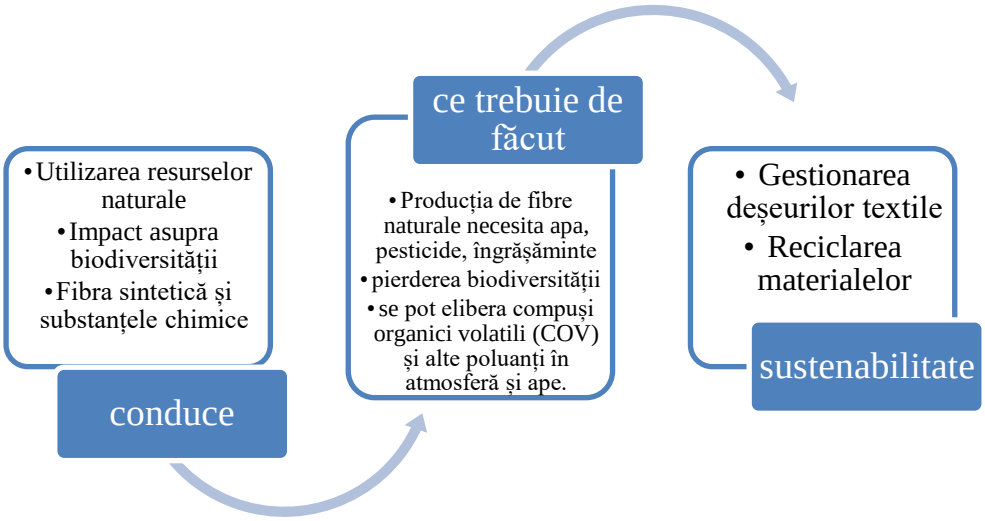

Figura 1. **Impactul modelului liniar al industriei textile asupra mediului**
Sursa: elaborat de autor

Conform „Strategiei UE pentru textile durabile și circulare", până în anul 2030, produsele textile plasate pe piața UE vor fi durabile și reciclabile, fabricate în mare parte din fibre reciclate, lipsite de substanțe periculoase și produse cu respectarea drepturilor sociale și a mediului. Consumatorii beneficiază mai mult timp de textile de înaltă calitate la prețuri accesibile, moda rapidă (fast fashion) iese din tendințe, iar serviciile economice profitabile de reutilizare și reparare sunt larg disponibile. Într-un sector textil competitiv, rezilient și inovator, producătorii își asumă responsabilitatea pentru produsele lor de-a lungul lanțului valoric, inclusiv atunci când acestea devin deșeuri. (EU Strategy, 2023). Strategia UE pentru textile durabile și circulare vizează transformarea sectorului textil într-unul mai sustenabil și mai ecologic. Principalele obiective ale strategiei sunt arătate în Figura 2.

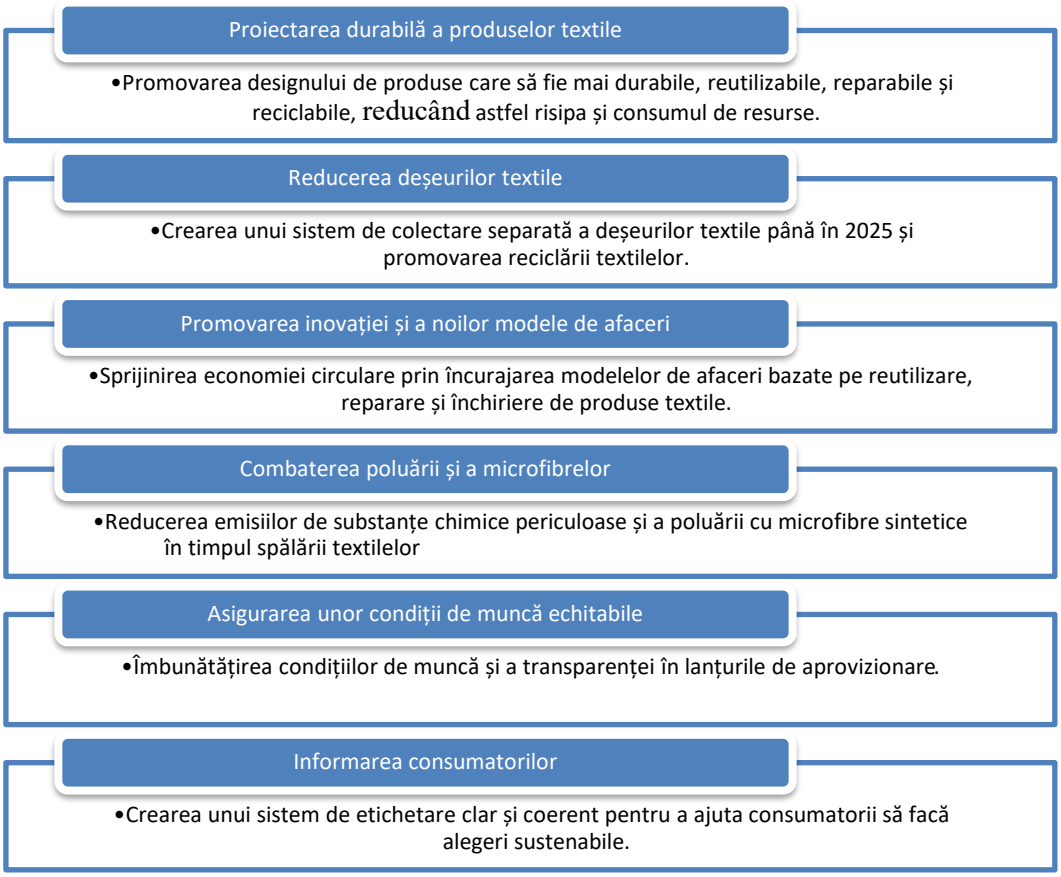

Figura 2. **Principalele obiective ale Strategiei UE pentru textile durabile și circulare**
Sursa: elaborat de autor

Strategia UE pentru textile durabile și circulare include mai mulți indicatori pentru a măsura progresul și impactul inițiativelor propuse, cum ar fi: durata de viață a produselor textile, rata de reciclare a acestora, reducerea emisiilor de carbon, consumul de resurse și materii prime, cantitatea de microfibre sintetice eliberate în mediul înconjurător și adoptarea modelelor de afaceri circulare. De asemenea, se include evaluarea conștientizării și schimbării comportamentului consumatorilor în ceea ce privește alegerea textilelor sustenabile și circulare. Comportamentul consumatorului poate fi influențat de mai mulți factori și poate varia în funcție de conștientizarea problemelor de mediu, accesibilitatea hainelor reciclabile, preț și calitate, cum ar fi: conștientizarea și educația, accesibilitate și disponibilitate, preț și calitate, beneficii adiționale (Soumita Kundu et, 2024).

Implicarea emoțională scăzută îi determină pe consumatori să scape de produse prin revânzare pentru a obține beneficii financiare. (Hennies and Stamminger, 2016). Obsolescența este adesea prezentată într-o lumină negativă. Astfel, conform Jayne Cox, Sarah Griffith, Sara Giorgi, Geoff King (2016), aruncarea produselor

înainte de a se strica sau a fi defecte este o practică centrală în comportamentul de consum din economiile dezvoltate, cum ar fi Marea Britanie. Produsele sunt adesea aruncate din motive de modă sau pentru a ține pasul cu avansurile tehnologice, mai degrabă decât pentru că au ajuns la sfârșitul vieții lor funcționale. Aceste comportamente contribuie la epuizarea resurselor, emisiile de gaze cu efect de seră și deșeurile fizice care trebuie gestionate. Extinderea duratei de utilizare a produselor (fie că sunt folosite de proprietarii lor inițiali sau de alții ulteriori) poate contribui la o mai mare eficiență a resurselor, având un potențial semnificativ de a reduce emisiile de gaze cu efect de seră (Jayne Cox, et, 2016).

Metodologia cercetării. Pentru realizarea obiectivului propus au fost aplicate metodele științifice generale: sinteza, analiză, sondajul, interviul, prelucrarea statistică a datelor empirice, metoda graficelor, comparația, gruparea etc. *Suportul informațional al cercetării este preponderent asigurat de:* legislația, politicile și strategiile europene din domeniul industriei textilelor, sustenabilității produselor textile și un chestionar elaborat, care conține 6 seturi de întrebări grupate în dependență de factorii selectați. În acest articol se vor reflecta rezultatele răspunsurilor din setul 6: Factorul 6. Gradul de informare. Întrebările adresate au fost: 6.1. Cunoașteți ce este reciclare? 6.2. Cunoașteți ce înseamnă produse reciclabile? 6.3. Aveti suficiente informatii pentru a fi un consumator de produse reciclabile? 6.4. Vreau să cumpăr îmbrăcăminte din produse reciclabile, dar nu știu care sunt. Datele prezentate în acest studiu au fost colectate prin metoda Interviurilor telefonice pe baza chestionarului menționat, iar răspunsurile au fost prelucrate și sistematizate atât pe Platforma Google forms. Perioada de culegere a datelor 01 februarie 2024 - 20 mai 2024. Numărul de respondenți - 662 persoane, din care 44 % au fost respondenți de genul feminin, și 45,9% - genul masculin. Categoria de vârstă a celor mai activi respondenți a fost încadrată în limita 36-40 ani (circa 24%), vârsta 26-35 ani (circa 19%). Circa 54% din respondenți sunt cu studii superioare, 32 % au studii profesionale și 13% - sunt cu studii medii. Repartiția geografică aproximativ egală dintre cele 3 Regiuni ale R. Moldova: Nord, Sud și Centru. Totuși, se atestă că circa 27% din respondenți sunt din mun. Chișinău. Per total circa 44 % din respondenți sunt din mediul rural.

Principalele rezultate. Gradul de informare și educare a societății noastre cu privire la principiile economiei circulare rămâne relativ scăzut, în ciuda eforturilor continue ale factorilor de decizie, mediului academic și mass-mediei de a crește conștientizarea asupra acestui subiect important. Economia circulară, care promovează reducerea risipei, reutilizarea și reciclarea resurselor pentru a minimiza impactul asupra mediului, nu este încă pe deplin înțeleasă de o mare parte a populației.

Conform datelor colectate, 25% dintre respondenți nu cunosc ce înseamnă reciclarea, ceea ce indică o lipsă semnificativă de educație de bază în acest domeniu. Aici putem relata mai multe ipoteze fie lipsa de acces la informații, fie lipsa informațiilor mai clare și mai accesibile, fie lipsa de interes a respondenților. De

asemenea, 30% dintre respondenți nu sunt siguri ce înseamnă reciclarea, ceea ce sugerează că, deși poate au auzit de concept, nu au o înțelegere clară sau completă a acestuia.

Doar 45% dintre respondenți au declarat că știu ce înseamnă reciclarea. Acest nivel relativ scăzut de conștientizare este îngrijorător, având în vedere importanța crucială a reciclării în reducerea deșeurilor și în protejarea resurselor naturale.

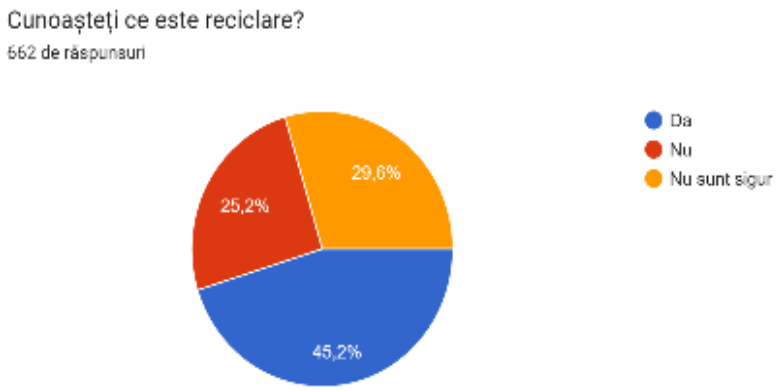

Figura 3. **Răspunsurile respondenților privind cunoașterea noțiunii ”reciclare”**
Sursa: elaborat de autor în baza chestionarului

În ceea ce privește cunoștințele despre produsele reciclabile, datele sunt similare. Aproximativ 30% dintre respondenți nu știu ce înseamnă produsele reciclabile, ceea ce reflectă o altă lacună în educația privind sustenabilitatea. Încă 22% dintre respondenți nu sunt siguri, arătând că există o confuzie generală în rândul populației cu privire la ce produse pot fi considerate reciclabile și cum pot contribui acestea la un mediu mai curat și mai durabil.

Doar 48,5% dintre respondenți au indicat că știu ce înseamnă produsele reciclabile, ceea ce, deși este ușor mai mare decât procentul celor care cunosc ce este reciclarea, rămâne un procent insuficient pentru a susține tranziția către o economie circulară eficientă. Aceste rezultate evidențiază necesitatea unor inițiative de educare mai bine direcționate și a unor campanii de sensibilizare care să includă exemple concrete și tangibile de produse reciclabile și de beneficiile utilizării acestora.

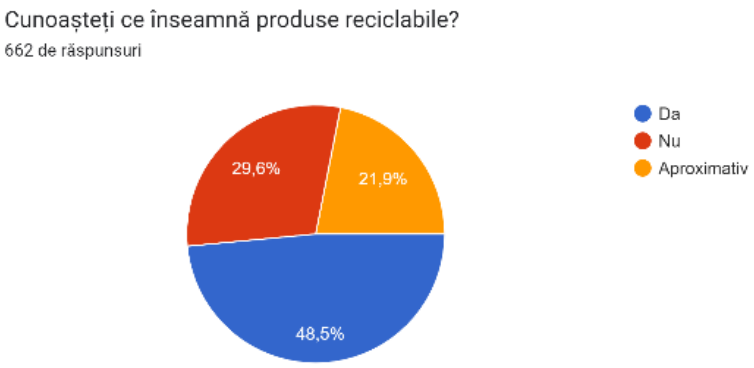

Figura 4. **Răspunsurile respondenților privind cunoașterea noțiunii ”produse reciclabile”**
Sursa: elaborat de autor în baza chestionarului

Studiul a relevat nivelul de percepție al respondenților în ceea ce privește gradul lor de informare cu privire la consumul de produse reciclabile. Rezultatele arată că jumătate dintre respondenți (50%) consideră că dețin informații suficiente pentru a lua decizii informate ca și consumatori de produse reciclabile. Acești respondenți se simt încrezători în capacitatea lor de a identifica și alege produse reciclabile și de a înțelege impactul pozitiv al acestor alegeri asupra mediului. Ei sunt familiarizați cu etichetele ecologice, certificările de sustenabilitate și au cunoștințe despre importanța reciclării și a utilizării materialelor reciclate în diverse produse.

Pe de altă parte, 36% dintre respondenți au răspuns negativ, indicând faptul că nu se simt suficient de informați pentru a fi consumatori de produse reciclabile. Aceasta poate fi atribuită mai multor factori, cum ar fi lipsa accesului la informații clare și concise, ambiguitatea etichetelor de pe produse sau chiar o lipsă de interes sau educație în acest domeniu. Acești consumatori pot întâmpina dificultăți în a distinge între produsele reciclabile și cele nereciclabile și ar putea avea rezerve în ceea ce privește veridicitatea informațiilor furnizate de producători. De asemenea, acest grup ar putea avea nevoie de campanii de informare și educare suplimentare pentru a înțelege pe deplin beneficiile și impactul alegerilor lor de consum.

Circa 14% dintre respondenți nu sunt siguri dacă au sau nu informațiile necesare pentru a fi consumatori de produse reciclabile. Această indecizie poate reflecta o conștientizare parțială a importanței sustenabilității, dar și o lipsă de încredere în informațiile pe care le au la dispoziție. Dce asemenea, putem presupune că acești respondenți se află într-o zonă de incertitudine, posibil având acces la informații contradictorii sau incomplete, ceea ce le afectează capacitatea de a face alegeri conștiente și informate.

În ansamblu, aceste date încă o dată demonstrează faptul, că există o nevoie clară de educație și informare mai eficientă. O mai bună comunicare a beneficiilor asociate cu utilizarea produselor reciclabile și a impactului pozitiv asupra mediului poate contribui la reducerea incertitudinilor și la încurajarea unor practici de consum mai responsabile. De asemenea, campaniile de sensibilizare ar putea fi personalizate

pentru a răspunde mai bine nevoilor diferitelor segmente de consumatori, ajutându-i să devină mai informați și mai implicați în adoptarea unor comportamente sustenabile.

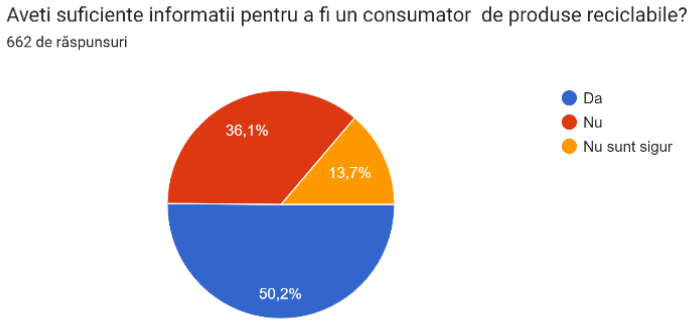

Figura 5. **Gradul de percepere a volumului de informație**
Sursa: elaborat de autor în baza chestionarului

Studiul a arătat că un segment semnificativ de consumatori apreciază îmbrăcămintea reciclată, aproximativ 40% dintre aceștia alegând astfel de produse nu doar pentru calitatea lor fizică, ci și pentru beneficiile ecologice și etice pe care le aduc. Acest tip de îmbrăcăminte este considerat o opțiune sustenabilă, deoarece contribuie la reducerea deșeurilor textile și minimizează impactul negativ asupra mediului. Mai mult de 60% dintre respondenți sunt de părere că îmbrăcămintea reciclată are un impact redus asupra mediului înconjurător. Acești consumatori recunosc avantajele reciclării, precum economisirea apei și reducerea emisiilor de dioxid de carbon asociate cu producția tradițională de textile. În plus, hainele reciclate contribuie la reducerea utilizării substanțelor chimice nocive pentru mediu, care sunt adesea folosite în procesul de fabricare a materialelor noi.

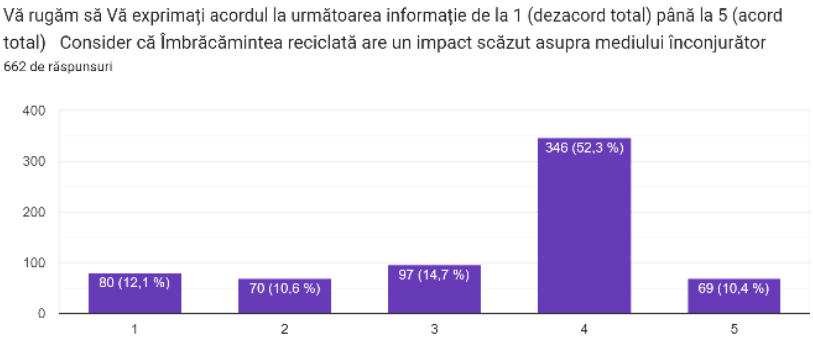

Figura 6. **Perceperea respondenților privind impactul îmbrăcămintei reciclate asupra mediului înconjurător**
Sursa: elaborat de autor în baza chestionarului

Aproximativ 50% dintre respondenți sunt convinși că achiziționarea hainelor reciclate contribuie la conservarea resurselor naturale. Aceasta se datorează faptului că reciclarea textilelor permite reutilizarea materialelor existente, ceea ce reduce cererea de materii prime noi, cum ar fi bumbacul, lâna, etc.

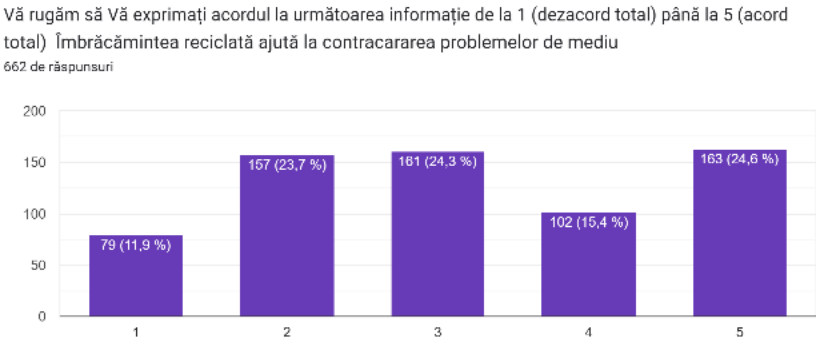

Figura 7. **Perceperea respondenților privind rolul îmbrăcămintei reciclate la contracararea problemelor de mediu**
Sursa: elaborat de autor în baza chestionarului

Mai mult decât atât, mulți consumatori consideră că îmbrăcămintea reciclată reprezintă o alegere etică. Ei văd acest tip de produs ca pe o modalitate de a sprijini practici de afaceri responsabile și de a promova o economie circulară, în care resursele sunt folosite în mod eficient și deșeurile sunt minimizate. Prin alegerea hainelor reciclate, respondenții studiului au considerat că contribuie la un sistem economic mai durabil, care pune accent pe refolosire și reciclare în loc de producția excesivă și risipa resurselor.

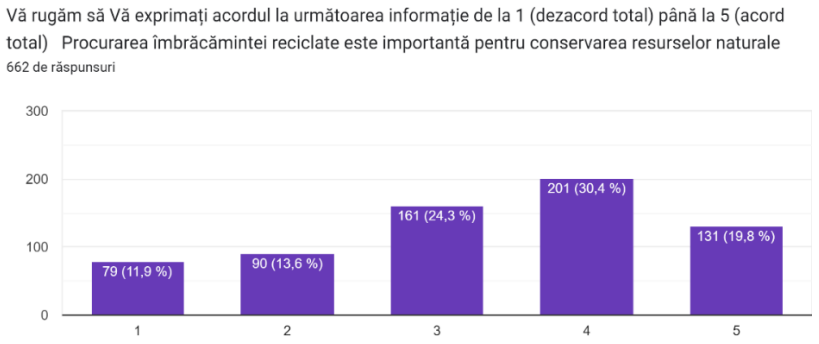

Figura 8. **Perceperea respondenților privind importanța îmbrăcămintei reciclate pentru conservarea resurselor naturale**
Sursa: elaborat de autor în baza chestionarului

Concluzii. Preferința crescândă pentru îmbrăcămintea reciclată demonstrează o schimbare semnificativă în comportamentul consumatorilor, care devin tot mai preocupați de impactul alegerilor lor asupra mediului și de sustenabilitatea pe termen lung a planetei. Această tendință reflectă o conștientizare sporită a problemelor de mediu și o dorință de a adopta un stil de viață mai responsabil și mai sustenabil.

Cu toate acestea, nivelul scăzut de informare și educare al societății noastre cu privire la principiile economiei circulare și ale reciclării indică necesitatea unor eforturi suplimentare și mai coordonate pentru a crește gradul de conștientizare și înțelegere a acestor concepte. Doar printr-o educație adecvată și prin campanii de sensibilizare bine structurate vom avea rezultate privind schimbarea comportamentului de consum și vom avea rezultate care va duce la o tranziție reușită către practici mai sustenabile și mai responsabile din punct de vedere ecologic.

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INEQUALITIES REGARDING THE ORAL HEALTH SYSTEM IN EUROPE AND ROMANIA

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Abstract. *The health status of the population is a complex phenomenon that expresses the health characteristics of the members of a community viewed as a whole, taking into account a series of biological, social and economic determinants. Among the socio-economic determinants that act at the individual level are financial income and the level of education. At the population level an important determining factor is represented by the national health policy. This refers to providing the population with medical personnel, financing and access to specialized medical services.In Romania, in contrast to the industrialized countries in Europe, the health policy is characterized by a chronic underfunding, with unfavorable effects on the state of oral health.Vulnerable populations, such as rural residents, as well as those with low incomes or the uninsured, have reduced access to specialized treatments due to the lack of dental offices in the respective areas, health insurance, and high costs.The improvement of public policies regarding the oral health of the population requires that the political decision-maker correctly identify the problems and find methods for an adequate budget allocation.*

Key words: *health inequality, Romania, public policies, oral health system*
JEL: *I00, I10, I15, I18*
UDC: *614.2(4:498)*

Introduction. Oral health is an essential part of a person's health and well-being and a global health priority. It also includes psychosocial aspects, general well-being, the ability to interact socially and perform professional tasks without pain,

discomfort and embarrassment. Oral diseases affect approximately 3.5 billion people or almost half of the world's population throughout life, from early childhood to old age. According to the Report published by the World Health Organization in 2023, 466 million people in the European region suffer from oral diseases, and annually approximately 70,000 new cases of oral cancer and more than 26,000 deaths from oral cancer are detected in Europe (WHO, 2023).

In terms of economic impact, it is estimated that approximately USD 113 billion is spent annually on the treatment of oral diseases in Europe, and productivity losses due to them are estimated at approximately USD 104 billion (WHO, 2023). Inequalities in oral health are caused by several social, economic, commercial, environmental factors. In addition to inequalities in oral health, there are also inequalities in the availability and accessibility of oral care in Europe. Last but not least, there are population groups whose oral health is affected by the existence of physical or mental disabilities that can constitute barriers to the provision of dental care.

The purpose of this narrative review is to present oral health inequalities caused by social determinants, namely: oral health systems in different countries and coverage of dental care from the point of view of costs, existence of health insurance and unmet therapeutic needs .

Universal models of oral health. The type of health system a country uses is based on a combination of historical, cultural, economic and political factors, largely depending on economic development (Widstrom & Eaton, 2004).
The main health models, each with advantages and disadvantages, are:

- Bismark type model;
- Beveridge type model;
- The national health insurance model;
- The private model.

The Bismark type model. It is financed by compulsory insurance contributions in different proportions depending on income and is collected at the level of insurance companies. The coverage is wide, but where it is not mandatory, there remain categories of the population without access to the benefits offered by the system. The sums resulting from the establishment of funds for the financing of health insurance are directed to the bodies or agencies that ensure their management and that contract with hospitals and family doctors or general practitioners for the services to be offered to the insured. Contracts with patients are based on the service/performance fee, and with hospitals they are based on often global budgets. Within this system, medical performances are relatively high, but the expenses they involve are the highest in Europe, because the costs of its administration are also high (Plumb, 2003).
The Bismarck model is widely praised for its emphasis on social solidarity and equality. Individuals contribute to the system based on their ability to pay, with the wealthiest in society giving more to support the less well off. Many countries use the

Bismarck model or a variation of the model. These include: Romania, Germany, Holland, Czech Republic, Slovakia, France, Austria, Belgium, Switzerland, Hungary.

The Beveridge type model. The Beveridge model is named after the British social reformer Sir William Beveridge. This model is also known as the "universal healthcare model" and is characterized by a single, state-financed and state-organized health system. In this respect, it differs from the Bismarck model in that it is centralized, which is a major advantage because it means that the government is held accountable for how it manages health services. Under this model, health care is provided free of charge, so that even people with no income have access to health care. State healthcare funding in the Beveridge system comes directly from taxation. In Europe, this system is found in: Great Britain, Sweden, Denmark, Ireland, Portugal, Spain, Norway, Cyprus, Latvia, Italy, Finland, Malta.

The national health insurance model. It is a centralized, government-organized health care system that provides universal coverage. It is funded by government taxation, with the government providing 'national insurance' either through income tax or additional tax. The government acts as a "single payer", providing these funds to a mix of both private and public healthcare organisations. Citizens can then enjoy free healthcare while also being able to choose which healthcare provider they would like to use. Thus, national health insurance combines the best parts of the Beveridge model (free, universal coverage, funds collected through taxation) with the best parts of the Bismarck model (allows doctor choice, encourages competition between health care providers). It is found in countries like: Taiwan, Canada, South Korea.

The private health model. This healthcare system is completely decentralized, with zero government intervention in both financing and delivery. In countries using the private model, citizens are expected to pay their own healthcare costs "out of pocket" (Winkelmann et al, 2022). The main advantage of the model is that it facilitates rapid developments in the health sector. As healthcare and pharmaceutical providers compete to provide faster, more efficient and cheaper products and services, their patients benefit from more flexibility and access to the latest and best healthcare. The consequence of this healthcare system is healthcare costs that can reach the point where they become completely unaffordable for the average person, except for those who invest in comprehensive health insurance. Thus, healthcare is reserved only for wealthy people, and those with no income can end up incurring large debts if they need treatment for a major condition. Among the countries that use this model are: the United States of America, India, Indonesia, Vietnam. The characteristics of each health system, with its advantages and limitations, are presented in table 1.

Table 1**. Advantages and limitations of health systems**

Health systems	Advantages	limitation
The Bismark model	• the system ensures stable sources of income for the health system; • the emphasis is on solidarity and equality; • allows greater personal freedom, offering the possibility of choosing their healthcare providers from the private and public sector;	- people who are not employees (unemployed, students, pensioners) are covered by other funds from the state budget, which is difficult to achieve in some cases
The Beveridge model	• general accessibility; • universal coverage; • administrative costs are reduced for such a system, compared to other types;	• low efficiency in managing funds; • lack of incentives for doctors; • long waiting lists; • lack of quality;
The national health insurance model	- free medical assistance for all citizens;	-investments are discouraged; -encourage patients to become medical tourists;
The private model	encourages competition between providers, which leads to the improvement of services;	-medical assistance is inaccessible for people without income; - there are no incentives for prevention and health education;

Source: Russel W, available at : https://www.william-russell.com/blog/healthcare-systems-globally/

Oral health system in Romania. In Romania, the oral health system is characterized by the following negative aspects that urgently require the adoption of new public health strategies and policies:

- uneven distribution of school offices throughout the country; in terms of accessibility, in the urban environment, a number of approximately 711 inhabitants have a dentist, while in rural areas, 3885 inhabitants are served by a doctor;
- the existence of a small number of dental offices under contract with the National Health Insurance House and public ones; in 2022, 16,305 private dental offices and only 36 school offices were registered in Romania;
- serving a limited number of patients, through the reduced amount of the ceiling, of only 4000 lei;
- limited coverage of the necessary procedures in the plan of complex dental treatments, by limiting the deductible operations.

Although the number of dentists has steadily increased every year, the unequal distribution in the territory has serious repercussions on the provision of specialist assistance in certain regions. In the private system, in 2022, the most doctors were in Bucharest, Timiș, Mureș, Iași, Prahova, and the lowest number of dentists was registered in Giurgiu and Călărași counties. In this context, it is imperative that there is adequate financing of oral health care, that the necessary funds are distributed equitably in all counties, regardless of social background, and that the ceiling offered by the National Health Insurance House covers the operations and procedures of a large number of patients. Prevention in Romania does not enjoy much attention, although it is known that the benefits would be great if more were invested in this component (Văidean, 2015). Prevention campaigns in the field of health exist only in a very small number, and the allocation of only 4% of the gross domestic product for health does not offer many perspectives in this regard, the funding being allocated mainly for curative purposes (Corovic et al, 2023).

The field of oral health is no exception to this rule of allocation of public funding in health. On the other hand, the lack of prevention programs in the field of oral health, the low allocation from the GDP and the low involvement of dentists in the prevention part and the clear explanation of all aspects of hygiene for their own patients, combined with the lack of school dental offices, lead to poor health education and, implicitly, the transfer of these tasks to the family (Murariu, 2019).
Regarding the coverage of specialist dentists, in Romania there are six specialties recognized at European level, a favorable situation compared to other countries where only two are recognized, respectively, Dento-Alveolar Surgery and Orthodontics (García-Espona et al, 2023). However, specialist doctors are mostly found only in urban areas.

Inequalities in dental care coverage. Oral diseases have a profound impact on the individual level, but also on society in general. They cause pain, discomfort, reduced quality of life, impacting on fundamental activities such as eating, speaking and smiling, which in turn disrupt social and family life, leading to lost school days and reduced productivity work (Watt, 2024). In general, access to dental care services appears to be limited by the high costs of care and treatment, but health care systems are increasingly excluding dental care from their benefit packages (Palència et al, 2014). In Europe, the degree of public coverage of dental care in the adult population varies, with countries such as Spain only covering tooth extractions, while in Sweden, all types of treatment are subsidized and a special high-cost protection system is in place for the elderly ≥65 years (Palència et al, 2014).

According to data provided by the National Institute of Public Health, in 27 of the OECD countries, only 2.6% of the population in 2019 reported having unmet care needs due to cost, distance or waiting times (INSP, 2022). Unmet needs are generally higher for dental care than for medical care, reflecting the fact that dental care is only partially covered by public schemes in many countries, often paid out of pocket or through additional services provided by private health insurance. In addition, there is

a category of disadvantaged people, which includes the elderly, immigrants, the rural population, the precarious situation of oral health being known, predominating caries and untreated dentitions, as well as oral cancer (Listl, 2011).

In Romania, the high costs for dental assistance, the lack of health insurance in the dental sector, as well as the very low ceiling for the settlement of dental services over time, produced an unfavorable situation of the population's oral health, as it results from the study carried out by the College Dentists in Romania in 2024 (CMSR, 2024):

- 2 out of 3 children have dental caries;
- 1 in 3 children suffer from dental abnormalities;
- over 40% of adults have chronic marginal periodontitis;
- over 70% of adults have unprotected teeth;
- 2 out of 3 Romanians need dental treatment (75% of the population 0-17 years old, 78% of the population 18+, 57% of the population over 50 years old);
- more than 50% of parents declare that it is difficult for them to cover the costs of dental treatments for their children.

Recommendations regarding the reduction of inequalities in oral health systems. The report of the World Health Organization (WHO) for the European Region provides a series of recommendations with the aim of encouraging public authorities to reduce inequalities in the oral health system. They refer to:

- developing national oral health policies in line with the WHO Global Oral Health Strategy and national policies on non-communicable diseases and universal health coverage;
- allocating sufficient staff and funds for oral health within the Ministry of Health or another national public health agency;
- the implementation of policies to reduce the consumption of sugars, to protect children from the harmful effects of food marketing;
- integration of oral health services with primary healthcare services;
- establishing a new system of human resources for oral health, including professionals in the field of primary dental health care.

In **conclusion**, despite the recognition of oral health disparities in all types of health systems, insufficient efforts are being made to ensure quality specialist care in all social settings and for all categories of vulnerable people, those with low incomes, with physical and mental disabilities, ethnic minorities and rural populations.

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IDENTIFYING FINANCING OPTIONS AND TAX INCENTIVES TO PROMOTE THEIR UTILISATION FOR SPEEDING UP THE GREEN TRANSFORMATION OF SME OPERATIONS

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Abstract. *This paper examines the financing options and tax incentives available to Small and Medium Enterprises (SMEs) in Moldova to promote their green transformation. The study explores how these financial tools can help SMEs overcome barriers to adopting sustainable practices and technologies. Furthermore, the paper discusses the role of government and private sector collaboration in facilitating this transition. The study underscores the significance of raising awareness among SMEs about available incentives and streamlining bureaucratic processes to improve access. Finally, it offers recommendations for enhancing Moldova's financial and regulatory frameworks to support the green transformation of SMEs.*
Keywords: financing options, tax incentives, green transformation, SMEs, Moldova
JEL: *H20, L53, O10, Q00, Q57, Q58*
UDC: *336.64*

Introduction. Moldova, a small country in Eastern Europe, faces unique challenges on its path to a greener economy, particularly within the Small and Medium Enterprises (SMEs) sector. SMEs are fundamental to Moldova's economy, constituting over 98% of businesses and contributing significantly to employment. With increasing global pressures to address climate change, it is imperative for Moldova to ensure that its SMEs integrate sustainable practices and technologies to remain competitive, reduce environmental impact, and meet international standards. The green transformation is essential not only for environmental sustainability but also for Moldova's economic progress. Adopting green technologies allows SMEs to lower operational costs, access new markets, and secure financing that promotes eco-friendly initiatives. However, realizing this transition requires a coordinated effort to improve the availability and appeal of funding options and tax incentives for SMEs, assisting them in overcoming financial barriers and knowledge shortfalls.

To further elaborate, Moldova's SMEs must navigate a complex landscape of regulatory requirements, market dynamics, and technological advancements. The government, in collaboration with international organizations, plays a crucial role in creating an enabling environment for green growth. This includes developing policies that incentivize sustainable practices, providing technical assistance, and

facilitating access to green finance. Additionally, fostering a culture of innovation and continuous learning within SMEs is vital for the successful adoption of green technologies. By investing in research and development, and promoting knowledge sharing among businesses, Moldova can build a resilient and adaptive SME sector capable of thriving in a green economy.

Moreover, the transition to a greener economy presents opportunities for job creation and economic diversification. Green sectors such as renewable energy, sustainable agriculture, and eco-tourism offer new avenues for growth and development. By capitalizing on these opportunities, Moldova can enhance its economic resilience and reduce its dependence on traditional industries. Furthermore, integrating sustainability into the core business strategies of SMEs can lead to improved brand reputation and customer loyalty, as consumers increasingly prioritize environmentally responsible products and services.

The journey towards a greener economy for Moldova's SMEs is multifaceted and requires a holistic approach. It involves not only the adoption of green technologies but also the creation of a supportive ecosystem that encourages sustainable practices. Through collaborative efforts between the government, businesses, and international partners, Moldova can pave the way for a sustainable and prosperous future.

Literature review. Small and Medium-sized Enterprises (SMEs) are crucial to economic growth, job creation, and innovation, yet they fall short compared to large corporations in terms of environmental sustainability. Green transformation includes the implementation of eco-friendly measures such as energy efficiency and waste management. However, SMEs often struggle to finance these investments due to limited access to traditional loans and the prohibitive costs of issuing green bonds. While venture capital and crowdfunding offer alternative funding methods, they frequently lack the capacity to support established SMEs or generate significant financial capital.

Government grants, subsidies, and tax incentives like accelerated depreciation and tax credits can assist SMEs, but their complexity and competitiveness often reduce their efficacy. Simplified application processes and expanded eligibility requirements could enhance accessibility. Studies (Chen, S., Peng, Y., & Li, J. 2021; OECD, 2020; Boeing & Matisoff, 2020; UNIDO, 2021) indicate that although tax deductions and lower corporate tax rates promote green investments, the complication and required resources generally deter smaller businesses. The overall administrative burden and focus on short-term survival make it challenging for SMEs to fully engage in green transformation efforts.

Funding the green transition of SMEs is essential to meet global sustainability targets. Numerous financing options exist, including traditional bank loans, green bonds, venture capital, crowdfunding, and government grants, each with unique benefits and challenges. For SMEs, barriers often involve accessibility, administrative burden, and a lack of awareness. Tax incentives like accelerated

depreciation, tax credits, and reduced corporate tax rates are effective but need to be simplified and better communicated to SMEs.

Future research should concentrate on enhancing the delivery of these financial and tax incentives and developing frameworks that improve SME engagement with green financing options. Policy initiatives must also emphasize the inclusion of SMEs in the global green transition, focusing on removing obstacles that impede their participation.

Research methodology. This research utilizes a mixed-methods approach to investigate the financing options and tax incentives available to Small and Medium Enterprises (SMEs) in Moldova, aimed at encouraging their green transformation. The methodology integrates qualitative analysis of policy documents and literature with quantitative evaluation of financing options and tax incentives along with their effects on SMEs. This comprehensive approach enables an in-depth examination of how financial instruments contribute to the green transformation of SMEs, blending theoretical insights with practical examples and expert viewpoints. The mixed-methods strategy offers a detailed understanding of both the policy framework and the tangible impacts of financing options and tax incentives in this dynamic area.

Main results. Small and Medium Enterprises (SMEs) in Moldova face multiple barriers when adopting green practices and technologies. Financial constraints are a primary issue, as many SMEs operate with tight budgets and limited access to affordable credit. Additionally, the technological knowledge gap and lack of expertise, combined with the high initial costs associated with green technologies, often deter businesses from pursuing environmentally friendly solutions. The complex regulatory environment, which may lack clear guidelines and incentives, further complicates efforts for Moldovan SMEs.

Many of these businesses remain unaware of the financing opportunities and tax incentives available to mitigate the financial challenges of adopting green technologies. Without a cohesive strategy from both government and private sector stakeholders, these companies find it difficult to move towards sustainability. Government involvement and private sector investments are crucial to supporting SMEs in overcoming these barriers and contributing meaningfully to the wider green transformation agenda (World Bank; EIB, 2024).

Moldova's SMEs have various financing options to support their green transformation efforts. Local banks and micro-financial institutions now offer specialized green loans aimed at funding sustainable projects like energy efficiency improvements, renewable energy installations, and eco-friendly waste management systems. For instance, financial institutions such as Moldindconbank and Moldova Agroindbank have developed products specifically for eco-friendly initiatives, making these options particularly advantageous for SMEs looking to make the transition.

International development organizations also play a significant role in Moldova's green financing ecosystem. Entities like the World Bank, the European

Investment Bank (EIB), and the Green for Growth Fund (GGF) provide substantial investments in environmental projects in Moldova, offering grants and low-interest loans to help SMEs adopt green practices. These organizations provide targeted financing that accelerates Moldova's green transformation while reducing risks for small businesses.

Furthermore, private investors, including venture capitalists and impact investors, are increasingly interested in supporting green initiatives throughout Europe. Impact investment funds, which focus on achieving positive environmental and social outcomes along with financial returns, serve as valuable resources for Moldova's SMEs (GGF; EIB, 2024; WB).

Moldova has introduced a range of tax incentives aimed at fostering green transformation within small and medium-sized enterprises (SMEs). These incentives encompass tax benefits for businesses that invest in renewable energy technologies, energy-efficient equipment, and environmentally friendly materials. Additionally, Moldova provides reduced VAT rates for certain green products and technologies, aiding the financial transition of businesses towards sustainable practices. However, the limited awareness of these incentives among SMEs hinders their uptake.

Several European Union countries have successfully adopted robust tax incentive frameworks to accelerate the green transition in businesses. For example, in Germany, companies benefit from lower energy taxes and depreciation incentives on energy-efficient technologies. Similarly, France offers tax credits to businesses investing in green research and development initiatives. Moldova could replicate these successful approaches by refining its tax policies to better encourage investment in sustainable technologies (OECD 2020, 2022; EC, MF).

To further enhance the green transition, the Moldovan government might consider more assertive tax reforms, such as offering complete tax exemptions for SMEs implementing renewable energy solutions or expanding tax credits for sustainability-focused research and development. Legislative efforts should aim to align Moldova's tax policies with the European Green Deal and other global environmental standards.

Discussion and conclusions. Increasing the uptake of green financing options and tax incentives among SMEs requires a focus on raising awareness. This can be achieved through initiatives spearheaded by government entities, industry associations, and chambers of commerce. Furthermore, specialized training programs that bolster SMEs' management skills for green transformation would be highly beneficial. Educating businesses about sustainability practices, financial opportunities, and tax benefits enables them to understand the significance of adopting environmentally friendly operations.

Bureaucratic hurdles frequently impede SMEs from obtaining crucial financing and tax incentives. Simplifying these procedures, especially via digital platforms, could greatly improve accessibility. For instance, Moldova could create a centralized digital platform that allows businesses to apply seamlessly for green loans, grants,

and tax breaks. This platform could also function as an information hub where SMEs can find current data on sustainable technologies and practices.

A collaborative effort between the public and private sectors is essential for promoting sustainability among SMEs. Cooperation among governments, banks, investors, and business associations is key to developing initiatives that support green transformation. Public-private partnerships can combine resources and expertise, ensuring that SMEs obtain the necessary assistance to implement sustainable practices.

The green transition of SMEs in Moldova is crucial for fostering enduring sustainability and economic growth. Leveraging financing opportunities and tax incentives allows SMEs to overcome the financial and knowledge barriers related to adopting eco-friendly practices. However, this requires a concerted effort from all stakeholders, including government entities, private enterprises, and international organisations. Moldova must continue to enhance its financial and regulatory frameworks to support SMEs in their environmental initiatives, ensuring they achieve global sustainability goals while remaining competitive internationally.

The green transformation of SMEs in Moldova is crucial for fostering long-term sustainability and economic development. Leveraging financing opportunities and tax incentives can help SMEs tackle the financial and knowledge barriers to adopting eco-friendly practices. Nevertheless, success in this area demands a joint effort from all involved parties, including government agencies, the private sector, and international organizations. Moldova needs to keep enhancing its financial and regulatory frameworks to assist SMEs in their environmental initiatives, ensuring they contribute to global sustainability goals while staying competitive internationally.

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GENERAL CONSIDERATIONS REGARDING THE CIRCULAR ECONOMY

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Abstract. *The European Union promotes the knowledge of the circular economy agenda. The implementation of the circular bioeconomy concept within in each country, requires support policies that support the use and recycling of secondary streams. Effective policy measures are critical in achieving circular economy goals by encouraging innovation and facilitating network synergies among stakeholders. This study presents a comprehensive analysis of recent environmental policies in Europe and the circular economy framework aimed at creating a cleaner and more competitive Europe. In this paper, a comprehensive analysis of the specialized literature was carried out, with an emphasis on the strategies of the circular economy. The analysis exposes a variety of scenarios and opportunities for effective planning, strategy, coordination, implementation and evaluation of circular economy. The historical progression of European policy reveals a series of initiatives and instruments involving significant financial investments, with objectives targeting innovation and climate change mitigation. Additionally, member states, regional governments, and private and public entities have contributed with customized actions and technological advancements in the circular economy field.*
Keywords: *circular economy, regulatory framework, implementation*
JEL: *O13, P26, Q57*
UDC: *338*

Introduction. The green economy is a concept that precedes the circular economy and the bioeconomy. It was commissioned by the British government, aiming to examine the concept of sustainable development and its impact on

economic progress, being first introduced in the 1989 "Blueprint for a Green Economy" report (Pearce et al., 1989).

The objective of the report was to assess the existence or lack of consensus regarding the concept of sustainable development and to explore ways in which it can be measured in the economic context. From the multiple definitions that the term green economy has acquired, the one from the United Nations Environment Program, presented in 2011, stands out, according to which the green economy is the one that leads to the improvement of human well-being and social equity, significantly reducing the risks for environment and the ecological deficit.

Bioeconomy is a term that appeared after 2005. It describes an economic sector that focuses on the exploitation of renewable biological resources to obtain a variety of items, such as food, animal feed, biological items and energy from bio-sources. This approach involves the sustainable use of resources from biological sources in order to efficiently produce goods and services in an environmentally friendly way.

The bioeconomy represents a significant factor in the transition to a sustainable economy and in achieving the objectives of reducing dependence on exhaustible resources and reducing the impact on the environment, assuming the circular use of biological resources, in order to minimize waste and maximize added value throughout the entire process of production.

In 2012, the European Commission launched a strategy dedicated to the bioeconomy, with the aim of strengthening the interconnections between the economy, society and the environment, and promoting a sustainable bioeconomy in Europe, focused on the responsible use of biological resources and the development of the bioeconomic sector, with the aim of contributing to economic progress, environmental protection and improving the quality of life for European citizens.

The concept of circular economy has gained popularity in recent years and took shape especially after 2012, with the publication of the report "Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition". This report defines the circular economy as an industrial system that is renewable by intent and design, replaces the concept of "end-of-life" with refurbishing (repair), seeks to transition to the use of renewable energy, eliminate the use of toxic chemicals that affect reuse, and seeks to eliminate waste through superior design of materials, products, systems and thus business models (Ellen MacArthur Foundation, 2012, Ellen MacArthur Foundation & McKinsey report, 2015). Bioeconomy and circular economy are different but complementary concepts, but having common elements, the "intersection" between them representing the circular bioeconomy.

Material and methods. In this paper, a comprehensive, chronological analysis of the specialized literature was carried out, with an emphasis on circular economy strategies systems in the EU and in the Member States.

The White Paper adopted by the European Commission in 1993 emphasized the need for a sustainable approach to economic growth, with the objectives of improving the employment rate and reducing the consumption of energy and natural resources. This emphasized the use of biotechnology in innovation and economic

growth, as well as the promotion of renewable energy and recycling. Thus, the concept of bioeconomy began to develop as a strategic approach to promote sustainable economic development, which harnesses biological resources responsibly and efficiently.

The Lisbon Agenda of 2000, promoted by the European Commission, emphasized the knowledge-based economy (KBE) as a response to the challenges of globalization and demographic aging that the European Union was facing at the time. The strategic objective of the EU, established by the European Council, was to become "the most dynamic and competitive knowledge-based economy in the world by 2010, capable of sustainable economic growth, generating more and better jobs, greater social cohesion and respect for the environment."

In 2002, "Life Sciences and Biotechnology - a Strategy for Europe" (Life Sciences and Biotechnology - A Strategy for Europe) highlighted that life sciences and biotechnology can play a significant role in fulfilling the objective of transforming the European Community into an economy based on knowledge, as established at the Lisbon Summit.

In 2005, the European Commission launched the concept of knowledge-based Bioeconomy, seen as a means to combine economic development with environmental protection on a sustainable basis. This concept recognizes the importance of biotechnology in achieving this goal and in addressing the economic and social challenges of the future.

In 2006, the "Creating an Innovative Europe" Report was developed to promote the development of innovation in Europe, underlining the importance of creating an innovation-friendly market. The report presents the concept of a Pilot Markets Initiative (LMI) which focuses on identifying and promoting six priority markets that could be engines of innovation and economic development in Europe. This initiative aims to facilitate the introduction of new non-food biological products and materials to the market, thus stimulating innovation and economic development in critical and emerging fields.

The "Cologne Paper" Report, published in 2007 as part of the "En Route to the Knowledge-Based Bio-Economy" conference organized by the German presidency of the European Council, emphasizes that biotechnology will play a key role in the European economy until 2030. The development of biotechnology in Europe it is considered essential for achieving sustainable economic growth, for generating jobs, ensuring the supply of electricity and maintaining the standard of living of European citizens.

According to Birch et al.'s 2010 paper, the knowledge-based Bioeconomy should be seen as a new political-economic strategy that aims to develop sustainable capital. This involves using knowledge and innovation from life sciences and biotechnology to create economic and social value, in accordance with the principles of sustainability and environmental protection.

In 2011, the European Union (EU) launched an extensive public consultation on the bioeconomy in Europe, aiming to gather information and opinions from citizens, companies, organizations and bioeconomy experts. The results of this

consultation provided a valuable perspective for the development of the future strategy in the field of bioeconomy (Report on the European Commission's, 2011a).

In 2012, the European Commission published the document entitled "Innovation for sustainable growth: A bioeconomy for Europe" (European Commission, 2012b). This document represents the strategy and action plan for the development of the bioeconomy in Europe. The public consultation revealed that the majority of respondents were optimistic about the prospects of the European bioeconomy.

The bioeconomy strategy of the European Union strives to accomplish several goals. These encompass diminishing reliance on limited resources, encouraging the uptake of advanced technologies and innovation, creating fresh employment prospects, and nurturing sustainable economic development. Furthermore, the strategy is dedicated to safeguarding the environment and mitigating climate change by enhancing the management of natural resources (Rodino S., 2022).

Overall, the bioeconomy strategy in Europe aligns with these directives and initiatives, given its potential to contribute to sustainable economic development, increase the use of biological resources and promote innovation in different economic sectors (Lupu I. and Vlăduț A., 2018).

Discussion and conclusions. According to the European Directive on waste management, we can define the circular economy as "a model of production and consumption, which involves sharing, renting, reusing, repairing, renovating and recycling existing materials and products as long as possible" with the aim of extending the cycle of life of the products and the minimization of waste production.

According to this definition, the linear economic model based on a simple principle "produce-use/consume-throw" becomes much more complex. When a product reaches the end of its life cycle, it is disassembled and the parts that can be used either for a new product, as spare parts, or recycled are kept. The part that is thrown, in this case being much smaller or non-existent compared to the linear model. This complex economic model creates more added value.

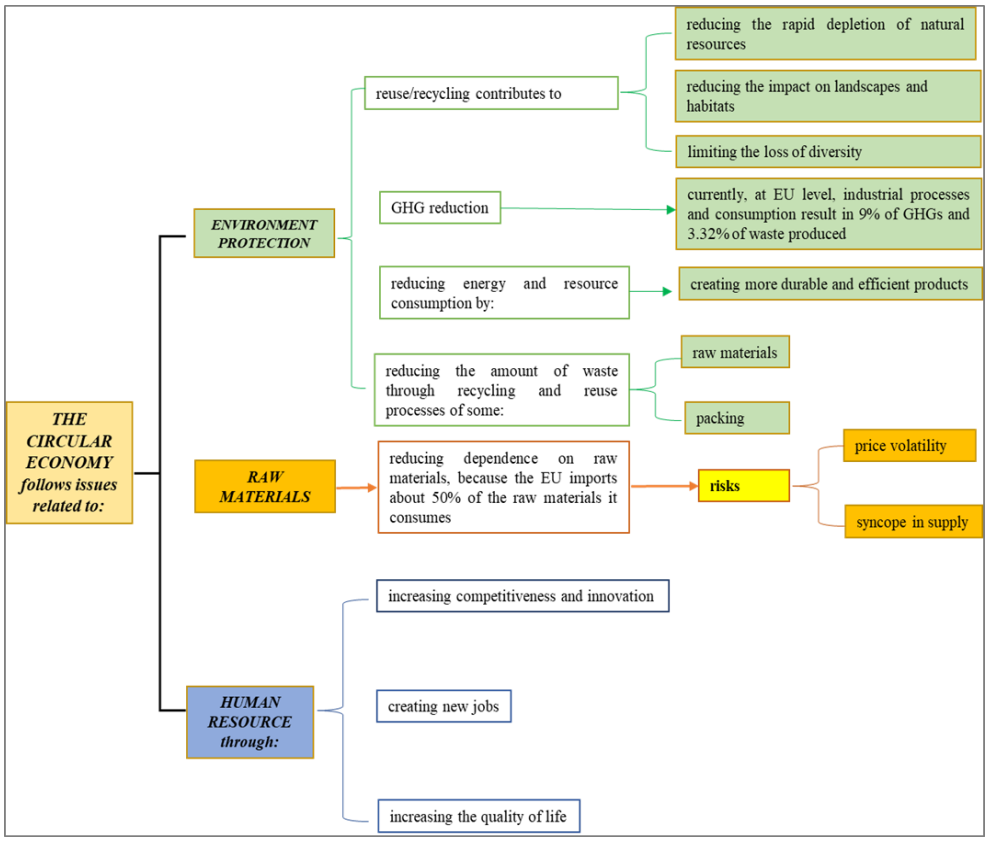

Figure 1. **The advantages of the circular economy**
Source: authors interpretation

In the linear model, the amount of cheap material and energy is large and easily accessible. The products obtained have a limited lifespan, in other words a limited wear and tear, causing consumers to make repeated purchases.The transition to the circular economy pursues multiple aspects primarily related to environmental protection, reducing the consumption of raw materials and energy, reducing dependence on a specific raw material by finding alternative sources, recycling and reuse, and not least related to the factor human (Figure 1).

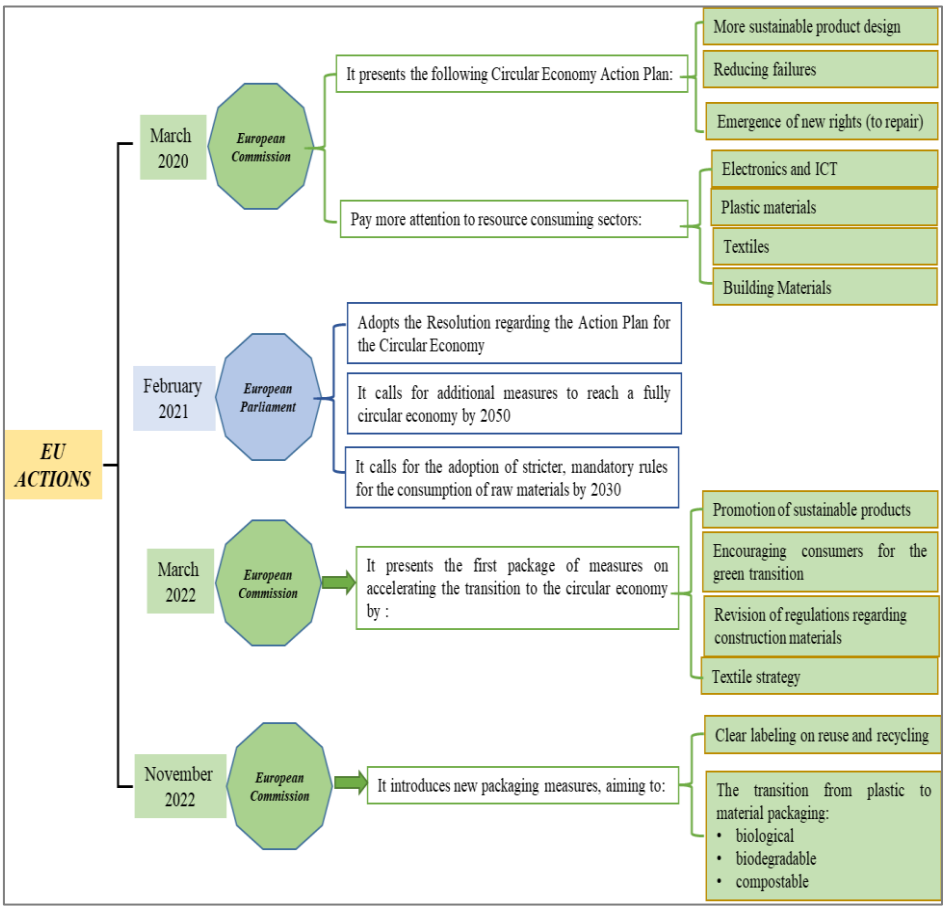

Figure 2. **Actions taken by the European Commission and the European Parliament towards a fully circular economy**
Source: authors interpretation

In order to fulfill its goal, that by 2050 the economy of the union will be a completely circular one, the European Commission and the European Parliament have taken a series of important steps:

- in March 2020, the European Commission proposed the first package of measures for the transition to a circular economy, in accordance with the EU objective of achieving climate neutrality by 2050. The plan contains proposals on encouraging sustainable products, informing consumers for the green transition, revising regulations on materials of construction and a strategy for sustainable textiles;
- in October 2022 the European Parliament approved the revision of the rules on persistent organic pollutants (POPs). Thus, the reduction of the amount of hazardous chemicals present in waste and production processes, as well as stricter limits/bans on certain chemicals and the exclusion of polluting materials from recycling are foreseen (Figure 2).

The global health crisis of 2021 revealed the need to develop an EU raw materials strategy based on sustainable sources of supply with high environmental

and social standards, reducing the EU's dependence on a few non-EU countries, promoting recycling and recovery of raw materials essential.

In order to achieve the desired implementation of the circular economy by 2050, the EC Action Plan sets out seven vital areas to reach the circular economy: plastics, textiles, electrical and electronic equipment, food, water and nutrients, packaging, batteries and vehicles, buildings and constructions. The EU produces an average of 2.5 billion tonnes of waste per year, of which 32.7 million tonnes are sent to non-EU countries.

Most of the "exported" waste consists of ferrous and non-ferrous metal scrap as well as paper, plastic, textile and glass waste and goes mainly to Turkey, India and Egypt. MEPs urge member states to recycle more and increase the quality of recycling, to abandon open-air storage of waste, to minimize its incineration and to reduce the presence of harmful chemicals in waste.

According to the rules, adopted by the European Parliament in January 2023, waste exported from the EU should be managed in an environmentally friendly way in the countries of destination, and enforcement should be stepped up to combat illegal shipments. Within the EU, MEPs want better information exchange and transparency on transport. EU exports of hazardous waste to non-Organization for Economic Co-operation and Development countries (non-OECD countries) should generally be prohibited. Exports of plastic waste to non-OECD countries should also be banned and those to OECD countries should be phased out within 4 years.

To support the implementation of the Circular Economy Strategy, coordinated actions are needed in several areas.

The investments in research and development in circularity are crucial. Cooperation between the public and private sectors, as well as the involvement of civil society and NGOs, is needed to address the challenges and opportunities associated with the circular economy. Implementing the circular economy requires a holistic and synergistic approach, with complementary actions and sound governance to ensure an efficient and sustainable transition to a more sustainable and circular economic model (National Circular Economy Strategy, 2018). The general objective of the Circular Economy Strategy in Romania is closely related to the Sustainable Development Goals and the global climate goals, as well as the new goals of the European Ecological Pact of the European Union.

Romania's National Recovery and Resilience Plan covers issues related to water management, waste management and building renovation to improve energy efficiency. These components are closely related to the objectives of the circular economy, as they aim to use resources more efficiently and reduce environmental impact. Also, PNRR sets deadlines for the adoption of the Strategy for the circular economy until the third quarter of 2022 and its Action Plan until the third quarter of 2023, which demonstrates Romania's commitment to promoting the circular economy and adopting some concrete measures for sustainable development.

The transition to the circular economy must be carried out in a way that takes into account the needs and characteristics of the business environment in Romania, especially small and medium-sized enterprises and micro-enterprises. The success of

the transition to the circular economy in Romania depends on the appropriate approach to the challenges and needs of the business environment, including SMEs. The successful completion of these initiatives by 2026 will represent a crucial step towards a more responsible and sustainable circular economy in the country, playing an important role in encouraging more responsible waste management and contributing to the achievement of European goals regarding the economy circular and sustainable development (Strategy-Economy-Circular, 2022).

"According to the statistics issued by the Circular Economy Monitoring Framework, Romania is among the European Union (EU) countries with the worst performance in terms of resource productivity, waste generation as a share of the Gross Domestic Product (GDP), waste treatment and the use of recycled materials in the economy". The fact that Romania has "the worst performance in terms of resource productivity" can be translated into "Romania has a significant potential for improvement", and the fact that Romania has among the "worst performances in terms of waste generation" in Europe, we gives hope that there are favorable prospects for the adoption and improvement of Circular Economy practices.

The National Strategy on the Circular Economy in Romania has as its general objective the implementation of the Action Plan on the Circular Economy (PAEC), in accordance with the principles and actions promoted within the EU Green Pact and is closely linked to the Sustainable Development Goals (SDGs) of the UN Agenda 2030 and global climate goals. At the national level, elements of the transition to the circular economy are also provided for in the National Strategy for the Sustainable Development of Romania 2030 and in the National Recovery and Resilience Plan of Romania. Romania should simultaneously follow several directions in order to develop policies aimed at advancing the circular economy. The strategy will be complemented by an Action Plan that will include specific actions for sectors with high potential for circularity, will identify budgetary resources and responsible for carrying out the actions (Figure 3).

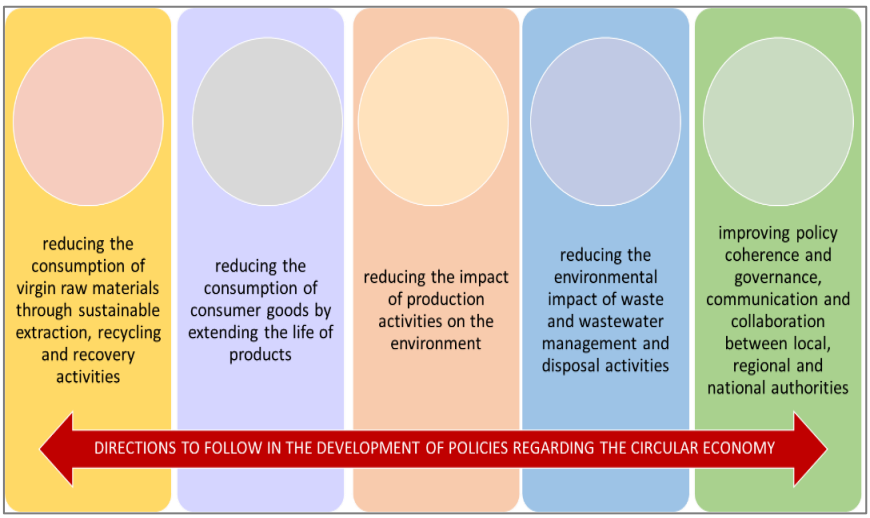

Figure 3. **Directions for the circular economy**
Source: authors interpretation

The concept of the circular economy is a complex one covering topics related to resources, recyclable/renewable resources, production, product life cycle, consumption, waste, replacing dangerous chemicals with less dangerous ones, aspiring to the zero waste - zero pollution system.

The transition to the circular economy challenges all economic actors, from producers to decision-makers and consumers, to rethink production and consumption models, to redefine the term "growth", transforming it into one that encompasses social and environmental benefits beyond economic profit.

A more concrete overview is provided by the 9 so-called R strategies, which start from the refusal to throw away products to recycling and recovery. Circular economy policies are often confused with waste policies. The diagram in Figure 4 sheds some light by realizing that only 2 of the 9 R strategies apply at the end of the products life cycle. Circular economy activities have the greatest environmental economic potential at the beginning of the life cycle, focusing on waste prevention and extending the life of products.

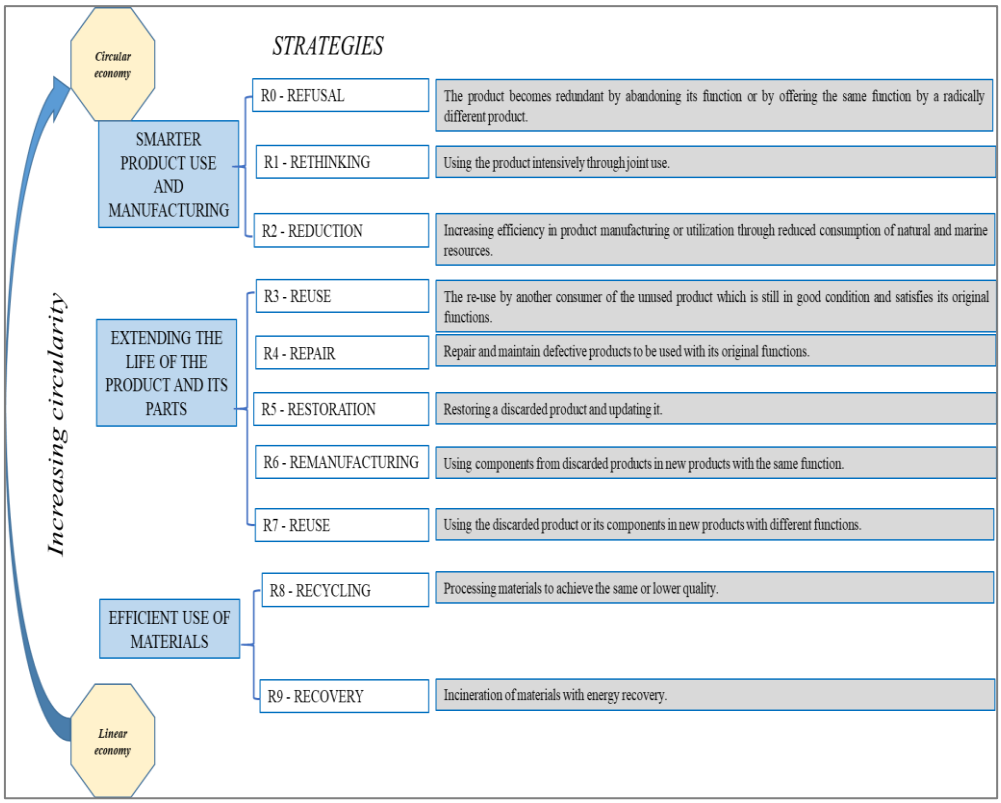

Figure 4. **Strategies to increase circularity**
Source: Potting et al. (2017)

Therefore, the circular economy decouples economic growth from resource use by reducing the input of materials, while maximizing the usability of products and minimizing the generation of waste.

This circular concept of closed loops contributes to solving the problems of resource scarcity, biochemical flows and climate change, while having a regenerative and recuperative benefit for communities.

The transition to a circular economy is an international challenge because globally we we are faced with limited natural resources and a growing population, the latter causing greater consumption and implicitly increased production. Demand for raw materials will further increase as a result of global population growth and the development of new technologies that require specific raw materials. This will exacerbate environmental, climate and other sustainability issues.

Romania, and Europe in general, is extremely dependent on raw material imports. This makes them vulnerable to geopolitical tensions that impact commodity prices and supplies in the future. China is the main supplier of 15 of the EU's 25 critical raw materials, meaning that the European Union (EU) is highly dependent on Chinese exports.

According to a report by the Joint Research Center, the trade balance of raw materials in Romania in 2018 was negative, including minerals, metals, stone and glass. In 2019, Romania imported from abroad 92% of metal ore inputs and 54% of fossil energy material inputs. The transition to the circular economy offers numerous opportunities for economic growth and job creation, innovation and emission reduction of greenhouse gases.

According to the new 2021 Circularity Gap Report, circular economy strategies have the potential to reduce global greenhouse gas emissions by 39% and ease pressure on virgin materials by 28%. In a global context, EC principles are closely related to the UN Sustainable Development Goals and can contribute directly to the achievement of 21 of the targets and indirectly to the achievement of a further 28 targets. In 2015, the First Action Plan for the Circular Economy was adopted by the European Commission. It included measures closely related to key EU priorities.

We are fully aware that Romania's transition from a linear economic model to a circular one will be a long-term process, which requires major changes in many areas of activity starting with the legislative framework, production, processing and recycling technologies and ending with mentalities people who have a refractory attitude and a low level of involvement in waste collection and recycling activities.

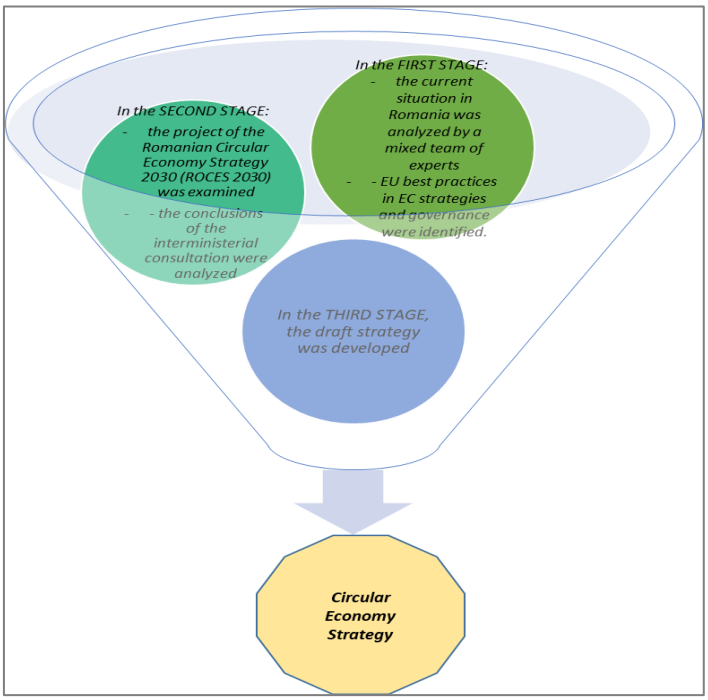

Figure 5. **Stages of the development of the Strategy for the Circular Economy**
Source: authors interpretation

As we have already mentioned, Romania is among the countries of the Union with the worst performances in terms of waste generation, treatment and use of recycled materials in the economy. To be able to move to EC, Romania needs a long-term vision and a strategic direction aimed at:

- provide the necessary tools for the implementation of decisions regarding the reduction of waste, dependence on primary resources and harmful emissions,
- changes the economic model,
- creates the conditions for increasing the number of new jobs (Dobre-Baron & all, 2022).

The transition to EC must be done without affecting the quality, productivity and performance of the Romanian business environment, generally based on SMEs. The Circular Economy Strategy was developed based on a three-stage methodology (Figure 5).

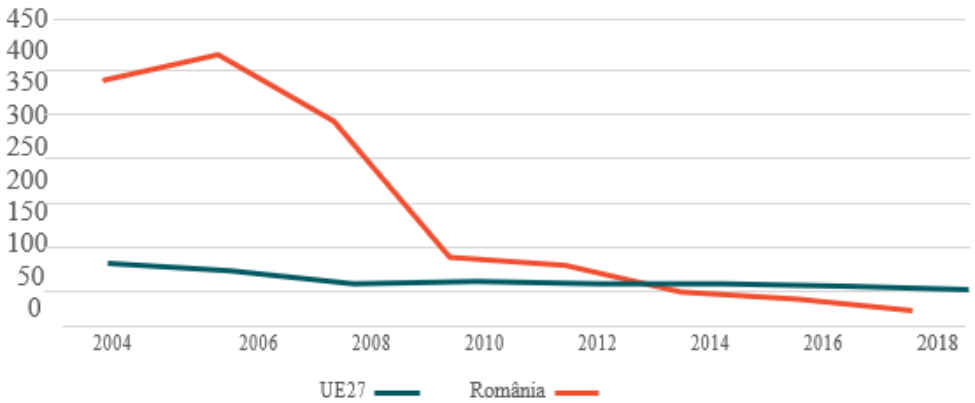

Figure 6. **Waste generation, excluding major mineral waste, per unit of GDP (in kg per 1,000 euros), 2004-2018**

Source: Eurostat

According to data from the European database, in the period 2010-2020, Romania had high economic growth, accompanied by a sustained reduction in poverty and an increase in household incomes. According to the same source, in 2020, the country's GDP reached 219 billion euros, reaching 9,120 euros/inhabitant, approaching the average standard of living of EU countries. As a result, the World Bank classified Romania for the first time as a high-income country, having a beneficial effect on the investment rating and on the accession negotiations to the Organization for Economic Cooperation and Development. Romania's economic growth is not yet decoupled from waste generation, the trends being rather mixed, always reflecting the GDP and consumption trends (Figure 6).

While household final consumption expenditure has risen steadily over the past 10 years, municipal waste generation per capita fell between 2010 and 2015, but then started to rise slightly, averaging 3% per year until in 2020. However, Romania is among the EU countries with the lowest production of municipal waste per capita. This could be related to the low level of consumption in the country compared to the EU average. Another explanation for the discrepancy between consumption and waste generation is the unreliability of reported waste data, which would require better data management and control policies.

Therefore, the conclusion regarding Romania's ranking in terms of municipal waste should be viewed with caution, as further analysis of data accuracy may be necessary. Similarly, total waste generation fell by more than half between 2004-2014 and only started to rise after 2014, during Romania's economic growth period. In addition, total waste generation per GDP and per domestic material consumption (DIM) decreased every year between 2004 and 2018. As a result, Romania reached the lowest total waste generation per DIM among EU countries in 2018. Despite a significant decrease in the share of total waste production in GDP, its value is still the second highest among EU countries. In addition, waste management in Romania lags significantly behind, as landfilling, and often illegal landfilling, is still the dominant form of waste management.

Like the rest of the world, Romania was deeply affected by the COVID-19 pandemic. In 2020, the economy contracted by 3.7% and the unemployment rate reached 5.5% in July before easing slightly to 5.3% in December. Trade and services fell by 4.7%, while sectors such as tourism and hospitality were hit hard. At the same time, Romania is affected by unfavorable climatic conditions that still lead to a reduction of the gross added value in agriculture.

According to the Global Footprint Network Advancing the Science of Sustainability, Romania's ecological footprint per person was 3.5 global hectares in 2018, exceeding its biocapacity by 0.3 global hectares per person. This leads to a national ecological deficit. However, Romania is among the EU countries with the lowest ecological deficit and has fewer environmental impacts than countries such as Sweden, Greece, Portugal or Austria. Romania has a huge potential in terms of improving waste management. The municipal waste recycling rate is one of the lowest in the EU while landfilling is still the dominant form of waste management. In 2018, the recycling rate for all waste except major mineral waste was just 29%, compared to the EU average of 55%.

Similarly, the municipal waste recycling rate reached only 14% in 2020, compared to the EU average of 48%, placing Romania among the lowest performing countries in the EU. Therefore, the EC identified Romania as being among the countries at risk of not reaching the EU's 2020 and 2025 targets of 50% and 55% respectively.

The recent study on the analysis of Romania's environmental performance, carried out by UNECE50, shows that the level of separate collection of recyclable materials from municipal solid waste remains low, being only 12.9% of the total municipal solid waste generated in 2017. Eurobarometer surveys on the attitude European citizens towards the environment and towards waste management and resource efficiency) shows a low level of involvement of Romanian citizens in circular economy activities. According to this survey (from 2018), 25% of Romanian respondents bought a refurbished product instead of a new one, close to the EU average of 30%. However, only 13% of respondents confirmed that they used a sharing scheme, which is the lowest share among EU countries. Similarly, only 9% of Romanian respondents confirmed that they rented or leased a product instead of buying it, which is the second lowest share after Malta.

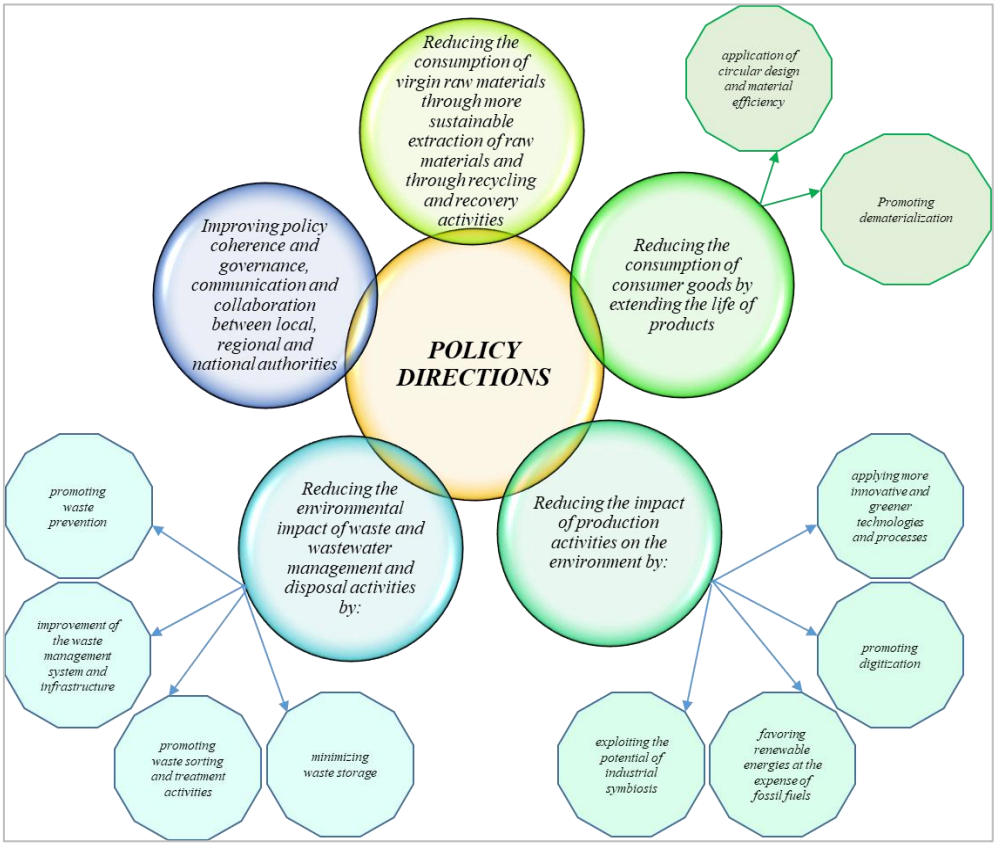

Figure 7. **Policy directions to advance the Circular Economy in Romania**
Source: authors interpretation

The National Strategy for the Sustainable Development of Romania 2030 (SNDDR) (Romanian Government, 2018) aims to achieve the transition to an EC, in accordance with SDG 12: Responsible consumption and production.

Through Government Decision no. 754/2022, the National Action Plan was approved, a key document that guides the implementation of the SNDDR 2030. The national waste management plan established the following objectives until 2030.

The key objectives of the National EC Strategy provide the framework that guides Romania's EC transition efforts through the implementation of the Action Plan. They also serve to define the most important elements and areas within EC applied in Romania, thus aligning the expectations and visions of all parties involved. EC promises to build a resilient system that will benefit businesses, people and the environment, resistant to the effects of climate change or global supply chain disruptions.

Based on the key objectives, the following directions should be pursued through policy development to advance EC in Romania. These must be addressed through regulations, economic incentives and measures that will be introduced in detail in the Action Plan. The measures will be established based on the legislation in force, at national, community and international level, and will not affect biodiversity or human health.

Conclusions. By means of a specific sectoral analysis, the potential for circularity in the entire economy is identified. To achieve this potential, key objectives are set and policy directions are provided to achieve them. The directions and objectives formulated in this Strategy will constitute the basis for an Action Plan that will be approved by Government Decision. The plan will contain more details and concrete actions to maximize the potential of circularity in key economic sectors. A general approach is used in the Strategy to develop a feasible governance structure and to assign responsibilities for EC implementation. The strategy also introduces a general monitoring and evaluation framework to ensure correct and timely implementation.

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MODEL OF INTEREST RATE WITH GOVERNMENT PONZI GAMES AND DEBT DYNAMICS UNDER UNCERTAINTY WITHIN FISCAL FEDERALISM

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Abstract. *This paper presents two objectives: in the first part, we make a presentation of interest rate equations in a historical overview, from Irwing Fisher to John Maynard Keynes. Second part is designed to quarterly estimated structural macro econometric model for the Republic of Moldova, denoted A Classical Macroeconometric Data Model for the Republic of Moldova (MDM) in context of Neo-Classical Approach of the Economy. This model has been developed with four uses in mind: the assessment of economic conditions in the Republic of Moldova, macroeconomic forecasting, policy analysis and deepening understanding of the functioning of market economy. As research methods, the paper comprises elements of stochastic long run simulations. The relationship between: interest rate and economic growth is insignificant. As results, we found that for the Republic of Moldova, Taylor's rule (interest rate, in New Keynesian approach) together with Macroeconomic Cointeg (database, 162 obs., in Neo Classical approach) would be the best fit. The gross domestic product contributes insignificantly to the calculation of the interest rate, other elements would influence the economy, such as the budget deficit, the inflation rate, foreign remittances, investment policy and agriculture.*
Key words: *Republic of Moldova, macroeconometric modelling, open and small economy, inflation, interest rate, economic growth, Classical economics, Keynesian economics*
JEL: *E21, E30, E31, E40, E41, E44*
UDC: *519.866*

Introduction. The portion of needy individuals in the worldwide population has declined during late many years. As per Chen and Ravallion (2004), 33% of the number of inhabitants on the planet resided in poverty in 1981, while the amount was 18% in 2001 and 9 percent in 2020. The decay is registered to a great extent because of quick financial development in medium-income nations like Moldova and Romania. There are, nonetheless, surprising contrasts among nations and between

districts in the creating scene. A few locales and nations, strikingly in East Europe, are quickly making up for lost time to industrialized nations. Others, particularly in Balkan countries, are falling a long ways behind and the portion of needy individuals in the population has even expanded in certain nations. Modern development has played a significant part in the financial growth of nations like Slovakia, Czech Republic, Hungary, Poland, Romania and The Republic of Moldova. Alongside sped up development, neediness rates have declined in numerous countries. A few nations have figured out how to accomplish development with value, while in others imbalance has stayed high. The fundamental accentuation is on depicting their development cycles and procedures, the job of modern turn of events, the commitment and scope of strategies to development execution, and the effect of development on open obligations. The review starts with a short hypothetical conversation of the effect of modern growth and development, and the effect of development on destitution and pay for recessions and afterward continuing at the nation economic model level. Public debt predicts the short-run yield flexibility of spending plan shortfall, for example all things considered, when result increments by one rate point. A steady relationship is a vital fixing on macroeconomics course readings, and business cycle models. However, little by listle having significant awareness of whether the versatility relies upon the power driving the business cycle. For example, whether joblessness and result co-move differently in downturns set off by financial strife or an oil supply disturbance is muddled ex-risk. The absence of proof is amazing considering stresses that the relationship separates every so often and is especially frail during recoveries from downturns established within financial market trouble (for example Gordon, 2010).

This paper proposes a basic strategy to appraise a large scale shock-specific spending plan shortfall versatility on open public debt: it measures by how much the deficiency rate falls over a specific skyline when result increments by one rate point over a similar skyline on account of a specific macroeconomic shock. Surmising depends on basic instrumental variable relapses of total shortfall on aggregate obligation. Involving information for the Republic of Moldova, we consider government spending, charge, money related approach, financial, innovation, and oil shocks. we acquire three key outcomes:

- At medium skylines (2-3 years), shortfall flexibilities are generally steady across different sorts of shocks.
- At more limited skylines, differences are more articulated. The speed at which joblessness changes comparative with yield relies upon the shock driving fluctuations. This features the significance to think about longer skylines. If not, one could inaccurately infer that the flexibility separates for certain cycles.
- The flexibility is biggest for financial shocks. Significantly, it is bigger than for financial approach and government spending shocks. we contend these findings can assist with understanding the at first "excessive shortage" recuperation following the 2007 financial emergency. Daly et al. (2013) who likewise gauge shock-specific shortfall flexibilities.

We construct the work along three aspects. In the first place, we think about a more broad determination of macroeconomic shocks. Second, we propose another one-venture way to deal with gauge the versatilities, though Daly et al. (2013) follow a two-venture system and 3-stage Klein Macroeconomic Model. This increments efficiency and simplifies the development of confidence groups. Third, our strategy permits us to perform feeble strong induction. The last point is pivotal in light of the fact that the gauge blunder fluctuation commitment of full scale shocks to the factors of interest is many times little (Gorodnichenko and Lee, 2017), prompting frail instrument issues.

Literature Review. The ongoing comprehension of monetary development is to a great extent founded on the neo-old style development model created by Robert Solow (1956). In the Solow model, capital gathering is a central point adding to monetary development. Efficiency development - estimated as an expansion in yield for each laborer results from expansions in how much capital per specialist, or capital accumulation (for example Fagerberg 1994). Capital developing will go on until the economy arrives at its consistent state - a place where net speculations develop at a similar rate as the workforce and the capital-work proportion remains constant. The further economy is the beneath of its consistent express, the quicker it ought to develop (see for example Jones 1998). In the consistent express, all per capita pay development arise from exogenous innovative change. The pace of mechanical interaction is thought to be steady and not, but affected by monetary impetuses. A few agents have observed that capital and work really make sense in just a small amount of result development and that taking into account the nature of the workforce (human resources) just to some degree diminishes the unexplained development - or Solow leftover. Endogenous development hypothesis, started by Romer (1986, 1990) and Lucas (1988), centers around the Solow model. Innovative change becomes endogenous to the model and is an aftereffect of the allocative decisions of monetary authorities (see Aghion and Howitt 1998, Veloso and Soto 2001). Mechanical advancement is driven by R&D exercises which thus are fuelled by private firms' expect to benefit from creations. Dissimilar to other creation data sources, technology and information are nonrivalrous (see Romer 1990). In addition, new information can expand the efficiency of existing information, yield-ing and expanding back to scale. Along these lines, the peripheral efficiency of capital doesn't decline with expanding GDP per capita, and wages need not meet across nations. Mechanical change and modernizations are fundamental wellsprings of underlying change. In Schumpeter's view, development lead to "imaginative obliteration", an interaction by which areas and firms related with old innovations decline and new areas and firms arise and develop (see Verspagen, 2000). More useful and beneficial areas and firms uproot less useful and less productive ones and total efficiency in the economy increments. Mechanical change is hence at the actual focus of current financial development. In light of the perception that, starting with the Industrial Revolution, innovative change occurred chiefly in the assembling area, creators like Kaldor (1970) and Cornwall (1977) have stated that the extension of this area is a main impetus for monetary development (see Verspagen, 2000). Additionally, Cornwall (1976, 1977) saw

innovative change in specific manufacturing areas as a main thrust for efficiency development in a few other sectors. Syrquin (1986) sees that, when in general development speeds up, manufacturing normally drives the way and becomes quicker than different areas. At low pay levels, the portion of assembling in GDP is, notwithstanding, low and its prompt commitment to total development minor. While assembling expands its result share - frequently as a reaction to changes in homegrown interest and in relative benefit - quicker sectoral development discernibly raises the total development paces of result and work efficiency. In created nations, innovative work (R&D) exercises are the primary driver of mechanical change. This isn't, nonetheless, the main component of innovative change. Firms and individual representatives advance by doing, expanding result and efficiency regardless of whether innovation or information sources stay unaltered (see for example Bolt 1962). As R&D exercises in non-industrial nations are moderately restricted and nations are a long way from the mechanical wilderness, worldwide innovation dissemination is fundamental for efficiency development. Global financial relations, particularly worldwide exchange yet in addition unfamiliar direct venture, are significant channels of innovation move and expanded efficiency development. In any case, innovation dissemination must be effective assuming that the degree of HR is sufficiently high, motivating forces for mechanical improvement are solid, and foundations are generally well-working.

One of the main impetuses for underlying change is the adjustment of homegrown and worldwide interest. At moderately low pay levels, people spend a huge piece of their pay on food. As pay rises, this offer will in general decay, though interest for makes rises. Also, as pay rises further, interest for produces increments at decreasing rates, while interest for administrations rises quickly. Changes will likewise influence sectoral work and result offers and effect the economy's work efficiency. Besides, exchange of goods ans services affects nations' specialization designs and on the pace of industrialization or underlying change inside businesses. Under an open exchange system, nations will more often than not spend significant time in the development of products for which they enjoy a near benefit and import items which are generally costly to locally deliver. Exchange receptiveness is additionally liable to carry unfamiliar interest into the country. This is frequently fundamental, and particularly so at beginning phases of capital creation. It is additionally liable to increment efficiency as homegrown organizations are confronting outside rivalry.

Notwithstanding, the organization of unfamiliar exchange matters as well as the open-ness of exchange (for example Amable, 2000; additionally, Rodrik in this volume). Additionally, specialization in itself doesn't be guaranteed to prompt higher development rates. This is most obvious on account of agricultural nations reliant upon commodities of primary items. As genuine worldwide costs of non-oil items have declined over the long run and are dependent upon sizeable present moment fluctuations, specialization is essential in creation only here and there - advances supported financial development (see for example Bolt 1962). As R&D exercises in non-industrial nations are somewhat restricted and nations are a long way from the

innovative wilderness, worldwide innovation dispersion is fundamental for efficiency development. Worldwide monetary relations, particularly global exchange yet, additionally unfamiliar direct venture, are significant close of innovation moving and expanded economic development. Notwithstanding, innovation dispersion must be proficient assuming the degree of HR andsufficiently high, motivated for solid mechanical improvement , and organizations are somewhat well-working.

One of the main thrusts for underlying change is the adjustment of lossness and worldwide interest. At moderate level, people spend a huge portion of their pay on food. As pay rises, this offer will in general downfall, while interest for fabricates rises. Likewise, as pay rises further, interest for makes increments at lessening rates, though interest for administrations rises quickly. Changes popularly will likewise change sectoral business and result offers and effect the economy's work efficiency. Moreover, exchange affects nations' exceptional ization designs and on the pace of industrialization or underlying change inside enterprises. Under an open exchange system, nations will quite often represent considerable authority in the creation of products for which they enjoy a similar benefit and import items which are somewhat costly to locally deliver. Exchange receptiveness is additionally prone to carry unfamiliar interest into the country. This is frequently indispensable, and particularly so at beginning phases of create ment. It is additionally liable to increment efficiency as homegrown organizations are facing outer rivalry.

Notwithstanding, the organization of unfamiliar exchange matters as well as the open-ness of exchange (for example Amable, 2000; likewise, Rodrik in this volume). Besides, specialization in itself doesn't be guaranteed to prompt higher development rates. This is most apparent on account of non-industrial nations subject to commodities of essential items. As genuine worldwide costs of non-oil items have declined after some time and are dependent upon sizeable transient variances, specialization in essential creation only here and there advances supported eco-nomic development.

Note, in Romer, the variables k_t, y_t, c_t, etc. are defined in units of effective labor Jones defines these use the tilde: $\tilde{k}$, $\tilde{y}$, and so on. This guide will use the Romer notation to maintain consistency with the chapter. Note that the worker earns w_t for each unit of labor L_t supplied. Each effective worker earns Atwt for each unit.

Framework and Assumptions

- Technological progress. Technology grows at rate g : $A_t = (1+g)\, A_{t-1}$.
- Also Ponzi[1] games plays a significant role in the context of external national debt, the public deficit and private investment - Pay As You Go (PAYG).

[1] Charles Ponzi (1882–1949) is the first author of a fraudulent pyramid-type game that promised a 100% win in 90 days. Fraudulent pyramid schemes of this type were later renamed the Ponzi scheme (game). The scheme mechanism provides for the payment of the current investors based on the amounts brought by the new depositors. Basically, the money of a new depositor is given to the old depositors as a gain, and he will receive his money from other future depositors. The scheme obviously works as long as there are new depositors for all the old ones.

- Since now, the two previous years of COVID-19[2] implications derived the capitalist market economies of the world through recurrent periods of dynamic trends. At the start of the present decade the growth rate of real GDP per capita turned negative in all of the three largest Eastern European Economies: Russia, Ukraine and Romania.
- Numerous disarrays identifying with the arrangement of strategies utilized by Monetary Policy in a specific space of study financial variables and parameters can reconsider anticipated time-arrangement and/or uncertainty in terms of model errors.

Government Policy. The Dynamics of the Economy. The law of motion for the capital stock is defined by how much households save. In per effective worker terms, the law of motion is:

$$k_{t+1} = \frac{1}{(1+n)(1+g)}\ s(r_{t+1})w_t \qquad (1)$$

Note, $w_t = f(k_t) - k_t f'(k_t)$ is is functions of the amount of capital per effective worker purchased today t. The savings rate is a function of $r_{t+1} = f'(k_t)$, which is a function of the capital stock next period, $t + 1$. We can therefore express the capital stock next period in terms of the model parameters and the capital stock today k_t :

$$k_{t+1} = \frac{1}{(1+n)(1+g)}\ s(f'(k_t))\ [f(k_t) - k_t f'(k_t)] \qquad (2)$$

Like the Solow model, the balanced growth path occurs when the capital stock per effective worker is not changing. That is, when $k_{t+1} = k_t$, so that $\Delta k = 0$. We cannot go further with the expression above. While the model does have an implicit solution from the expression above, it does not have a closed-form solution. We are able to show that the capital stock will converge to a steady state value, but we cannot solve for this value explicitly.

Logarithmic Utility and Cobb-Douglas Production. However, if we assume a Cobb-Douglas production function and log utility, we can solve for the steady state level of capital per effective worker. From above, the savings rate is constant in the log utility case:

$$s = \frac{1}{2+\rho} \qquad (3)$$

[2]Victoria Fală (2020) "Repere pentru politica de atragere a investițiilor și de sporire a competitivității exporturilor Republicii Moldova în contextul crizei economice generate de COVID-19. (Repere pentru politica de atragere a investițiilor și de sporire a competitivității exporturilor Republicii Moldova în contextul crizei economice generate de COVID-19)". Theses of International Scientific Conference **"Economic and Social Implications of the COVID-19 Pandemic: Analysis, Forecasts and Consequences Mitigation Strategies"**. October 23, 2020. Chisinau (Republic of Moldova

The real wage rate per effective worker is:

$$A_t w_t = (1-\alpha)\, k_t^{\alpha} \qquad (4)$$

Therefore, the law of motion for the capital stock is:

$$k_{t+1} = \frac{1}{(1+n)(1+g)} \; \frac{1}{2+\rho}\,(1-\alpha)k_t^{\alpha} \qquad (5)$$

Since the Diamond model is a two-period model, it doesn't have a diagram analogous to the Solow Growth Model. We can use the expression above to see how a change in the model parameters affect outcomes. The underlying dynamics and convergence to steady state is similar to Solow. Consider the following:

- Increase in population growth rate *n*:

$$k_{t+1} > \frac{1}{(1+n)(1+g)} \; \frac{1}{2+\rho}\,(1-\alpha)k_t^{\alpha} \Longrightarrow \Delta k > 0 \Longrightarrow k \uparrow \text{ until } k_{t+1} = k_t = k_{new}^{*} \qquad (6)$$

- Increase in savings rate (decrease in ρ):

$$k_{t+1} < \frac{1}{(1+n)(1+g)} \; \frac{1}{2+\rho}\,(1-\alpha)k_t^{\alpha} \Longrightarrow \Delta k < 0 \Longrightarrow k \downarrow \text{ until } k_{t+1} = k_t = k_{new}^{*} \qquad (7)$$

We maintain the same basic implications as the Solow Growth model. The fundamental difference in the Diamond model is that the savings rate is determined by households maximizing utility. The key implications for economic growth are identical:

- The growth rates of key variables are identical. Specifically, per capita output grows at rate *g*.
- Changes to the model parameters (besides *g*) lead to changes in steady state, but do not lead to changes in the growth rate of variables in per capita terms. In other wards, a change in the savings rate affects per capita income, but does not affect its growth rate.

The Speed of Convergence

At steady state, $k_{t+1} = k_t = k^{*}$: (8)

$$k^{*} = \frac{1}{(1+n)(1+g)} \; \frac{1}{2+\rho}\,(1-\alpha)k^{*\alpha} \qquad (9)$$

$$k^{*} = \left[\frac{(1-\alpha)}{(1+n)(1+g)(2+\rho)}\right]^{\frac{1}{1-\alpha}} \qquad (10)$$

$Solving\ for\ y^{*}$:

$$y^*: = [\frac{1-\alpha}{(1+n)(1+g)(2+\rho)}]^{\frac{\alpha}{1-\alpha}} \quad (11)$$

The speed of convergence to steady state depends on capital share of output α. If there is a change in the model's parameters, capital per effective worker gets $(1 - \alpha)$ of the way to the new steady state value each period. This makes sense because the transition to a new steady state is based on the accumulation/decumulation of capital per effective worker. If α is low, it will take relatively longer for this process to occur. For a given value of α, the economy will converge to steady state more quickly in the Diamond model vs. the Solow model.

Government in the Uzawa-Lucas Model. The Diamond model is a natural model to use for looking at the implications of government tax/savings policy. Allowing for two different types of households allows us to understand the differential effects of such policies. For simplicity, Romer focuses on the log utility case where the savings rate is constant.

Suppose the government introduces a program that makes savings compulsory for households. The government collects a lump-sum tax *G* from households when they are working in period (1) and returns the funds to these households (plus interest) $G(1 + r_{t+1})$ when they are retired in period (2). Consider how this affects the lifetime budget constraint. Starting with the definition of second-period consumption, we observe that a portion *G* is deducted from savings because of the lump-sum tax, but $(1 + r_{t+1})G$ is available for the retired household to consume:

$$C_{2t+1} = (1 + r_{t+1})(A_t w_t - C_{1t} - G) + (1 + r_{t+1})G \quad (12)$$

$$C_{1t} + \frac{1}{1 + r_{t+1}} C_{2t+1} = A_t w_t \quad (13)$$

Notice that this collapses to the same lifetime budget constraint in the model above. This makes sense because the households are going to save the same fraction of their before- and after-tax income. The level of private savings will be lower because the government is taking a portion of the household's savings as part of the mandatory program. If the government does not invest these funds into the economy's capital stock, then the steady state capital stock per effective worker will be lower. Permanent changes in the lump-sum tax *G* will affect the steady state, but do not affect the growth rate of per capita income. Temporary changes in *G* will not affect outcomes because households know the value will return to its initial level and will consume and save based on the long-run value of *G*. It is important to note that this is not the Social Security System in the United States. Instead of each generation financing its own retirement, the working generation pays for it with taxes. This suggests that the amount collected by the retired households depends not only on the interest rate, but on the population growth rate.

Data. The data series used in the empirical analysis have a quarterly frequency and were obtained from the National Bureau of Statistics for the Economy of the Republic of Moldova, as well as from the Area Wide Model (AWM) database (for more details see Fagan et al., 2005 as well as the website - https://eabcn.org/page/area- wide-model). The analyzed periods are 2000: 1–2021: 1. Regarding the determination of potential GDP, the HP filter was used to estimate it. As primary references or used two sources mainly as follows: https://www.mathworks.com/help/econ/hpfilter.html but also the article by Robert J, Hodrick and Edward C. Prescott[3] from 1999. Phillips used in its unemployment rate model, however lately, the output gap is being used more and more frequently due to the problems encountered by measuring NAIRU, the natural unemployment rate, this being the reason why we used the production gap. We assumed that there are different models of dynamic Phillips Curve (PC)- price adjustment in a common framework. The system draws intensely on the model of exogenous ostensible inflexibility and the model of inflation targeting. Time is discrete. Each period, incompletely competitive firms deliver output utilizing labor as their as it were input. As within, the production function is one-for-one; in this way total output and total labor input are rise to. The model excludes government purchases and worldwide exchange, total consumption and total output are equal. Households maximize utility, taking the ways of the real wage and the real interest rate as given. Firms, which are claimed by the households, maximize the present discounted value of their profits, subject to constraints on their price-setting (which shift over the models we'll consider). At last, a central bank decides the way of the real interest rate through its conduct of money related arrangement.

Conclusions and Discussions. For the nations examined here, modern advancement has been a significant reason for monetary development. Yield extension has been related with send out advancement, expanded exchange opening, monetary progression and a better business environment in the majority of the nations. Nonetheless, import security and particular government intercession have been utilized too.

As neediness in many emerging nations is an overwhelmingly provincial issue, expanded agrarian efficiency is much of the time a key to destitution decrease at the beginning of monetary turn of events. This has been the case for example in Moldova and Indonesia. Nations that have begun their monetary changes - as Moldova did

- with farming change or generally underscored provincial improvement have - toward the start - commonly experienced declining disparity because of a diminishing of country destitution. In Korea and Taiwan, because of land changes of prior many years, pay appropriation was moderately in any event,

[3] Hodrick, Robert J, and Edward C. Prescott. "Postwar U.S. Business Cycles: An Empirical Investigation." Journal of Money, Credit, and Banking. Vol. 29, No. 1, February 1997, pp. 1–16.

when quick industrialization started. In Indonesia, oil rents were utilized in supporting rustic turn of events.

After the beginning phases of monetary turn of events, development in the modern area is, in any case, fundamental for supported long-run development and neediness reduction. In the nations contemplated, the development of the assembling area has created work potential open doors outside farming and, as assembling in large numbers of these nations has been - essentially toward the start - concentrated in incompetent work, the poor have benefited. In certain nations, similar to Korea, development during specific periods has obviously been supportive of poor, with the poor benefiting relatively more than the non-poor. There are, nonetheless, massive contrasts between nations to the extent that the effect of industrialization on the poor is concerned. In Moldova, for instance, the development of the assembling area in the last part of the 1980s and mid 1990s helped gifted specialists to a more prominent degree than incompetent ones. Frequently, financial development has been joined by expanding imbalance over certain periods, regardless of whether neediness in outright terms has declined - as shown by the new involvement with Moldova.

The degree to which modern advancement successfully diminishes neediness and imbalance relies upon the example of industrialization. Enterprises which utilize a high extent of untalented specialists and additionally utilize homegrown data sources and natural substances delivered with work escalated advancements can decidedly affect livelihoods of poor people. In Taiwan, for instance, during the beginning stages of modern turn of events, the interest for incompetent work-ers expanded comparative with that for gifted laborers, which diminished imbalance and destitution. At later stages, interest for gifted laborers fundamentally expanded, alongside an adjustment of Taiwan's commodity and assembling structure. At that point, Taiwan had made significant interests in human resources, so the impact on pay circulation of changing ability requests was moderately muffled. The Republic of Korea has followed a comparable way. In Brazil and India, then again, producing has would in general be somewhat capital concentrated, setting out moderately unassuming work open doors for poor people. Additionally in India, the help area has been a significant supporter of late development, yet the powerful assistance enterprises like programming and administrative center handling have given not many positions to the untalented straightforwardly. In any case, with solid development execution for the beyond 15-20 years, the neediness rate in India has altogether declined. The topographical area of industry can likewise influence the degree to which industrialization is supportive of poor. In Moldova, industrialization has essentially expanded per capita pay, however as modern improvement has been amassed in the eastern seaside districts of the country, imbalance between locales has expanded and modern advancement has contributed somewhat little to neediness decrease in a significant part of the inside. In any case, between provincial work versatility is high and the settlements sent home by traveler laborers can assist with alleviating impacts of geographic grouping of industry on local imbalance. Topographical reasons - or monetary distances - likewise part of the way make sense of why a few pieces of Brazil, India, Indonesia or Moldova are significantly less

evolved than different pieces of those nations. Beginning circumstances fundamentally sway on whether major modern improvement happens, and whether industrialization speeds up financial development and diminishes neediness. Major circumstances for supportable eco-nomic development and modern advancement incorporate political, social and macroeconomic solidness, well-working establishments and law and order. The job of government is fundamental in making these. Assuming these system conditions are inadequate with regards to, speculations - whether unfamiliar or homegrown - are probably going to be not many and development restricted and fluctuating. Monetary flimsiness is probably going to affect particularly poor people, as has happened for example in Moldova during the 1990s and in Indonesia in the last part of the 1990s. In Korea and Taiwan, then again, financial advancement has been substantially more steady. Government plays a significant part in framework and HR advancement as well as in empowering and supporting development and innovative overhauling. For destitute individuals, training is much of the time a road to better business and pay amazing open doors. The presence of all-inclusive instruction, as in Moldova, gives the unfortunate better prospects to partake in the advancement interaction.

At the beginning of their turn of events, nations might depend on essential assets or a modest workforce, and every one of the nations dissected here have started their advancement cycle by depending on either of these elements. Over the long haul, notwithstanding, interest in human resources and mechanical overhauling are fundamental assuming a nation wishes to remain globally cutthroat and support monetary success. Korea and Taiwan are genuine instances of nations where HR advancement fundamentally affects modern turn of events and expansive financial development. Because of quick specialized change and globalization, rivalry is turning out to be increasingly extreme, and the ability to utilize cutting edge innovations is progressively essential to succeed. That limit is over each of the an element of the educational fulfillment and abilities level of the labor force. Nations might decide to fabricate their modern abilities through homegrown innovative work as Taiwan and Korea did to a consider-capable degree. A more normal methodology has been to plug into worldwide worth chains and become a provider of work concentrated items (UNIDO, 2002), continuously updating innovative abilities through unfamiliar speculations. This is the technique utilized for example by Moldova. The two methodologies are not totally unrelated, and numerous nations depend on a blend of innovation imports and improvement of homegrown advancements and mechanical abilities, with the equilibrium having a tendency to move towards the last option as monetary improvement continues. Legislatures play a huge part in ability working as well as in drawing in FDI. All nations examined here have, sooner or later in time, completed particular modern approaches, by which they have planned to change the sectoral construction of creation towards areas accepted to offer more noteworthy possibilities for quicker efficiency development. Taiwan and particularly Korea are instances of product fabricating focused nations which have effectively involved government intercession and import assurance in the beginning stages of improvement of their assembling areas. Today, the level of

strategy opportunity left to agricultural nations is narrower than it was a few decades prior, regardless of whether some very much arranged government intercession might appear to be defended in light of the examples of overcoming adversity of the previous many years. Nonetheless, legislatures actually play an essential part in advancing feasible monetary development and particularly neediness diminishing development. As well as guaranteeing solidness, well-working foundations and suitable regulation (for example work regulations), other fundamental government activities are connected with abilities arrangement, innovation support, advancement funding, foundation improvement, and arrangement of an assortment of public merchandise. Every one of these affect the development and exchange execution of a country. Fast financial development as such will in general diminish neediness. Quick development might increment pay disparity, however this isn't unavoidable. Whether it does, relies not just upon the expertise predisposition of specialized change in an economy yet on human capital development measures and on the idea of tax collection and use strategies. Notwithstanding advancement of occupation making ventures and SMEs and sup-porting the production of homegrown linkages, disparity can be diminished for example by sponsored admittance to schooling, financed lodging, moderate tax assessment or monetary resource reallocation like land changes.

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HETEROGENEOUS EFFECTS OF FISCAL RULES UNDER THE MAASTRICHT FISCAL CRITERION: BUDGET FISCAL DEFICIT AND DEBT SUSTAINABILITY ANALYSIS

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Abstract. *We contend that ambivalence or uncertainty regarding the error terms may be the root cause of many methodological misunderstandings in time-series econometrics. Macroeconomic time series have imprecise relationships, and early econometricians invariably discovered that any estimated relationship would only fit with errors. Second part is designed to quarterly estimated structural macro econometric model for the Republic of Moldova, denoted A Classical Macroeconometric Data Model for the Republic of Moldova (MDM) in context of Neo-Classical Approach of the Economy. We have interpreted the term error from the perspective of 7 macroeconomic indicators, namely Gross Domestic Product (error, pension), Inflation Rate (error, wage and salary,) Interest Rate (error, unemployment) Unemployment Rate (error inflation rate), Budget Fiscal Deficit (error, ra-gap vat gap estimation), Public Debt (ra-gap vat gap estimation) and Exchange Rate (error, gross domestic product). As research methods, we examines the interpretation of equation errors in time series econometrics. We contrast the view of errors as what is omitted from the statistical model with the view that the errors represent the shocks that are the important driving forces of model dynamics. The history of econometrics may be seen as oscillating between these interpretations of errors, with some econometricians attempting to maintain both simultaneously. As results, in 2020 due to COVID-19 we decomposes the dynamics of the modeled variable into three parts: short-run shocks, disequilibrium shocks, and innovative residuals, with only the first two of these sustaining an economic interpretation.*
Key words: *error term, time-series, dynamic models, simultaneous-equations models, interpretation, econometrics*
JEL: *B23, C15, C22, C30, C32, H60*
UDC: *330.43*

Introduction. The share of the world's population that needs to be saved has declined in recent decades. In 1981, 33% of the world's population lived in poverty, compared to 18% in 2001 and 9% in 2020, according to Chen and Ravallion (2004). In mediumpay countries such as Moldova and Romania, the rot is mainly due to rapid monetary growth. In spite of this, in the cause situation there are astonishing differences between countries and places. Surprisingly, the East European countries are rapidly catching up with their industrialized counterparts. Other countries,

especially in the Balkans, have also been slow to catch up and there has even been an increase of those who need help. The major points of the paper should be summarised in a conclusion to the Research Paper, which would help readers understand what is going on. Although conclusions do not usually contain any new information which was not mentioned in the article, they are frequently reworded or given a fresh perspective on this subject. Illustrating their development cycles and methods, the significance of current events, the extent and commitment of development implementation techniques, and the effects on open commitments are the key goals. A stable relationship is a crucial fix on business cycle models and the readings for macroeconomics courses. However, little is understood about the fact that flexibility is caused by the same power that powers the business cycle. The following three key results are achieved: Deficit adaptation is, and in many cases very much on a consistent basis between different kinds of shocks, within the range of 2 to 3 years. Differences are more pronounced at other limited time horizons. The shocks causing the swings dictate how quickly the unemployment rate varies in relation to the yield. It emphasizes how crucial it is to take longer skylines into account. If this isn't the case, one could mistakenly conclude that the flexibility splits during some cycles. The most crucial factor in financial crises is flexibility. We believe these findings could contribute to the understanding of the early recovery of extreme shortages after the financial crisis of 2007. Compared to shocks to the financial system and public spending, it is far higher. Daly et al. (2013), who additionally measure flexibilities unique to shocks. This piece is being constructed from three angles. In any case, we are thinking about providing a more thorough protection against economic shocks.The shocks causing the swings dictate how quickly the unemployment rate varies in relation to the yield. It emphasizes how crucial it is to take longer skylines into account. If this isn't the case, one could mistakenly conclude that the flexibility splits during some cycles. The most crucial factor in financial crises is flexibility. We believe these findings could contribute to the understanding of the early recovery of extreme shortages after the financial crisis of 2007. Compared to shocks to the financial system and public spending, it is far higher. Daly et al. (2013), who additionally measure flexibilities unique to shocks. This piece is being constructed from three angles. In any case, we are thinking about providing a more thorough protection against economic shocks.

Literature Review. Robert Solow's development model, known as neo-old style, plays a major role in shaping our current knowledge of economic development. Capital accumulation plays a vital role in the economic advancement in the Solow model. Enhanced skill levels - determined by a gain in productivity per worker; these advances in capital per skilled worker, or capital deepening, are assessed by an increase in productivity per employee (e.g. Fagerberg 1994). Capital formation will go on until the economy hits a certain level. where investment and the ratio of capital to labour remain stable. Jones 1998 suggests that the speed at which an economy should expand is negatively related to the size of its foundation. Any variations in individual income within the stable state are due to outside technological advancements. It is thought that mechanical interaction progresses at a consistent

pace, yet it is impacted by monetary incentives. Some agents have noticed that considering the workforce's nature - human resources - reduces the unexplained growth, known as the Solow residual, by a slight amount in overall output growth, indicating that both capital and labour are significant. Romer (1986, 1990) and Lucas (1988) introduced the endogenous growth hypothesis, with the Solow model being central to it. Due to the allocation choices made by financial authorities, new advancements are integrated within the model itself (refer to Aghion and Howitt 1998, Veloso and Soto 2001). Research and development (R&D) activities fuelled by private companies' profit expectations drive the advancement of mechanical development. Unlike some other sources of creation information, innovation and data can be shared without being depleted (see Romer 1990). Furthermore, fresh data could improve the effectiveness of current information, resulting in increased productivity and scalability. Therefore, there is no need for wages to be equal in all countries, and the effectiveness of capital in peripheral areas does not decline as GDP per capita increases. Technology and modernization are the main forces behind profound change. According to Schumpeter, progress breeds "imaginative destruction," a process in which newly invented products and businesses take the place of more established ones and continue to grow and change (see Verspagen, 2000). When more useful and productive industries and businesses take the place of less benefit and productive ones, the economy becomes more efficient. As a result, technical innovation is the primary driver of the current economic expansion. Because most new innovations began in the manufacturing sector during the Industrial Revolution, Kaldor (1970) and Cornwall (1977) have argued that the expansion of this sector is a major engine for economic growth (see Verspagen, 2000). Furthermore, Cornwall (1976, 1977) pinpointed cutting-edge advancements in specific manufacturing fields as the main catalyst for enhanced efficiency in several other sectors. Manufacturing typically takes the lead and outpaces other sectors as development speeds up, as stated by Syrquin (1986). Nevertheless, even with reduced wages, assembly has minimal influence on GDP and its contribution to overall development is gradual. Faster sectoral growth dramatically increases overall output and labor productivity growth as assembly gains a greater share of outputs, frequently as a result of shifts in local demand and comparative advantage. In industrialized nations, R&D projects serve as the primary driving force behind technical developments. Nevertheless, this is not the main element of revolutionary transformation. Regardless of whether innovation and sources of information stay the same, businesses and individuals progress by taking action (refer to Bolt 1962). Since non-industrialized countries have few R&D resources and are remote from the technological frontier, the global dissemination of innovation is essential for increasing efficiency. Global financial exchanges, such as international trade and startup companies, are important catalysts for productivity development and innovation. Innovation must spread effectively if there are sufficient human resources, strong mechanical improvement incentives, and sound foundations. Initial transformation is largely driven by the need to strike a balance between national and international interests. People who are paid relatively little put a significant amount

of their money toward eating expenses. This deal will typically worsen as salaries increase, even with increasing interest rates on mortgages. Similarly, as wages increase, the cost of goods rises at a slower pace compared to the quicker increase in the cost of services. Changes will also have an effect on the economy's work efficiency, sectoral work, and result offers. Furthermore, the exchange of goods and services among countries influences the specialization trends and the pace of industrialization or fundamental transformations in companies. In a system of free trade, countries will usually import items that are costly to produce domestically and will focus on producing goods in which they have a comparative advantage. Additionally, the openness of trade is also endangered by the possibility of attracting new investments to the country. This is often crucial, particularly in the initial phases of raising capital. As local companies compete with external sources, they have the opportunity to increase their efficiency. - Nevertheless, the involvement of new trading issues and the openness of trade (like Amable, 2000; also Rodrik in this volume). Moreover, there is no guarantee that concentrating on a specific area will lead to increased growth rates by itself. This is particularly noticeable in agricultural countries that depend on primary goods. Specialization in the production of goods is sometimes needed due to decreased real global costs of non-oil goods over time, which are influenced by significant current fluctuations (refer to Bolt 1962 for example). Global spread of innovation is crucial for advancing efficiency because of the lack of research and development efforts in developing countries and their remoteness from centers of innovation. Overall, economic connections, particularly global trade and new investment opportunities, play a significant role in driving growth and expanding economic development. However, in order for innovation to spread effectively, there needs to be a competent level of HR, driven by strong technological advancement, and somewhat organized. The main driving force behind the fundamental change is the adaptation of lossiness and global interest. Individuals allocate a considerable amount of their earnings towards food expenses at a reasonable rate. As wages increase, this deal will typically decrease, as interest in manufacturing increases. Additionally, with further increases in wages, worker demand rises at a slower pace compared to the quick increase in demand for services. Changes that are well-liked will impact the efficiency of the economy's functioning and the business propositions within various sectors as well. Trade also affects the rate of industrialization or the basic transformation of industry, as well as the exceptionalization tactics adopted by nations. A free trade agreement allows countries to export pricey commodities that would otherwise be produced domestically in exchange for maintaining considerable control over the production of goods in which they specialize. Increasing the country's openness to trade also makes it more likely to draw in foreign investment. This is frequently required, particularly in the formative phases of growth. In addition to increasing productivity, external competition may also benefit local businesses. Nonetheless, trade openness and the structure of undeclared commerce are significant (see, for instance, to Amable, 2000; Rodrik in this volume). Additionally, specialization alone does not

ensure higher rates of development. This is particularly clear in underdeveloped countries that rely on crucial goods.

Framework and Assumptions. We consider a Danish Model of Fiscal Policy, where budget accumulation soars to 44% of GDP (as presented below). The remaining 56% will be considered the subject of the Pension Fund, allocated within an Overlapping - Generations Infinite Horizon model. The Gross Domestic Product is a synthetic indicator because it does not refer to the nominal convergence criteria from Maastricht (1993). Therefore, within the article, the comparison framework regarding the total indicated volume/GDP at one year is taken into account as a 100% reference.

60%	75%	90%	105%	120%	135%	150%	165%	180%	195%	210%	225%	240%	Public Debt
W	X	Y	Z	A	B	C	D	E	F	G	H	I	
-48%	-44%	-40%	-36%	-32%	-28%	-24%	-20%	-16%	-12%	-8%	-4%	3%	Budget Fiscal Deficit
AAA	AA	A	BBB	BB	B	CCC	CC	C	DDD	DD	D	E	
DDG				DDF				DDB					
-12%	-11%	10%	-9%	-8%	-7%	-6%	-5%	-4%	-3%	-2%	-1%	3%	Local Fiscal Policy Deficit
AAA	AA	AA	AD	BBB	BB	B	BD	CCC	CC	C	CD	D	
-12%	-11%	-10%	-9%	-8%	-7%	-6%	-5%	-4%	-3%	-2%	-1%	NR (Not Rated)	RA-GAP VAT Gap Estimat.
AAA	AA	A	BBB	BB	B	CCC	CC	C	DDD	DD	DD	N	
+96%	+88%	+80%	+72%	+64%	+56%	+48%	+40%	+32%	+24%	+16%	+8%	-4%	Gross Domestic Product
12	11	10	9	8	7	6	5	4	3	2	1	0	
1	2	3	4	5	6	7	8	9	10	11	12	13	Budget

Source: Author's calculation, Gross Domestic Product, Value-Added Tax, Budget Fiscal Deficit & Public Debt

DDG, Remittances. Percentage Points from GDP.
DDF New Budget Execution, Percentage Points from GDP
DDB Local Budget Execution, Percentage Points from GDP

Credit Rankings. We assume that Budget Fiscal Deficit and Public Debt is subject of Credit Ranking (Greece, to see 2009 Sovereign Debt Crises) and (2020 Covid-19 Medical Crises). The Relationship between these two crises concern about 11 years of economic growth and inflation. Economic growth is seems to be Gross Domestic Product, and Inflation – Harmonized index of consumer' price, which is by the way, a index which covers financial movement of economy. Interest rate is described by Taylor Rule, which consist of inflation rate and Gross Domestic Product. Interest relate a financial sector, not market sector (inflation rate).

A – Pre-Investment Grade
B – Investment Grade

C – Upper-Investment Grade
D – Speculative Grade
E – Not Rated

Financial balances and other monetary characteristics are impacted by automatic effects and discretionary policy measures that arise from changes in the macroeconomic environment, which are frequently connected to fluctuations in output. Tax cuts and spending increases are two examples of discretionary policy measures that could negatively impact the budget balance. When economic activity slows, revenues decline and spending may naturally increase (many expenses, including unemployment benefits, adapt to the cycle). As a result, the economy's balance deteriorates. Because these changes are the product of cyclical influences, relying just on changes in the budget balance may be misleading because they may appear to be deliberate expansionary or contractionary policy measures.

Therefore, consistent changes are implemented to manage the impact of recurring advancements on economic factors and assess the undisclosed financial status. In order to achieve this, the cyclically adjusted balance that is adjusted nominally must be defined initially. The following is a method to analyze the total fiscal balance (OB). As a result, new methods of investigation must be developed that would allows for a more precise increase in the effectiveness of applied techniques like statistical-mathematical techniques, questionnaires, descriptive methods, etc. Econometrics is the science that incorporates financial hypothesis, mathematics and statistics, at times when the way the results are interpreted involves risk and uncertainty. The point of the paper is to foster an econometric estimating model, in light of the hypothesis economic, where estimates and projections for the Republic of Moldova's gross domestic product will be made. as facts In the beginning, the series of quarterly GDP values from 1995 to 2018 (average prices in 2010) will serve. The authors were of the opinion that it was necessary to use a series expressed in constant prices; as a result, the effect was not expansion, as uncovering the genuine development of GDP is significant. The percentage of the world's population in need of assistance has declined in recent years. According to Chen and Ravallion (2004), the percentage of people living in poverty decreased from 33% in 1981 to 18% in 2001 and thereafter to 9% in 2020. The majority of the drop can be attributed to the significant economic growth seen by middle-income nations like Moldova and Romania. Nevertheless, the creative community varies surprisingly throughout countries and areas. Many nations and regions, particularly those in Eastern Europe, are quickly recovering from the recent setbacks experienced by wealthy nations. In the Balkans and in some other countries, a lot of people are falling behind; in fact, some are becoming more and more destitute.

Slovakia, the Czech Republic, Hungary, Poland, Romania, and the Republic of Moldova have seen notable economic expansion due to contemporary advancements. Poverty rates have declined in numerous countries due to rapid economic development. While certain countries have effectively achieved development with added value, others have continued to experience high levels of inequality. The key

focus is on showcasing their growth processes and methods, the role of contemporary innovation, the accountability and scope of strategies for advancement performance, and the influence of development on public obligations. The survey starts with a brief theoretical conversation about the influence of current development and progress, as well as the effect of advancement on depression and income during downturns, and then continues at the national economic model level. Public debt is expected to determine the short-term yield sensitivity of budget deficit, such as a one percentage point increase in output. In macroeconomics courses, it is important to have a consistent connection between business cycle models and the assigned readings. Yet gradually becoming conscious of whether the force propelling the economic cycle is accountable for its adaptability. An example of the complexity is whether unemployment and outcomes move differently during recessions caused by financial crises or oil supply disruptions. The lack of verification is surprising given the tensions that arise when the relationship is strained and is especially fragile during recoveries from downturns in financial market turmoil (such as Gordon, 2010). This paper presents a key technique for assessing the potential impact of a significant shock-induced budget deficit on government debt sustainability. It assesses the amount that the deficit rate falls over a given skyline in the event that a macroeconomic shock on a comparable skyscraper causes the outcome to grow by one rate point. The expectation is based on relapses of the overall deficit on the total obligation, which is the fundamental instrumental variable. Analyzing information on Moldovan government spending, fees, monetary policy, fiscal policy, technical developments, and petroleum price changes. Three key findings include: Shortfall flexibilities usually stay consistent for different types of shocks over a moderate period (two to three years). Discrepancies are more noticeable with fewer available options. The pace of unemployment fluctuations in proximity to production is influenced by the driving shocks. This highlights how crucial it is to account for longer skylines. If not, inaccurate conclusions regarding how flexibility is distributed in particular cycles may be drawn. The best times to show flexibility are during financial shocks. These findings, in our opinion, can contribute to our understanding of the early stages of the "excessive shortage" recovery following the financial crisis of 2007. Compared to government spending and financial system shocks, it is far higher. Additionally, Daly et al. (2013) assess flexibility deficiencies unique to shocks. There are three distinct ways to construct the piece. We start by looking at a more inclusive definition of macroeconomic shocks. Furthermore, in contrast to Daly et al. (2013) with their two-venture system and three-stage Klein Macroeconomic Model, we propose a single-venture approach to versatility. This increases productivity and makes creating trust groups easier. Furthermore, we can perform weak strong induction with our approach. The latter point is crucial since large-scale shocks frequently have a little margin of error in the commitments made to pertinent variables, which might cause issues with the instruments (Gorodnichenko and Lee, 2017).

The level of public debt. The market-access country (MAC) debt sustainability analysis (DSA) framework is based on a general and flexible identity characterizing the evolution of the stock of public debt. In its most basic form,

the evolution of public debt can be characterized in the following way:

$$D_{t+1} = \frac{e_{t+1}}{e_t}(1 + i^f_{t+1}) * D^f_t + (1 + i^d_{t+1}) * D^d_t - (T_{t+1} + G_{t+1} - S_{t+1}) + O_{t+1} + RES_{t+1}) \quad (35)$$

(1)

Obligations associated with the stock of debt from the previous period

Primary Fiscal Balance

Other one-time factors

Where subscripts refer to time periods and superscript *"f", "d"*, refer to foreign-currency and domestic-currency denominated debt, respectively.

D^f_t is the stock of foreign currency as obligations-denominated debt at the end of period t.
D^d_t is the stock of domestic currency as obligations -denominated debt at the end of period t.
e_{t+1} is the stock of foreign currency as obligations -denominated debt at the end of period t.
i^f_{t+1} is the stock of domestic currency as obligations -denominated debt at the end of period t.
i^d_{t+1} is the stock of domestic currency as obligations -denominated debt at the end of period t.
T_{t+1} is the stock of taxes-denominated debt at the end of period t.
G_{t+1} is the stock of grants-denominated debt at the end of period t.
S_{t+1} is the stock of expenditures-denominated debt at the end of period t.
O_{t+1} is the stock of other one-time factors-denominated debt at the end of period t.
RES_{t+1} is the stock of other one-time factors -denominated debt at the end of period t.

For simplification, the primary balance (PB) is no longer decomposed into taxes (T), grants (G) and expenditures (S). The basis for the decomposition of the change in the debt-to-GDP ratio—the debt dynamic—is as follows:

$$D_{t+1} = (1 + \varepsilon_{t+1}) * (1 + i^f_{t+1}) * D^f_t + (1 + i^d_{t+1}) * D^d_t - PB_{t+1} + O_{t+1} + RES_{t+1} \quad \text{(b)}$$

Where, ,$1 + \varepsilon_{t+1} = \frac{e_{t+1}}{e_t}$

The debt-to-GDP ratio and debt dynamics. To gauge the obligation trouble, scaling the supply of obligation by a proportion of reimbursement capacity is fitting. Since the format centers around the development of the obligation to-GDP proportion, this segment presents just the decay of this proportion.

Dividing equation (2) by nominal GDP in local currency (Y) in period t+1, yields the following expression:

$$\frac{D_{t+1}}{Y_{t+1}} = (1+\varepsilon_{t+1}) * (1+i^f_{t+1}) * \frac{D^f_t}{Y_{t+1}} + (1+i^d_{t+1}) * \frac{D^d_t}{Y_{t+1}} - \frac{PB_{t+1}}{Y_{t+1}} + \frac{O_{t+1}}{Y_{t+1}} + \frac{RES_{t+1}}{Y_{t+1}}$$

Using small caps to express contemporaneous ratios:

$$d_{t+1} = (1+\varepsilon_{t+1}) * (1+i^f_{t+1}) * \frac{D^f_t}{Y_{t+1}} + (1+i^d_{t+1}) * \frac{D^d_t}{Y_{t+1}} - PB_{t+1} + o_{t+1} + res_{t+1}$$

Let $Y_{t+1} = (1+g_{t+1}) * (1+\pi^d_{t+1}) * Y_t$, where g is the real growth rate of the economy and π is domestic inflation (as measured by the change in the GDP deflator), we can further define the previous expression:

$$d_{t+1} = \frac{(1+\varepsilon_{t+1}) * (1+i^f_{t+1}) * D^f_t}{(1+g_{t+1}) * (1+\pi_{t+1}) * Y_t} + \frac{(1+i^d_{t+1}) * D^d_t}{(1+g_{t+1}) * (1+\pi_{t+1}) * Y_t} - pb_{t+1} + o_{t+1} + res_{t+1}$$

Deducting dt from both sides, the change in the debt-to-GDP ratio (the debt dynamic) is therefore:

$$d_{t+1} - d_t = \frac{(1+\varepsilon_{t+1}) * (1+i^f_{t+1})}{(1+g_{t+1}) * (1+\pi_{t+1})} * d^f_t + \frac{(1+i^d_{t+1})}{(1+g_{t+1}) * (1+\pi_{t+1})} dd_t - pb_{t+1} + o_{t+1} + res_{t+1} - d_t$$

Let $\rho_{t+1} = (1+g_{t+1}) * (1+\pi_{t+1})$

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}} [(1+\varepsilon_{t+1}) * (1+i^f_{t+1}) * d^f_t + (1+i^d_{t+1}) * d^d_t] - pb_{t+1} + o_{t+1} + res_{t+1} - d_t$$

Isolating the contribution from the exchange rate,

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}} [(1+i^f_{t+1}) * d^f_t + (1+i^d_{t+1}) * d^d_t + \varepsilon_{t+1} * (1+i^f_{t+1}) * d^f_t] - pb_{t+1} + o_{t+1} + res_{t+1} - d_t$$

Moving the right-hand side dt inside the brackets…

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}[(1 + i^f_{t+1}) * d^f_t \ + (1 + i^d_{t+1}) * d^d_t + \ \varepsilon_{t+1} * (1 + i^f_{t+1}) * d^f_t - d_t * (1 + g_{t+1}) * (1 + \pi^d_{t+1})] - pb_{t+1} + o_{t+1} + res_{t+1}$$

Isolating the contribution from real GDP growth,

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}[(1 + i^f_{t+1}) * d^f_t \ + (1 + i^d_{t+1}) * d^d_t + \ \varepsilon_{t+1} * (1 + i^f_{t+1}) * d^f_t - d_t * g_{t+1} -$$

$$-d_t(1 + \pi_{t+1} * g_{t+1} \ + \ \pi_{t+1}) - pb_{t+1} + o_{t+1} + res_{t+1}$$

Isolating the contribution from interest rates,

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}[i^f_{t+1} + d^f_t \quad + \quad i^d_{t+1} * d^d_t + d^f_t + d^d_t + \varepsilon_{t+1} \ * (1 + i^f_{t+1}) * d^f_t - d_t * g_{t+1} -$$

$$-d_t(1 + \pi_{t+1} * g_{t+1} + \pi_{t+1}) - pb_{t+1} + o_{t+1} + res_{t+1}$$

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}[i^f_{t+1} + d^f_t \quad + \quad i^d_{t+1} * d^d_t + \ \varepsilon_{t+1} \ * (1 + i^f_{t+1}) * d^f_t - d_t * g_{t+1} + d^f_t + d^d_t\text{-}d_t - d_t * (\pi_{t+1} * g_{t+1} + \pi_{t+1})] \ - pb_{t+1} + o_{t+1} + res_{t+1}$$

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}[i^f_{t+1} + d^f_t \quad + \quad i^d_{t+1} * d^d_t + \ \varepsilon_{t+1} \ * (1 + i^f_{t+1}) * d^f_t - d_t * g_{t+1} - d_t * \pi_{t+1}(1 + g_{t+1})] \ - pb_{t+1} + o_{t+1} + res_{t+1}$$

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}\left[d_t * \left(\frac{i^f_{t+1} * d^f_t}{d_t} + \frac{i^d_{t+1} * d^d_t}{d_t}\right) - d_t * \pi_{t+1} * (1 + g_{t+1}) + \varepsilon_{t+1} * (1 + i^f_{t+1}) * \ d^f_t \quad - d_t * g_{t+1}\right] - pb_{t+1} + o_{t+1} + res_{t+1}$$

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}\left[d_t * i_{t+1} - d_t * \pi_{t+1} * (1 + g_{t+1}) + \varepsilon_{t+1} \ * (1 + i^f_{t+1}) * \ d^f_t - d_t * g_{t+1}\right] - pb_{t+1} + o_{t+1} + res_{t+1}$$

Effective nominal interest rate (weighted average)

$$d_{t+1} - d_t = \frac{1}{\rho_{t+1}}\left[d_t * (i_{t+1} - * \pi_{t+1} * (1 + g_{t+1})) + \varepsilon_{t+1} \ * (1 + i^f_{t+1}) * \ d^f_t \quad - d_t * g_{t+1}\right] - pb_{t+1} + o_{t+1} + res_{t+1} \quad (36)$$

Contribution of effective interest rate	Contribution of the exchange rate	Contribution of real GDP growth	Contribution of primary balance and other factors

Where it+1 is the effective nominal interest rate (weighted average)
Where i_{t+1} is the effective nominal interest rate (weighted average)
This can also be expressed in terms of real interest rates and real exchange rates:

$$d_{t+1} - d_t = * \left(d_t * \left[r^d_{t+1} \frac{d^d_t}{d_t} + r^f_{t+1} \frac{d^f_t}{d_t} \right] - d_t * g_{t+1} + d^f_t * \xi_{t+1} * (1 + r^f_{t+1}) \right) - pb_{t+1} + o_{t+1} + res_{t+1}$$

Contribution of effective interest rate	Contribution of the exchange rate	Contribution of real GDP growth	Contribution of primary balance and other factors

Where,

$$(1 + i^d_{t+1}) = (1 + r^d_{t+1}) * (1 + \pi^d_{t+1})$$

$$(1 + i^d_{t+1}) = (1 + r^f_{t+1}) * (1 + \pi^f_{t+1})$$

$$1 + \xi_{t+1} = \frac{e_{t+1}}{e_t} \left(\frac{1 + \pi^f_{t+1}}{1 + \pi^d_{t+1}} \right)$$

What is debt sustainability analysis. Debt sustainability analysis (DSA) asks if, under current policies, a country or a government will be able to service its debts in the medium and long run without renegotiating or defaulting, and without having to undertake policy adjustments that are implausibly large economically and politically. DSA frameworks provide an intertemporal consistency check by testing whether macroeconomic plans are viable not only from a "flow balance" perspective but also from a "stock balance" point of view. They may also help dissuade policymakers from pursuing policies that deliver short-term benefits at the cost of creating unsustainable debts in the future. In recent years, the IMF developed an approach to debt sustainability that is now used in surveillance and lending decisions[5]. These DSAs help policymakers assess the risks associated with short-run macroeconomic forecasts and the policies on which such forecasts are based. A first risk is that projections of external or public debt may not be always grounded on sufficiently conservative assumptions. For instance, some governmental-supported programs have been based on assumptions about growth in export volumes and prices

[5] See, "Assessing Sustainability," IMF (2002, 2003).

that proved to be optimistic, contributing to excessive borrowing. A second key risk to the realism of forecasts is the assumed path of the real exchange rate. Countries may be able to sustain relatively large stocks of foreign currency denominated debt through real exchange rate appreciation over the medium term. As discussed, moreover, it may be reasonable to assume that some countries will experience secular real appreciation as an equilibrium phenomenon due to catch-up growth. While the assumption of real appreciation may be defended in some circumstances, experience in several countries that underwent substantial real depreciations following crises suggests that it is risky to base policies on the assumption that real appreciation will continue indefinitely. DSAs also allow policymakers to identify the economic sectors responsible for excessive debt accumulation, be they the national government (as in a number of African countries in the 1990s), subnational governments and state enterprises (as in some transition economies), or the private sector (as in the Asian crisis countries).

In many emerging market countries, debt ratios may be moderate and the main risk to sustainability may arise from liquidity problems. In some cases, countries do not have sufficient liquidity to cover maturing obligations even when they can be considered solvent, i.e., have relatively low and declining external debt-to-GDP ratios. Concerns about liquidity may arise, for instance, if the sovereign or private sector needs to make large amortization payments to creditors in the near future and foreign exchange or government revenues are insufficient. In such cases of temporary illiquidity, much depends on the willingness of creditors to maintain or increase their exposure in the short run. Market confidence is a crucial ingredient, and the vulnerability to confidence crisis needs to be evaluated and addressed alongside long-term sustainability.

For low-income countries that do not borrow from private capital markets, the sustainability of the public debt is largely de-linked from the sentiments of the market. It depends, instead, on the willingness of official creditors and donors to continue providing positive net transfers through concessional loans and grants[6]. For low-income countries that have high debt ratios, solvency is more of a concern than liquidity. DSAs allow a study of the exposure of the IMF and other multilateral creditors to individual borrowers. Finally, DSAs are also useful to assess the impact and response to powerful technological and demographic changes that constrain government policies in the long run. Fiscal DSAs help quantify the fiscal impact of population aging, immigration, and other long-run population changes.

Data. The data series used in the empirical analysis have a quarterly frequency and were obtained from the National Bureau of Statistics for the Economy of the Republic of Moldova, as well as from the Area Wide Model (AWM) database (for more details see Fagan et al., 2005 as well as the website - https://eabcn.org/page/area- wide-model). The analysed periods are 2000: 1–2021: 1. Regarding the determination of potential GDP, the HP filter was used to estimate it. As primary references or used two sources mainly as follows:

[6] For treatment of debt sustainability in low-income countries, see IMF,(2004, 2004a).

https://www.mathworks.com/help/econ/hpfilter.html but also the article by Robert J, Hodrick and Edward C. Prescott[7] from 1999. Phillips used in its unemployment rate model, however lately, the output gap is being used more and more frequently due to the problems encountered by measuring NAIRU, the natural unemployment rate, this being the reason why we used the production gap. We assumed that there are different models of dynamic Phillips Curve (PC)- price adjustment in a common framework. The system draws intensely on the model of exogenous ostensible inflexibility and the model of inflation targeting. Time is discrete. Each period, incompletely competitive firms deliver output utilizing labour as their as it were input. As within, the production function is one-for-one; in this way total output and total labour input are rise to. The model excludes government purchases and worldwide exchange, total consumption and total output are equal. Households maximize utility, taking the ways of the real wage and the real interest rate as given. Firms, which are claimed by the households, maximize the present discounted value of their profits, subject to constraints on their price-setting (which shift over the models we'll consider). At last, a central bank decides the way of the real interest rate through its conduct of money related arrangement.

Conclusions and Discussions. Modern progress has had a major impact on the economic growth of the countries studied. In many nations, increasing yield has been associated with export expansion, increased trade openness, economic growth, and better business environments. Nevertheless, import security and targeted government involvement have also been employed. In numerous developing countries, poverty is a common problem, and improving agricultural productivity is often crucial in reducing poverty at the beginning of economic growth. This phenomenon has been observed in countries like Indonesia and Moldova, where economic changes have led to a decrease in national uniqueness due to a reduction in the sense of national urgency, particularly at the early stages. During the rapid industrialization of Korea and Taiwan, pay distribution remained relatively moderate as a result of previous land reforms. Oil revenues were utilized to promote rural development in Indonesia. In any event, modernization is crucial for sustained long-term growth and poverty alleviation following the early stages of economic development. In the countries being looked at, the expansion of the manufacturing industry has created job opportunities beyond agriculture. Yet, due to the fact that the manufacturing process in these nations initially emphasized subpar quality, it is the underprivileged who have profited. In the same way as in Korea, specific stages of progress visibly favoured the impoverished, causing them to have a comparative edge over those who are not poor. However, there are significant variations among nations regarding the effects of industrialization on the disadvantaged. In Moldova, skilled professionals benefitted more than incompetent ones from the growth of the manufacturing sector in the late 1980s and mid-1990s. Although there may be a reduction in real poverty levels, the economic development in Moldova has shown an increase in inequality

[7] Hodrick, Robert J, and Edward C. Prescott. "Postwar U.S. Business Cycles: An Empirical Investigation." Journal of Money, Credit, and Banking. Vol. 29, No. 1, February 1997, pp. 1–16.

during certain timeframes. Industrialization exemplifies how modern technology effectively decreases poverty and inequality. Numerous countries depend on a mix of importing innovation and fostering domestic advancements and technical expertise. As financial growth progresses, the scale often tilts towards the latter choice. There is some connection between the two approaches. Laws have a substantial effect on the enhancement of skills and the increase of foreign direct investment. Every country studied has, at some point, implemented certain modern strategies aimed at shifting industrial growth towards areas with greater potential for faster productivity growth. During the initial phases of establishing their manufacturing hubs, Taiwan and Korea's governments successfully integrated import protection and state intervention. Although successful government intervention may seem justified based on recent success stories, developing countries have less policy freedom compared to past decades. Nevertheless, legislatures are essential in facilitating sustainable economic growth, particularly growth that alleviates poverty. Additional essential government tasks include skills training, technology assistance, funding for innovation, infrastructure enhancement, and provision of various public goods, as well as ensuring stability, effective institutions, and proper regulation (like labour laws). All of these factors have an influence on the economic development and commerce of a country. Overall, rapid economic growth will lead to a reduction in dependency. An increase in pay discrepancy could occur due to fast expansion, however, it is not guaranteed. The concept of tax collection and utilization tactics, alongside the skillset readiness of experts for specific economic reforms, can influence whether an economy thrives. Despite the expansion of small and medium enterprises (SMEs) and encouragement for forming local connections, inequality can be lessened by offering free school admission, discounted housing, fair tax evaluation, or redistributing resources such as land.

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[8] *art. 13 para. (1) of the Code on Science and Innovation of the Republic of Moldova, no. 259/2004 (Official Monitor of the Republic of Moldova, 2018, nr.58-66, art.131)*

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FINANCIAL STRATEGY TO ACCELERATE GREEN GROWTH IN MOLDOVA

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Abstract. *The financial strategy to accelerate green growth in Moldova is essential for ensuring sustainable economic development and environmental improvement. This strategy emphasizes the importance of expanding the green finance sector to support the adoption of eco-friendly technologies and practices among Small and Medium Enterprises (SMEs). The paper underscores the significance of leveraging various financing options, such as green bonds, venture capital, and government grants, Moldova can overcome the financial barriers that hinder the green transformation of its economy. Furthermore, the paper discusses the implementation of tax incentives, including accelerated depreciation, tax credits, and reduced corporate tax rates for green investments, can further encourage SMEs to invest in sustainable projects. These measures, combined with improved regulatory frameworks and increased awareness among businesses, will create a conducive environment for green growth. By addressing the financial and regulatory challenges, Moldova can pave the way for a greener and more resilient future.*
Keywords*: financial strategy, green growth, Moldova, economic development, environmental improvement*
JEL: *O10, O16*
UDC: *336.02+338.2](478)*

Introduction. Green growth aims to achieve both economic development and environmental improvement. To fund this, the green finance sector must be expanded. Stern (2006) contributed significantly to the field of green climate economics and finance, essentially founding a new domain within climate change economics and calling on policymakers worldwide for immediate action. His detailed and rigorous research forecasted that failing to take proactive measures to reduce GHG emissions and adapt to climate change could cost us over 5% of GDP, potentially shrinking the global economy by 5% to 20% within the next two decades.

Financing green technology and industry is crucial for fostering the next generation of eco-friendly firms. However, high uncertainty and a lack of proven high returns on green investments make investors hesitant to invest heavily in this sector (Hee Jin Noh, 2018).

Both institutional and individual investors strive to maximise their financial returns from investments. However, for private investors, investing in green initiatives has been challenging due to the high risks and low returns associated with the early stages of research and development. Despite this, as the green market becomes established and expectations turn positive—likely within the next decade—the market perception will fundamentally shift. Only well-prepared participants will thrive when this occurs. Historically, those who secure an early position in emerging markets tend to dominate. Although current investments in the green sector may seem like a bottomless pit, this phase is vital for market formation and growth. A long-term perspective is crucial in green finance. Policymakers understand that they cannot compel the private sector to invest in green energy without convincing assurances that a viable market will eventually materialise. This understanding led to the creation of the Green Climate Fund, designed to mitigate uncertainties and externalities by hedging the risks inherent in green investments.

Green growth policy is particularly appealing to developing countries aiming for economic advancement through green technologies and projects. According to the Paris COP 21 agreement, both developed and developing nations must contribute to global carbon reduction efforts. Nonetheless, economic development remains the priority for developing countries. Consequently, these countries will require green growth policies supported by financial resources that can be termed green finance.

Literature review. Green finance lacks a standard definition, with emerging terms like sustainable finance, environmental finance, carbon finance, and climate finance rising in importance. Sustainable Finance aims to create lasting economic and social value by considering environmental, social, and governance factors. Environmental Finance focuses on investments tied to the ecological environment, treating environmental damage as a financial risk and avoiding harmful projects. Carbon Finance funds emission-reducing projects through mechanisms like the Emission Trading Market and carbon funds. Climate Finance supports activities aimed at adapting to and mitigating climate change, promoting a low-carbon and climate-resilient development.

The core terminologies of green finance involve a comprehensive approach that tackles environmental challenges, fosters economic growth with a focus on sustainability, and strategically integrates the financial sector in the shift toward a sustainable future. Three definitions from the European Banking Federation, Organization for Economic Cooperation and Development (OECD), and the Government of Germany have been analyzed. While these definitions all stress the importance of environmental sustainability and addressing climate change, they differ slightly in their focal areas. The European Banking Federation offers an extensive view of environmental and climate-related issues, whereas the OECD

emphasizes economic growth along with pollution reduction. The German government's definition highlights the strategic integration of the financial sector into transitioning to low-carbon economies, focusing on both environmental and economic aspects.

Environmental Aspects: The European Banking Federation's definition explicitly includes issues like pollution, greenhouse gas emissions, biodiversity, and water or air quality. The OECD indirectly addresses environmental concerns by mentioning pollution and emissions reduction and improving natural resource use efficiency. Germany's definition aligns with these aspects by stressing the move toward low-carbon and resource-efficient economies within climate change adaptation contexts.

Climate Change-Related Aspects: The European Banking Federation mentions energy efficiency, renewable energies, and measures to prevent and mitigate severe climate events. The OECD indirectly touches on climate change by discussing greenhouse gas emission reductions. Germany's definition specifically includes the transformation of the financial sector toward low-carbon economies, tying directly into climate change initiatives.

Economic Growth and Efficiency: The OECD prioritizes economic growth while reducing pollution and greenhouse gas emissions, minimizing waste, and enhancing resource use efficiency. Germany focuses on the strategic incorporation of the financial sector in transitioning to low-carbon and resource-efficient economies, indicating an emphasis on economic efficiency alongside sustainability.

Components of Green Finance span significant portions of an economy's financial structure. Dr. Nannette Lindenberg's definition (Lindenberg N. 2014) highlights this extensive scope, identifying three main areas: financing both public and private green investments, supporting public green policies, and promoting a green financial system.

Analysis of the theoretical framework regarding sustainable financing in the field of green economy. Sustainable development entails fulfilling the needs of current and future generations, ensuring their interests are preserved without mutual compromise. At its core, it reflects the universal acknowledgment of our planet's limited resources, which everyone has a right to access. The rise of "green finance" supports sustainable development by marrying economic and environmental objectives. Green finance refers to financing methods that are eco-friendly and is vital for achieving sustainability. As highlighted by Wang & Zhi (2016), green finance merges financial and business practices with environmentally conscious principles. Its significance lies in guaranteeing that financial resources are allocated responsibly toward the environment, essential for realizing sustainability goals.

This study emphasises key principles, aiming to provide a clear conceptual understanding and encouraging detailed scholarly analysis. It seeks to explain the main elements and outline green finance's impact on sustainable development. Further sections cover essential terms, highlight leading green initiatives, list green finance strategies worldwide, and identify major challenges. Recommendations are

offered to overcome obstacles in adopting green financing for sustainable goals. The study ends with a brief summary of its findings.

The global significance of green finance in sustainable development. Green finance has gained global recognition for several important reasons. It aligns with the imperative of sustainable development, becoming a focal point in international financial spheres. The adoption of eco-finance products at the "One Planet Summit" in Paris in 2017, supported by global central banks and financial industry leaders, serves as evidence of its growing prominence. The Green Climate Fund's commitment to support green projects capable of reducing global greenhouse gas emissions by 1.4 billion tonnes underlines its essential role in financing sustainability efforts. Green finance prioritizes the societal benefits that flow from a healthier environment. They place a strong emphasis on the potential for economic activity and ecological well-being to coexist harmoniously, ultimately fostering long-term societal development. The "green" aspect of green finance is highlighted by the allocation of social capital to various sectors, including corporate governance, renewable energy, green building, climate resilience and environmental conservation. There is a diverse range of green financial products including: green bonds, green investments, green insurance, carbon credit and the anticipation of new products.

Green bonds, renowned for their risk mitigation attributes and appeal to socially conscious investors, have gained increasing importance in addressing climate change and financing strategies for sustainable development. Despite the recognized potential of green finance in promoting sustainable development goals, clear evidence of its global effectiveness remains elusive (Swaty S., 2023).

Economic opportunities in the green economy through innovation and investment. The recent global financial and economic crisis led to a decline in investment levels, which underscored the need to stimulate and revitalize investment activity in Europe. To address this, the Investment Plan for Europe, known as the Juncker Plan, was established with three main goals: removing barriers to investments, providing visibility and technical support for investment projects, and utilizing financial resources more effectively. This plan aims to enhance investments in strategic areas focusing on resource efficiency, the circular economy, and combating climate change.

The European Fund for Strategic Investments (EFSI), which supports the Investment Plan for Europe, plays a crucial role in advancing and endorsing the green economy. According to the plan, it is anticipated that investment projects worth 392.6 billion euros will be carried out through the EFSI, benefiting around 945,000 SMEs. Additionally, the European Union estimates that investments ranging from 422-527 billion euros are necessary to achieve efficient resource use.

The EFSI can be utilized to finance projects in several sectors:

- environmental protection;
- sustainable urban and rural development;

- enhancement of eco-system services;
- climate change initiatives.

The Investment Plan for Europe is a significant new funding source for resource efficiency, circular economy, and environmental projects, creating business opportunities to modernize the economy. About half of the approved EFSI projects focus on climate action. The EU, via EFSI, offers new funding structures and can bridge financiers and project promoters. In nations with limited financial access, it's challenging to get investors interested in innovative environmental sectors. Creating specific investment platforms for the circular economy is being considered to ease financing. Improved resource management could save European businesses €245-€604 billion per year, or 3-8% of annual turnover (EC, 2024).

The economic opportunities offered by the Investment Plan for Europe relate to:

- Securing non-refundable financing from the European Fund for Strategic Investments.
- Registering a project on the European Portal for Investment Projects (PEPI) to attract global investors.
- Taking advantage of advisory services offered by the European Investment Advisory Hub (EIAH).
- Accessibility for a wide range of fields, groups, or producer associations.
- Offering financial instruments that address key operational risks.
- Combining EFSI sources with funding from other programs like LIFE, EIB grants, the Natural Capital Financing Facility, and the Private Funds for Energy Efficiency program.

The economic policy of the European Union strongly supports the circular economy, aimed at transforming the European economy into a system that uses natural resources efficiently, preserves the value of materials and products through their reuse, and reduces the negative impacts of economic activities on the environment and health. For resource-limited Europe, the circular economy presents an opportunity to secure access to essential resources, maintain global competitiveness, and ensure a high-quality environment for its citizens. Implementing circular economy strategies can reduce EU industrial emissions, limit the production and exposure to hazardous substances, and help mitigate climate change. The circular economy's symbiotic benefits for both the economy and the environment offer a pathway to achieving certain UN Sustainable Development Goals (SDGs).

In December 2015, the European Commission adopted a circular economy[9] action plan aimed at fostering employment, economic growth, and investment, while developing a carbon-neutral, resource-efficient, and competitive economy. This plan has facilitated the creation of new business opportunities and the development of new markets within the EU and internationally[10].

[9] COM(2015) 614.

[10] https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=cei_cie010&language=en

The government plays a crucial role in supporting green industries, especially at their inception. Due to budgetary limitations and inefficiencies, sustained funding is often unfeasible. Hee Jin Noh (2014) suggests that governments should promote private investments in green sectors. Traditional bank debt-financing isn't appropriate due to the need to protect depositors' money and avoid high-risk ventures. Hence, varied financial tools are needed, and governments should foster green finance. Two ways to attract private investment include initial public investment to reduce risks and develop a viable market, and forming public-private partnerships. To secure green finance, the public sector should start green projects and provide substantial incentives.

Green finance plays a critical role in fostering individual firms and driving economic growth by supporting the development of green technology and enhancing the expansion of related industries. To achieve this, an emission trading system, alongside legal frameworks linked to green finance, must be designed to function effectively.

Improving Moldova's current regulations can be approached in several ways. First, enhancing the cap-and-trade system is essential. The priority should be to design a system that allocates and facilitates transactions efficiently and transparently, aiding the green growth of enterprises. Emission rights should be distributed fairly and rationally among economic players. By strengthening capital allocation—how businesses distribute their financial resources across various processes, personnel, and projects—we should develop policies that leverage these resources effectively. Setting the free allocation rate and criteria is crucial for maximizing greenhouse gas reduction and contributing to economic growth.

Furthermore, the carbon exchange, which operates the cap-and-trade system, needs to be more proactive. Increasing the number of trading participants is vital, allowing private financial institutions to engage promptly. Encouraging participation through carbon emission derivatives trading can also contribute significantly. Supportive measures for participating firms should be planned, incorporating incentives such as financial or tax benefits to encourage the development of green technologies.

The second approach involves improving the traditional green finance support system to promote private sector funding. This includes expanding green certifications and tax support, offering incentives like favorable interest rates on green loans, regulatory relief, and tax exemptions.

Thirdly, there is a need to enhance the accounting and credit assessment systems. Firms with emission rights should recognize them as assets, while those obligated to pay for emission rights should register them as liabilities. However, ambiguities in the legal definitions of emission rights must be addressed through revisions and new provisions. When assessing a firm's credit, their carbon emissions should be considered.

Lastly, enhancing the carbon emission disclosure policy is crucial. Mandating the disclosure of carbon emissions will provide market participants with better

quantitative and qualitative information, motivating firms to increase their investments in green industries.

In conclusion, improving regulations around green finance requires comprehensive revisions to the cap-and-trade system, traditional green finance support mechanisms, accounting and credit assessment practices, and carbon emission disclosure policies. These efforts will rejuvenate the ecosystem of the green industry.

Conclusions. Moldova's financial strategy to expedite green growth is crucial for achieving sustainable economic progress and environmental enhancement. This approach underscores the need to expand the green finance sector, aiding Small and Medium Enterprises (SMEs) in adopting eco-friendly technologies and practices. By utilizing various financing avenues such as green bonds, venture capital, and government grants, Moldova can surmount the financial obstacles impeding its economic green transformation.

Additionally, introducing tax incentives like accelerated depreciation, tax credits, and reduced corporate tax rates for green investments can further motivate SMEs to channel resources into sustainable initiatives. These efforts, when coupled with improved regulatory frameworks and heightened business awareness, will foster an environment conducive to green growth.

The success of this initiative hinges on collaboration between the government, private sector, and international organizations. By uniting their efforts, these stakeholders can offer the essential support and resources to propel Moldova's economy towards a green transformation. This joint endeavor will not only advance global sustainability objectives but also boost Moldova's competitiveness on the world stage.

In conclusion, Moldova's financial strategy to hasten green growth presents a holistic approach to achieving enduring sustainability and economic vigor. By tackling financial and regulatory hurdles, Moldova can chart a course towards a greener and more robust future.

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EVOLUTION OF THE LEGISLATIVE FRAMEWORK FOR ACHIEVING CLIMATE NEUTRALITY AT EU LEVEL

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Abstract. *The article has as starting point, the major need to achieve climate neutrality, the initiation of those measures to support the implementation of the green economy, as part of the transition to a new sustainable model of economy, due to future threats and risks presented by the appearance of climate changes, the increase in the degree of aging of the population and the irrational use of resources that we are facing. In the current context, the analysis carried out takes into account aspects starting from the European framework of the climate transition and the consequences of the legislative proposals, to the existing barriers and the actions in order to identify the characteristics at the EU level that can facilitate this process of transition and last but not least, the opportunities that will arise in the future. Finally, we highlight the consequences of the legislative proposals, aiming at the active contribution to achieving the objective of climate neutrality, which is identified as the central pillar of the European climate framework. As a final consideration, achieving climate neutrality requires coherence in supporting the process of economic recovery, in correlation with mitigating the effects of climate change, reflecting of the challenges we face.*
Key-words: *sustainability, transition, climate neutrality, initiatives, challenges, opportunities*
JEL: *Q01, Q53, Q54, Q56*
UDC: *338+502.15](4)*

Introduction. Climate neutrality is an essential objective for combating climate change, being able to contribute to preventing the worsening of these phenomena. By drastically reducing emissions and compensating the inevitable, the possibility of stabilizing the increase in global temperature and preventing catastrophic climate consequences is sought (Edenhofer et al., 2014).

The main reasons why climate neutrality is crucial include:

- reducing the impact of climate change because if emissions are not drastically reduced, significant increases in global temperatures are expected, with severe effects on ecosystems, water resources, food security and human health (Fuss et al., 2014);
- prevention of natural disasters, otherwise extreme weather phenomena will become more frequent and more severe with global warming;

- the conservation of biodiversity because many species are threatened by climate change due to the loss of natural habitats and the disruption of ecosystems.

The European Union and many developed countries have set the goal of achieving climate neutrality by 2050. This ambitious goal requires major economic and technological transformations, as well as a change in society's behavior. Achieving climate neutrality is one of the most important solutions to limit climate change and ensure a sustainable future for future generations.

Literature review. A review of the literature regarding the need to implement the legislative framework in order to achieve climate neutrality involves knowing the evolution of the concept of climate neutrality and its applications in various fields. It is vast and has involved many intense discussions in fields such as climate change, environmental law, political science and economics. We mention several reference authors who have significantly contributed to the understanding of this concept of climate neutrality and its context at the European and global level:

- *climate change and the transition towards climate neutrality.* Authors like Maslin (2014) "Climate Change: A Very Short Introduction" clearly explained the concept of climate neutrality and the urgent need to achieve this goal to prevent the worst effects of climate change. It addresses climate neutrality in the context of the need for coordinated global action.
- *the slow pace of climate action and the emphasis on the need for drastic measures to achieve climate neutrality.* Anderson (2011) in "Beyond Dangerous Climate Change: Emission Scenarios for a New World" and through his many contributions to IPCC reports on global temperature limits, developed the definition of climate neutrality in a practical framework, emphasizing the difference between "zero emissions" and neutrality, and argued that a distinction must be made between actual climate neutrality and unfulfilled promises.
- *climate transitions and strategies to achieve climate neutrality.* Geden (2019) in "Net Zero Emissions: Long Term Targets and Short Term Action" wrote about the political strategies needed to achieve climate neutrality by 2050 and emphasized the importance of developing clear and credible pathways to reducing emissions, not just theoretical commitments . He often criticizes the slowness of political action and provides a clear analysis of the various definitions of climate neutrality.
- *climate neutrality, human climate change and future scenarios.* Mann (2019) "The New Climate War: The Fight to Take Back Our Planet" and his articles provide a scientific approach to the context in which climate neutrality is needed, linking it directly to data on the concentrations of CO_2 and other greenhouse gases greenhouse. He emphasizes the urgency of climate action and the need to achieve neutrality by the middle of this century.
- *the context of climate neutrality from a historical and political perspective.* Oreskes (2010) Merchants of Doubt, explores the political and social context

of climate change, including the concept of climate neutrality, the link between political action and the science of climate change.

- *defining climate neutrality in a wider context.* Rockström et al (2013) "A Safe Operating Space for Humanity" and in (2012) "The Human Quest: Prospering Within Planetary Boundaries", helped to define climate neutrality in a broader context related to maintaining the ecological stability of the planet. He discussed the importance of reducing carbon emissions and conserving natural resources to prevent the collapse of global ecological systems.

These authors have contributed to the development of the concept of climate neutrality and to the understanding of the need for urgent action, their work providing essential insights into how the European legislative framework for achieving climate neutrality should be implemented to prevent catastrophic climate change (IPCC, 2018).

Research methodology used in establishing the legislative framework for climate neutrality involves a multidisciplinary approach and considering the complexity and global nature of climate issues.The main research methods used in this process – literature review and the establishment and consequences of legislative proposals regarding climate neutrality at the EU level.

Objective: to identify and analyze the existing legislation at national and international level aimed at the transition to climate neutrality.

Methodology: a systematic review of existing policies and regulations, international agreements (Paris Agreement on Climate Change), national and regional legislation (European Green Deal) and institutional strategies already adopted.

Tools: Documentary analysis of treaties, directives and other relevant normative acts. Establishing the legislative framework of climate neutrality is a complex process to ensure that the legislation adopted is effective, fair and adaptable to current and future challenges.

Main results in the establishment of the European legislative framework regarding the achievement of climate neutrality**.** As it appears from the specialized literature, the establishment of a legislative framework at the European level to achieve climate neutrality is a central component of the European Union's climate policy. (European Parliament, 2021). The objective of the EU is to become the first climate-neutral continent by 2050 at the level of all EU member countries, being an example to be followed by the other States Parties to the Paris Agreement (Bodansky, 2016). The European climate transition framework proposes an intersectoral vision that aims to move from a low-carbon economy to a higher stage, to achieve climate neutrality, which will allow member states to identify and solve, in a unitary way and in a real time horizon of climate problems (Masson-Delmotte et al., 2021).

Given the need for an integrated approach to the measures included in the legislative framework to achieve the objective of climate neutrality, the following were adopted:

European Green Deal. The European Green Deal is the EU's strategy for transforming the European economy into a sustainable, competitive and resource-efficient economy, with the objective of generating no net greenhouse gas emissions by 2050 (European Commission, 2019). It covers essential areas for reducing emissions such as:

- energy - the transition to renewable sources, energy efficiency and the gradual elimination of fossil fuels;
- industry - creating a greener industry by reducing emissions, promoting the circular economy and recycling materials;
- agriculture - aims to reduce the environmental impact of agriculture and fishing.
- transport - the promotion of electric vehicles, the decarbonisation of air and maritime transport and the development of green infrastructure (European Environment Agency, 2020).

The European Green Deel is identified as a key instrument in supporting the financing of the transition to fair climate neutrality at the level of the European Union, aiming at the regulation of some important areas, such as those described above, as well as climate change, environmental protection, finance and regional development. The existence of a dialogue is absolutely necessary for the reconfiguration of strategies and policies in all economic sectors, for the implementation of new sustainable production and consumption models at the sectoral level (Geden, 2018).

We have identified a series of synergies at the level of strategic documents:

- The new EU Industrial Strategy guides european industrial policies towards a sustainable and resilient European Union at the international level;
- The EU Strategy On Energy System Integration is synergistic with the EU Hydrogen Strategy, respectively with that of methane in the EU, in support of the decarbonization of the energy system;
- Sustainable and Smart Mobility Strategy - correlated with actions regulated by the EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil';
- The From Farm to Fork Strategy - For a fair, healthy and environmentally-friendly food system and is synergistic with the Common Agricultural Policy: 2023-27 (CAP) and with EU Action Plan For Organic Agriculture;
- The EU Biodiversity Strategy for 2030 is synergistic with the new EU Forest Strategy for 2030 – Sustainable Forest Management in Europe (2022).

The European Green Deal will form the basis of a competitive and efficient EU economy, from the point of view of the use of resources, having as primary targets:

- zero net greenhouse gas emissions by 2050;
- recording an economic growth dissociated from the use of resources;
- the fairness of citizens, sectors and regions.

European Climate Law. Adopted in June 2021, the European Climate Law legally sets the EU's goal of achieving climate neutrality by 2050. This legislation requires the following:

- climate neutrality by 2050 - member states must reduce their greenhouse gas emissions and adopt concrete measures to eliminate net emissions;
- intermediate objectives - by 2030, the EU has set out to reduce net emissions by at least 55% compared to 1990 levels, known as "Fit for 55";
- national action plans - member states are obliged to draw up and implement national plans on energy and climate, which must be reviewed and updated periodically;
- monitoring and reporting – performance will be monitored by the European Commission, which will issue annual reports and recommendations for each member state.

The European Climate Law establishes the time horizon for achieving climate neutrality - the year 2050, highlighting as a mandatory objective at the EU level, the net domestic reduction of greenhouse gas emissions by at least 55% by 2030, compared to the levels since 1990, determining the contribution of limitations and absorptions of emissions (European Parliament, 2021).

They consider:

- more stricte dispositions on adaptation to climate change;
- stronger synergies between European Union policies and the objective of achieving climate neutrality;
- commitment to negative emissions after 2050;
- monitoring the progress made by the member states towards achieving climate neutrality, as well as the establishment of the The European Scientific Advisory Board on Climate Change;
- the initiation of mechanisms regarding effective collaboration with the various sectors of activity to achieve the objective of climate neutrality in various economic fields at the EU level;
- a methodology for the conceptualization of the climate objective for 2040, considering the indicative budget regarding GHG emissions, for the period 2030-2050;

The European Green Deal and the European Climate Law strengthen the normative framework of climate change, having a strategic role in the actions that each member state will initiate, ensure the general framework of action to translate into legislation the achievement of the objective of climate neutrality by the year 2050.

Fit for 55 . In July 2021, the European Commission presented the legislative package "Fit for 55", which contains proposals to achieve the objective of reducing emissions by 55% by 2030 (European Commission, 2021). It includes measures on:

- the reform of the Emissions Trading System (ETS) aims to extend the ETS to cover additional sectors such as maritime transport and buildings;
- the transition to clean energy envisages increasing the share of energy from renewable sources to 40% of total energy consumption by 2030;

- carbon taxes by introducing a Carbon Border Adjustment Mechanism (CBAM), which imposes taxes on products imported from countries with less strict climate regulations;
- zero-emission vehicles - accelerating the adoption of electric vehicles and phasing out sales of cars with internal combustion engines by 2035.

Priority is given to aspects that have the role of ensuring an effective approach to the climate effort at the sectoral level, with an emphasis on the transformation of all sectors of the economy, with an emphasis on energy, transport and mobility, agriculture. The Fit for 55 package consists of a set of interconnected proposals, which aim to achieve a fair, competitive and green transition by 2030 and in the next period.

The implications of the legislative proposals included in the Fit for 55 Package envisage a mixed approach to achieving the objective of climate neutrality, aiming at: the application of the trading system of GHG emission certificates in new sectors of activity (buildings and road transport), increasing the use of renewable energy and of energy efficiency, the development of transport modes with low GHG emissions, infrastructure and alternative fuels. Also, attention is paid to the issues related to the prevention of the relocation of GHG emissions.

The implementation of the legislative measures included in the Fit for 55 Package is a complex process, starting from the aspects regarding the transition from fossil fuels to efficient ones, energy, transport, mobility, energy efficiency of homes, impact on the workforce.

As a conclusion, the framework of the mentioned legislative proposals aims at its active contribution to the achievement of the objective of climate neutrality, which is identified as the central pillar of the European climate framework. The EuropeanGreen Deal, the European Climate Law, as well as the proposals included in the Fit for 55 Package give specificity to the climate effort at the EU level in correlation with other existing initiatives at the international level.

To support regions and economic sectors affected by the transition to climate neutrality, the EU has created the Just Transition Fund, which will provide funding for:

- coal regions and industries with high carbon emissions through financial and technological assistance for the adaptation and diversification of local economies;
- retraining and supporting the labor force through funds for vocational training programs, retraining and job creation in ecological sectors (European Commission, 2021).

Green financing and investments. The EU aims to mobilize massive funds to support the transition to climate neutrality. The European Green Deal Investment Plan (EGDIP)aims to mobilize at least €1 trillion in green investment over the coming years. The Green Energy Financing Facility and green bond initiatives will also help finance the transition (European Commission, 2020).

Discussion and conclusions. The European Union's legislative proposals on achieving climate neutrality by 2050 have significant consequences for the economy, society and the environment, both at the level of the member states and globally:

Economic consequences:

- the energy and industrial transition will cause the industry and the energy sector to go through profound transformations, with massive investments in renewable energy sources, green technologies and energy efficiency. While these changes will create new markets and green jobs, traditional sectors such as fossil fuels and heavy industry will suffer economic losses and redundancies;
- increased costs in the short term because the implementation of new technologies and adaptation of existing infrastructures will require considerable initial investments, which could lead to increased costs for businesses and consumers, at least in the short term;
- The Carbon Border Adjustment Mechanism (CBAM) will impose taxes on imports of goods from countries that do not have strict regulations on carbon emissions, in order to prevent the relocation of industry outside the EU ("carbon leakage"), which will affect trade flows European/global and could generate trade tensions with countries that do not implement similar measures;
- innovation and competitiveness - in the long term, investments in green technologies and innovation can increase the EU's global competitiveness, strengthening its role as a leader in the green economy. Companies that adopt sustainable solutions will be more resilient and more competitive in European/global markets.

Social Consequences:

- jobs and reskilling – while the green transition will generate new jobs in areas such as renewable energy, sustainable transport and resource management, there will be significant job losses in polluting industries such as mining and power generation based on coal. The Just Transition Fund will be key to reskilling workers and supporting affected communities;
- economic and regional inequalities so that regions heavily dependent on fossil fuels, such as the coal-bearing regions of Eastern Europe, will be more affected by the climate transition, requiring considerable financial support for these regions in order to avoid increasing economic inequalities;
- costs to consumers – in the early stages of implementing climate measures, energy bills are likely to increase due to investments in infrastructure and green technologies, and social protection measures and subsidies are needed to mitigate the impact on vulnerable populations.

Environmental consequences:

- reducing greenhouse gas emissions by implementing the legislative proposals will have a major positive impact on the environment, by significantly reducing

CO_2 and other greenhouse gas emissions, stabilizing global temperatures and mitigating the effects of climate change;
- improving air quality as with the transition from fossil fuels to clean energy sources, air quality in the EU will improve considerably, reducing respiratory diseases and premature deaths associated with atmospheric pollution;
- the protection of biodiversity will be ensured through policies related to climate neutrality that will support the restoration of ecosystems and the conservation of biodiversity, especially through reforestation and restoration projects of natural habitats.

Geopolitical consequences:
- EU global leadership in combating climate change by implementing the ambitious measures mentioned, will influence other countries to adopt similar measures;
- trade tensions - The CBAM mechanism and other carbon adjustment measures could generate trade tensions for countries that do not adopt similar standards. In particular, developing countries that depend on exports to the EU might consider these measures a form of protectionism;
- dependence on critical resources as the transition to green technologies will lead to increased demand for rare materials (such as lithium and cobalt, used in electric batteries), the EU having to manage import dependencies for these critical resources, diversifying suppliers and promoting recycling.

Consequences for technology and innovation:
- accelerating green innovation through climate policies will stimulate research and development in areas such as renewable energy, energy storage, electric vehicles and energy efficiency; new economic opportunities will be created and transition costs will be reduced;
- creating new markets - the climate transition will generate new markets for sustainable products and services, such as green construction, sustainable agriculture and carbon capture and storage technologies.

The EU's legislative proposals on climate neutrality will have transformative effects at economic, social, technological and geopolitical levels. Although the short-term challenges will be considerable, they are necessary to prevent the serious consequences of climate change. In the long term, the green transition could position the EU as a global leader in the sustainable economy, creating a more resilient, healthier and fairer society.

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TRENDS IN ACHIEVING CLIMATE NEUTRALITY AT THE EU LEVEL

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Abstract. *Climate change is having a growing impact not only on our health and food system, but also on the ecosystems and biodiversity of our planet. In order to achieve long-term climate neutrality, significant emission reductions will have to be made. At EU level, current measures and policies to collectively meet the objective of climate neutrality are insufficient to achieve the new climate and energy targets. For the EU economy, it is important that the climate neutrality target be achieved in a way that preserves the EU's competitiveness. The EU aims to lead and strengthen global action on climate change through international agreements and diplomacy by setting high standards and working with other nations to influence global climate policies and encourage wider international engagement. The transition to renewable energy sources and the improvement of energy efficiency, investments in clean energy infrastructure, technological innovation and energy efficient practices are essential to achieve the objective of climate neutrality.*
Key-words: *climate neutrality, green energy, transition, climate policies*
JEL: *Q3, Q4, Q54*
UDC: *338*

Introduction. Climate neutrality, defined as the balancing of greenhouse gas (GHG) emissions through measures to reduce and absorb greenhouse gases, has become a central global target, in particular in the European Union (EU), which aims to achieve climate neutrality by 2050.The EU plays a leading role in tackling global climate change, setting clear targets and adopting concrete policies in this regard. Current trends in achieving this goal involve the transition to renewable energy, such as solar and wind energy, reducing fossil fuel consumption, and, promoting the circular economy and developing carbon capture and storage technologies. At the same time, the strategies include citizen engagement, massive investments in green infrastructure and economic adjustments for a just and sustainable transition. Climate neutrality has become a major goal for governments, companies and organizations around the world, reflecting the urgent need to combat climate change. Increasing investment in green innovations and international partnerships are also vital to accelerating the transition to a low-emission and sustainable economy.

The objective of climate neutrality at EU level is to achieve zero net greenhouse gas emissions by 2050, according to the European Green Pact ("European Green

Deal"). This means that the EU aims to reduce GHG emissions as close to zero as possible and balance any residual emissions through carbon absorption measures, such as reforestation or carbon capture and storage technologies.To achieve this goal, the EU has set a crucial intermediate step: to reduce emissions by at least 55% by 2030 compared to 1990 levels, through legislative initiatives and investments in the transition to a green economy, the promotion of renewable energies, energy efficiency and electrification of transport. The European climate law, adopted in 2021, makes this objective legally binding, underlining the EU's strong commitment to tackling climate change.

Literature review. Climate neutrality is a central concept in climate change discussions and sustainable development. Overall, climate neutrality involves striking a balance between greenhouse gas emissions and the ability to remove them from the atmosphere. In the literature we have identified several definitions and interpretations:

1. *Carbon neutrality vs. climate neutrality.* Carbon neutrality is a commonly used term and refers to a specific balance for carbon dioxide (CO_2).According to Anderson and Peters (2016), carbon neutrality focuses only on CO_2 emissions and measures to eliminate them, by methods such as carbon capture and storage (CCS) or by compensation measures (e.g., reforestation). Climate neutrality, by contrast, is a broader concept that includes all greenhouse gases (not just CO_2), such as methane (CH_4) and nitric oxide (N_2O). Authors such as Rockstrom et al. (2017) believe that climate neutrality is a more ambitious goal, which involves not only reducing CO_2 emissions, but also managing all GHG sources.

2. The equilibrium between emissions and absorption. The IPCC (2018) (Intergovernmental Panel on Climate Change) defines climate neutrality as the situation where net GHG emissions are reduced to zero, or by the complete elimination of emissions, either by increasing the natural or technological carbon absorption capacity in the atmosphere. In Steffen et al. view (2018), climate neutrality implies that any amount of GHG emitted must be compensated by capture processes or other mechanisms of absorption, such as forests, soils or innovative technologies (such as carbon capture from the atmosphere).

3. Compensation and capture. Smith et al. (2016) explains that climate neutrality is often associated with the use of carbon credits or compensation schemes (compensation) to balance unavoidable emissions. In this respect, companies or countries that cannot completely reduce emissions to zero can invest in projects that remove GHG from the atmosphere, such as a forestation, etc., biodiversity conservation or carbon capture technologies.

4. Neutrality in the context of sustainable development. Some authors, such as Meadowcroft (2009), point out that climate neutrality must be seen in the broader context of sustainable development, not just as a matter of technology and emissions, but also as part of a broader social and economic transformation. Thus, achieving climate neutrality also involves social justice, intergenerational equity and equitable distribution of the costs of the transition to a low-emission economy.

5. Climate neutrality and climate resilience. The authors Biermann and Pattberg (2012) propose that climate neutrality should not only be about reducing emissions, but also about increasing resilience to the impacts of climate change. Achieving neutrality should be accompanied by measures to adapt economies and societies to the inevitable effects of climate change, such as extreme events, sea level rise or disruptions to agriculture.

6. Associated terms: zero emissions. Climate neutrality is often equated to the term "zero net emissions". According to Masson-Delmotte et al. (2018), this means that an equivalent amount of greenhouse gases emitted is eliminated or compensated, although the term "zero net" stresses that residual emissions may exist as long as they are balanced by equivalent removals.

7. Climate neutrality and technological innovation. Fuss et al. (2014) discusses that climate neutrality will not only be possible by reducing emissions, but also by technological innovations that allow the removal of carbon from the atmosphere. Thus, technologies such as carbon capture and storage bioenergy or direct capture of carbon from the air play an important role in achieving this goal.

8. Critics and challenges. Some authors, such as Anderson and Peters (2016), criticize the over-relaxed use of the concept of climate neutrality. They argue that it can be used to perpetuate the industrial status quo, providing an excuse for real inactivity in reducing emissions through offsetting measures or technologies that are not yet scalable.

In conclusion, the key concept is to strike a balance between greenhouse gas emissions and the ability to remove them from the atmosphere through a combination of mitigation measures, compensation and absorption.

Main trends in achieving climate neutrality within the EU. *The European Green Pact ("European Green Deal").* Adopted in 2019, the European Green Deal is the EU's key plan to make the European economy sustainable. The European Green Pact is the cornerstone of EU decarbonisation strategies. This initiative aims to transform the European economy by reducing greenhouse gas emissions, promoting renewable energies and improving energy efficiency.Strategiile adoptate includ măsuri concrete pentru fiecare sector economic, cum ar fi energie, transport și agricultură. The main objectives are:

- climate neutrality by 2050: EU aims to be the first climate neutral continent;
- emissions reduction by 55% by 2030: a key intermediate target to keep the course towards 2050;
- circular economy: reducing waste and promoting the reuse and recycling of resources;
- development of renewable energies: supporting the transition from fossil fuels to renewable sources such as solar and wind energy.

Legislation for climate. In March 2021, the EU adopted the European climate law, which makes legally binding emission targets set in the Green Deal. It reinforces member states' commitments to contribute to the common objectives by implementing appropriate national measures.

Border carbon adjustment mechanism. It is an important instrument introduced by the EU as part of efforts to achieve climate neutrality by 2050 and to protect the competitiveness of European industry. The main purpose of border carbon adjustment mechanism is to prevent „relocation of carbon emissions" („carbon leakage") – a phenomenon in which companies move their production to countries with less stringent climate regulations for avoid the costs of reducing emissions imposed in the EU.

Border carbon adjustment mechanism aims to reduce global carbon emissions and encourage a green and fair transition, both within and outside the EU. This mechanism will make goods imported into the EU subject to the same climatic requirements as goods produced within the Union. The importers from the EU will be required to purchase border carbon adjustment mechanism allowances corresponding to the amount of carbon dioxide incorporated in imported goods. These certificates will reflect the price that European producers pay for their emissions through the EU Emissions Trading System (ETS). If the country of origin of the products has an equivalent carbon pricing system, importers will be able to deduct those costs from the total due by border carbon adjustment mechanism.

Border carbon adjustment mechanism, in a first phase, will cover industries with a high level of emissions and resettlement risks, including steel and iron, cement, fertilizers, aluminum, electricity. These sectors are responsible for much of global carbon emissions and are most vulnerable to international competition from countries with less rigorous climate standards. Border carbon adjustment mechanism will be implemented in stages, with a transition period starting in 2023 and by 2026 the mechanism is expected to become fully operational, with strict reporting and purchasing obligations of carbon credits for all covered goods.

*Sustainable funding.*The EU has developed various financial instruments to support the green transition:

- Just transition fund: this fund is intended for the regions and economic sectors that will be most affected by the green transition;
- Invest EU and Next Generation EU: these initiatives provide massive financial support for green and innovative projects, including investments in renewable energy, energy efficiency and sustainable infrastructure.

Renewable energy and energy efficiency. The EU aims to increase the share of renewable energies in its energy mix. Through programs such as "Fit for 55", the focus is on reducing energy consumption through energy efficiency, increasing investment in solar and wind energy, and electrifying some sectors, including, such as transport and industry. In 2021, renewable energy sources overtook fossil fuels as the EU's main source of electricity, marking a turning point in the energy transition. In addition, green hydrogen is seen as a key technology for decarbonising the industrial and transport sectors, which are harder to electrify. The EU has launched an ambitious hydrogen utilization strategy that provides for investment in the necessary infrastructure and incentives for the production and use of green hydrogen.

Green transport. Another priority area is to reduce emissions from the transport sector. The transport sector is one of the largest emitters of greenhouse gases. Green

transport is an essential solution to the climate and environmental challenges of the XXI century. Investing in clean technologies, infrastructure and effective policies will help reduce carbon emissions and improve the quality of life in cities. As technologies advance and transport becomes more sustainable, these measures will play a crucial role in the global transition to a low-emission economy and a sustainable future. The EU is promoting the transition to electric vehicles, the expansion of charging infrastructure and rail transport, and the decarbonisation of air and sea transport through alternative fuels. The EU encourages the use of public transport, electric vehicles and alternative mobility solutions. Initiatives such as the development of bicycle infrastructure and the improvement of rail transport are crucial to reducing emissions from the sector.

*Citizens' involvement and the just transition.*To support the green transition, the EU has increased access to finance for green projects. The Just Transition Fund and other financial initiatives provide essential resources to help regions and sectors most affected by the transition to a low-emission economy. In order to ensure the support of the general public, the EU is focusing on citizen engagement and an intensive social dialogue with the industries and communities that will be affected by these changes. Reskilling and upskilling programs are aimed at workers from traditional sectors to facilitate the transition to green jobs. The EU encourages the participation of citizens and local authorities in green initiatives, promoting local projects that can significantly contribute to climate neutrality objectives.Through this fund, financial support and training are provided for the affected workers, as well as investments in infrastructure and local economic development. For example, in coal-dependent regions, the Just Transition Fund will support economic diversification, green jobs and the retraining of workers.

Biodiversity and sustainable agriculture. Biodiversity and sustainable agriculture are interdependent and essential for a sustainable future. Biodiversity conservation is crucial to maintaining resilient agricultural systems and long-term productivity. At the same time, the shift to sustainable farming practices provides solutions to reduce the negative impact of intensive agriculture on biodiversity and contribute to achieving global climate goals. Promoting agriculture that works in harmony with nature will support not only the protection of biodiversity, but also the well-being of future generations. Protecting biodiversity and reducing the impact of agriculture are crucial to achieving climate neutrality. The EU pursues policies that reduce the use of pesticides, promote organic farming and ensure sustainable forest management.

International cooperation. The EU is working with other countries and international organizations to combat climate change globally. International agreements and partnerships to exchange best practices are crucial to maximize the impact of efforts to combat climate change. The Paris Agreement is an example of cooperation in which the EU plays a key role.

These measures and trends reflect the EU's strong commitment to climate neutrality by 2050, even if there are significant challenges, such as industrial transition and avoiding negative social impacts on certain regions.

Conclusions. Achieving climate neutrality at EU level is possible, but requires close coordination between member states, massive investment in innovation and green infrastructure, and, as well as measures to ensure the social fairness and sustainability of this transition.

A major challenge of the climate transition is to ensure a fair transition that does not disproportionately affect fossil fuel-dependent regions and industries. The EU has understood this problem and created the Just Transition Fund, which will help the regions and communities most affected by the transition, such as coal mining or high-emission industries.

Climate neutrality at EU level is not only an environmental objective, but a complex economic, technological and social project with profound implications for all sectors of the economy and for the lives of citizens. A combination of ambitious policies, investments in innovative technologies and green infrastructure, as well as a fair and socially just transition, can ensure the success of this endeavour. The EU aims to be a global leader in combating climate change, and its efforts will shape not only the future of Europe but also of the world economy.

Digitalisation and technological innovations are playing an increasingly important role in emissions monitoring and resource optimisation. Artificial intelligence (AI) and big data analysis (Big Data) are used to improve energy efficiency in various sectors by optimizing energy networks, managing demand and efficiently monitoring energy consumption.

At the same time, the EU is taking on the role of a climate diplomacy promoter, supporting climate policies in developing countries and providing financial support for their sustainable development. Through initiatives such as the Sustainable Development Mechanism and the International Climate Agreements, the EU supports the global transition to a green and sustainable economy.

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THE ROLE OF FINANCIAL INSTRUMENTS IN PROMOTING SUSTAINABLE FINANCE AND THE CIRCULAR ECONOMY

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Abstract. *In the current context of climate change and sustainability concerns, the role of financial instruments in promoting sustainable finance and the circular economy is becoming increasingly important. This paper explores various available financial instruments, such as green bonds, sustainable loans, and ethical investment funds, and analyzes their impact on promoting circular economy initiatives. It also examines the barriers and challenges faced in implementing these instruments, as well as the policies and regulations that can facilitate their integration. By identifying the most effective practices and strategies, the paper aims to provide a comprehensive perspective on how the financial sector can contribute to the transition towards a more sustainable and circular economic model.*
Key-words: *Financial instruments; Sustainable finance; Circular economy; Green bonds; Sustainability*
JEL: *G23, G59, O16, O17, Q56, Q57*
UDC: *336.143*

Introduction. The future of finance is digital: both consumers and businesses are increasingly adopting digital financial services, while innovative market players are implementing new technologies, and existing business models are shifting towards a collaborative and circular economy.

Digital finance has played a key role in helping citizens and businesses navigate the unprecedented challenges brought by the COVID-19 pandemic. For instance, online identity verification has enabled consumers to open accounts and access a wide range of financial services remotely. A growing proportion of in-store payments is now digital and contactless, and e-commerce has seen significant growth.

FinTech solutions have contributed to expanding and accelerating access to loans, including through the issuance of "green bonds" and government-backed loans as part of the response to the pandemic. Ensuring a stable and reliable digital infrastructure has also become crucial, given the increasing number of users of online financial services and the fact that many employees in the financial sector are working remotely. If there were any doubts before, it is now clear that digital finance

offers numerous benefits, and both citizens and businesses in Europe are ready to embrace them.

Europe must fully capitalize on this digital shift as part of its recovery strategy, contributing to the repair of the social and economic damage caused by the pandemic. Digital technologies will be essential for relaunching and modernizing the European economy across all sectors. They will enable Europe to advance as a global digital player. At the same time, financial service users must be protected from the risks associated with the increasing use of digital finance[11].

Innovation is increasingly taking a digital form, facilitating the development of businesses. To a growing extent, innovation involves new products, processes, or business models made possible by digital technologies. While initially serving merely as support, information technology systems, combined with appropriate software, have become a central pillar of economic activities for many businesses. This is because digitalization offers substantial new opportunities, as digital networks and data services generally facilitate economies of scale, enabling the provision of better-quality services at lower costs.

Innovation cycles are accelerating, becoming more open and collaborative. Digital technologies and applications are increasingly being built in a modular manner, communicating with each other through application programming interfaces (APIs).

Although financial innovation is not a new phenomenon, investments in technology and the pace of innovation have increased significantly. FinTech solutions are being introduced that use digital identification, mobile applications, cloud computing, big data analysis, artificial intelligence, blockchain technology, and distributed ledger technology. These new technologies are transforming the financial sector and the way consumers and businesses access services, creating opportunities for FinTech-based solutions to offer better access to finance and improve financial inclusion for digitally connected citizens. These developments place the consumer at the center, support operational efficiency, and further enhance the competitiveness of the EU economy. FinTech also plays an important role in the Capital Markets Union. It can contribute to deepening and expanding the EU capital markets by integrating digitalization, with the aim of transforming business models through data-driven solutions, such as in asset management, investment intermediation, and product distribution.

FinTech also presents opportunities and challenges regarding regulatory compliance and oversight. It can facilitate, streamline, and automate compliance and reporting processes, as well as improve supervision. Service providers can offer FinTech-based compliance services to regulated entities. However, regulated entities remain responsible for fulfilling their obligations. For instance, entities subject to customer due diligence requirements under anti-money laundering regulations

[11] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - "Now is Europe's time: repairing the damage caused by the crisis and preparing the future for the new generation", COM(2020) 456 final, 27.5. 2020.

cannot delegate responsibility for meeting these requirements to external service providers.

FinTech also poses challenges, such as cybersecurity risks, data protection issues, consumer and investor protection concerns, as well as market integrity matters. The General Data Protection Regulation (GDPR) and the Anti-Money Laundering Directive provide fundamental safeguards for protecting personal data and ensuring the integrity of the EU's financial system against money laundering and terrorist financing. An EU financial market based on technology requires full compliance with these fundamental safeguards. Cyber risks undermine trust and pose a threat to the stability of the financial system. Periodic security breaches highlight that cyberattacks are an increasing source of concern. Such attacks should be decisively addressed to prevent and mitigate any negative consequences for the financial sector and its clients and consumers. It is of paramount importance that the financial sector becomes more cyber-resilient to ensure that it is well-protected, that financial services are efficiently and seamlessly delivered across the EU, and that consumer and market confidence is maintained.

European regulatory and supervisory frameworks should allow businesses operating in the EU single market to benefit from financial innovation and offer their customers the most suitable and accessible products. Such frameworks should also ensure a high level of consumer and investor protection while maintaining the resilience and integrity of the financial system.

Literature review. Digital finance has evolved significantly in recent decades, with its roots in the adoption of electronic payment systems and the development of internet banking in the late 1990s (Smith & Jones, 2015). Early literature focuses on the transformation from traditional banking methods to digital solutions, emphasizing the gradual adoption of online transactions and digital payment platforms (Lee, 2010). In the contemporary era, the integration of advanced technologies such as mobile banking and blockchain has reshaped the financial sector (Doe, 2021).

The Impact of Digital Innovation on Business Development

According to Brown (2018), digital innovation has facilitated the growth of businesses by offering more efficient and cost-effective solutions. The adoption of cloud computing, big data analytics, and artificial intelligence (AI) has allowed companies to streamline their processes and enhance decision-making capabilities. Studies show that the adoption of digital financial tools has significantly accelerated the speed of business transactions and reduced operational costs (Anderson & Black, 2019).

Modular Innovation and Open Financial Systems. Recent research highlights the importance of modularity in digital innovation, particularly in financial services (Miller & Thompson, 2020). The development of Application Programming Interfaces (APIs) has fostered a more open and collaborative environment for financial services, allowing different platforms and systems to interact seamlessly

(White et al., 2022). This modular approach to innovation promotes flexibility and enhances the scalability of financial solutions (Doe, 2021).

The Role of FinTech in Sustainable Finance and the Circular Economy

The Emergence of Green Bonds and Sustainable Finance

The issuance of green bonds has become a cornerstone of sustainable finance, with FinTech playing a pivotal role in this sector (Smith & Green, 2020). As described by Johnson and Lee (2019), FinTech platforms have facilitated the distribution of green bonds by providing transparent and efficient mechanisms for issuers and investors. Research suggests that these financial instruments are crucial for promoting investments.

Research methodology. This chapter outlines the research methodology employed to investigate the role of financial instruments in promoting sustainable finance and the circular economy. The methodology is based on empirical research, combining both qualitative and quantitative methods. This approach allows for a comprehensive understanding of the phenomena being studied by collecting data from various sources and applying different analytical techniques.

The research is designed as a mixed-methods study, incorporating both quantitative and qualitative approaches to gather comprehensive data on the subject. The empirical nature of the research allows for real-world insights and the generation of data that can lead to a deeper understanding of the application of FinTech solutions in sustainable finance.

The quantitative analysis component focuses on analyzing numerical data related to the adoption of digital financial instruments, particularly FinTech solutions, in promoting sustainable finance and circular economy practices. This includes statistical analysis of financial data, trends in the issuance of green bonds, and the impact of digital finance on sustainability metrics.

The qualitative analysis component includes in-depth interviews and case studies. Interviews are conducted with key stakeholders in the financial sector, including experts in sustainable finance, circular economy, and digital finance. The case studies focus on organizations and financial institutions that have successfully implemented FinTech solutions to support sustainability goals.

The empirical research relies on two main sources of data: primary and secondary.

The primary data was collected through surveys and interviews with industry experts, as well as financial professionals involved in the development and implementation of green financial instruments.

Secondary data were collected from a range of published reports, academic articles, and financial databases. This data provided context and supported the quantitative analysis by offering insights into the broader trends in sustainable finance and the circular economy.

Financial Data: Data from financial institutions and market reports on green bond issuance, the performance of sustainability-linked financial instruments, and the integration of digital technologies in finance.

Literature Review: Articles from academic journals on sustainable finance, circular economy, and the role of FinTech in these areas were reviewed to support the empirical findings.

The research utilized a purposive sampling technique to select participants for interviews and case studies. This approach was chosen to ensure that only individuals with relevant experience and knowledge of sustainable finance and FinTech were included.

Data Analysis Methods. The data analysis for this research employed both quantitative and qualitative methods to ensure a robust examination of the research questions. Metrics such as the frequency of green bond issuance, the rate of adoption of blockchain technology, and the level of digital financial services usage were examined. To explore relationships between the adoption of FinTech solutions and sustainability outcomes, inferential statistics such as regression analysis were used. This helped to quantify the impact of digital finance on promoting the circular economy and reducing environmental impact.

The qualitative data collected from interviews were analyzed using thematic analysis. The interview transcripts were coded to identify key themes related to the role of FinTech in supporting sustainable finance. Themes such as the challenges of implementing digital finance solutions and the benefits of blockchain in tracking sustainability metrics were explored.

The case studies were analyzed in-depth to provide contextual understanding of how different financial institutions are leveraging digital finance to drive sustainability. This involved comparing the experiences of institutions to identify the best practices and lessons learned.

The research adhered to strict ethical guidelines to ensure the confidentiality and privacy of the participants. All respondents to the survey and interviews were informed about the purpose of the research, and their consent was obtained before data collection. Additionally, all data was anonymized to protect the identities of the participants and institutions involved in the study.

This chapter has outlined the research methodology used in this study, highlighting the mixed-methods approach that combines both quantitative and qualitative analysis. By employing empirical research techniques, this study aims to provide a comprehensive understanding of how financial instruments, particularly those enabled by FinTech, can support the transition to sustainable finance and the circular economy.

Main results. In response to the significant risks posed by global warming, on December 12, 2015, 195 countries participating in the United Nations Framework Convention on Climate Change reached an agreement by adopting the Paris Agreement. The primary goal was to limit global temperature rise to well below 2°C above pre-industrial levels, with efforts to further limit the increase to 1.5°C to mitigate severe impacts.

The European Commission has since set an ambitious target of achieving net-zero greenhouse gas emissions by 2050, which will require major transformations across economies and present significant challenges for various industries.

Sustainable finance plays a crucial role in meeting the political objectives outlined in the European Green Deal, launched by the European Commission in 2019, as well as in fulfilling the EU's international commitments on climate action and sustainability. Sustainable finance helps channel private investments towards a climate-neutral, resource-efficient, and equitable economy that is resilient to climate change. It also ensures that investments contribute to a sustainable recovery in the aftermath of the COVID-19 pandemic, with funds allocated to EU member states contingent on meeting specific environmental and sustainability criteria.

To further support the objectives of the European Green Deal, the European Climate Law came into force on July 29, 2021. This law ensures that all EU policies align with the goal of achieving climate neutrality by 2050, making this target legally binding. Both EU institutions and member states are required to take necessary measures at both the EU and national levels to meet this objective, while emphasizing the importance of fairness and solidarity among member states.

The Climate Law also includes provisions for monitoring progress and adapting actions as needed, based on existing systems such as the governance process for national energy plans and periodic reports from the European Environment Agency, as well as the latest scientific evidence on climate change and its effects.

Sustainable finance has become a key focus for the European Union, serving as a critical tool in achieving the political objectives of the European Green Deal. It is seen as a type of financing that supports the sustainable development of the economy while simultaneously reducing environmental pressures and considering social and governance factors.

The purpose of sustainable finance is to improve the financial sector's contribution to sustainable development, particularly in the context of combating climate change. This involves integrating environmental, social, and governance (ESG) factors into financial decision-making, with the goal of directing long-term investments towards sustainable economic activities and projects.

Several legislative initiatives at the European level have been introduced and transposed into national legislation, or applied directly in Romania, to foster the development of environmentally sustainable economies, in line with collective efforts to combat climate change.

The European Commission's action plan on sustainable finance and its renewed strategy for sustainable finance includes ten initiatives organized into three main categories:

- ✓ Reorienting capital flows towards a more sustainable economy.
- ✓ Incorporating sustainability elements into risk management.
- ✓ Encouraging transparency and a long-term vision.

The implementation of this action plan has led to the adoption of a set of legislative acts that create the necessary framework for sustainable finance, including:

Definition of sustainable economic activities: Regulation (EU) 2020/852 establishing a framework to facilitate sustainable investments (Taxonomy Regulation).

Introduction of transparency requirements:

Establishing reporting requirements for providers and distributors of financial products and services to clients regarding the impact of sustainability risks on investment profitability and the effect of investments on the economy's sustainability – Regulation (EU) 2019/2088 on sustainability-related disclosures in the financial services sector (SFRD).

Imposing obligations on companies to report reliable and comparable sustainability information needed by investors and other stakeholders – a proposal for a directive on corporate sustainability reporting (CSRD), which entirely replaces the Non-Financial Reporting Directive (NFRD).

Creation of new benchmarks for low-carbon impact activities: A benchmark for climate transition activities and a specialized benchmark – Regulation (EU) 2019/2089 amending Regulation (EU) 2016/1011 on benchmarks.

In addition to financing mechanisms supporting sustainable projects through banking and financial markets, the insurance sectors, as well as those in the investment fund and private pension fund industries, play a significant role in the transition to a green economy as institutional investors interested in placing financial resources for the medium and long term.

Financial market participants, financial advisors, and issuers are obliged to provide specific information regarding their approaches to integrating sustainability-related risks and considering the negative impacts on sustainability.

In June 2021, the European Commission adopted a new strategy for financing the transition to a sustainable economy, aiming for several actions to achieve this goal, including:

- Expanding the EU Taxonomy framework, a general framework for the green labeling of financial instruments;
- Identifying gaps in protection offered by insurers regarding natural disasters;
- Including ESG risks in credit ratings;
- Amendments to the Solvency II directive to integrate sustainability risks into insurers' risk management processes.

In the context of the new strategy, the European Commission also proposed establishing a legal framework for European green bonds through a new regulation (European Green Bond Standards – EUGBS).

Achieving the United Nations (UN) Sustainable Development Goals (SDGs) requires sustained long-term investment. These investments are crucial for decarbonizing existing physical capital, ensuring resilience to a changing climate, conserving and enhancing natural capital, and training and reskilling the workforce for a climate-neutral economy.

The coronavirus pandemic has further complicated this challenge, imposing unprecedented pressure on individuals, healthcare systems, national economies, and government finances.

The European Union (EU) has decisively responded to facilitate recovery through the ambitious €750 billion "NextGeneration EU" package. Additionally, at the international level, the EU launched the "Team Europe" initiative, part of the global crisis response program, amounting to nearly €36 billion. However, recovery from COVID-19 is expected to dominate global public finances in the short and medium term, especially considering the calls from various stakeholders for a green recovery.

The European Investment Bank (EIB) Group, including the Bank and the European Investment Fund, plays a vital role in supporting the EU in achieving the long-term objectives of the European Green Deal and the UN SDGs.

The EIB Group is one of the world's largest financiers of sustainable development, with a particular focus on climate action and environmental sustainability. Through a wide range of financial products and advisory services, the EIB collaborates with partners to support long-term ecological investment needs. The EIB Climate Bank Roadmap for 2021-2025 focuses on innovation, providing everything from seed capital for early-stage development to senior debt for mature technologies.

The EIB Board's decisions centre on two main areas:

- First, the EIB aims to increase its support for climate action and environmental sustainability, targeting over 50% of its total lending activity by 2025. This commitment is intended to mobilize €1 trillion for investments in the coming decade, accelerating the transition to a climate-neutral and resilient economy.
- The second essential dimension is to ensure that "all financing activities align with the objectives and principles of the Paris Agreement." The EIB cannot support the agreement with 50% of green financing while simultaneously undermining its goals with the remaining 50%, adhering to the principles of sustainable finance.

The EIB is committed to ensuring that all its activities do not significantly harm the objectives of reducing carbon emissions and adapting to climate change. In line with the common alignment framework of the Multilateral Development Banks (MDBs) from Paris, the Roadmap breaks down this commitment into four main workstreams. The first focuses on accelerating the global ecological transition by increasing green investments and supporting long-term innovation and new business models. Additionally, it emphasizes ensuring that the transition is equitable for all, supporting communities vulnerable to climate risks.

The EIB Group will continue to support a wide range of activities in accordance with its public policy objectives. Therefore, the third workstream aims to ensure that none of these activities significantly impede the transition. In other words, all its financing activities should align with the objectives of the Paris Agreement.

The European Green Deal is becoming the new growth strategy for the EU, representing a significant opportunity for the EIB Group to strengthen its dialogue with member states to facilitate the long-term achievement of green investments. This level of ambition also extends beyond the EU's borders.

The Agreement addresses eleven areas, including a just transition for all, both within the EU and globally; thus, these areas are relevant to the EIB's operations worldwide.

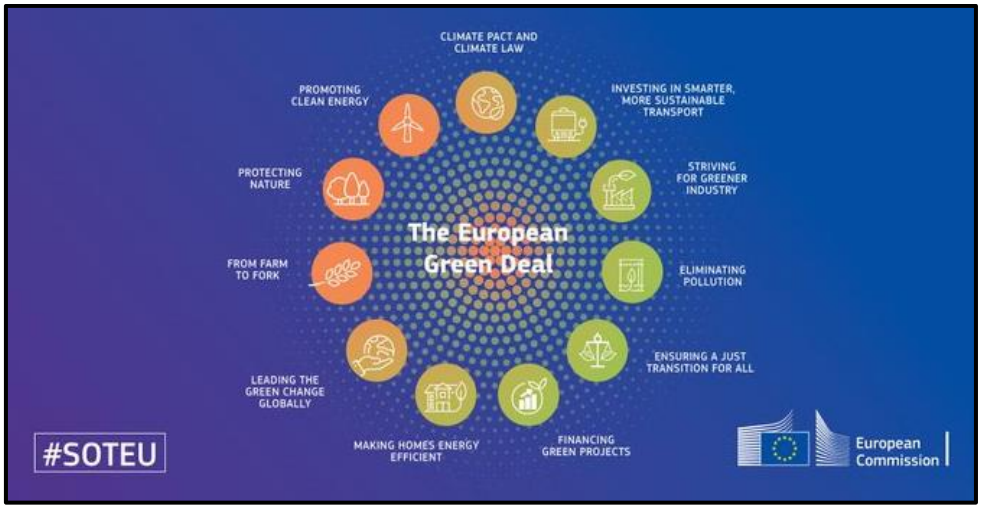

Figure 1. **Basic themes of the European Green Deal**
Source: europa.eu

Structuring around these areas of interest helps to ensure full alignment of the EIB Group with the EU. including the objectives and by extension the use of the EU budget. It provides a coherent basis for strengthening dialogue with Member States on investment programs – ranging from medium-term Recovery and Resilience Plans[12], National Energy and Climate Plans 2030[13], National adaptation strategies and plans, territorial just transition plans[14], or long-term national strategic plans[15].

Green bond as a sustainable investment tool. The rapid transition to a low-carbon economy is necessary to achieve the climate goal agreed in the Paris Agreement. The Intergovernmental Panel on Climate Change's latest report, the Sixth Assessment Report, concluded that global emissions would need to be almost halved by 2030 to limit the 1.5°C temperature increase that is projected to require an additional average annual investment in clean energy and infrastructure of about $3 trillion by the end of the decade. The International Monetary Fund is also calling for the harnessing of private finance for climate change in emerging markets and

[12] https://ec.europa.eu/info/files/guidance-member-states-recovery-and-resilience-plans_en
[13] https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en
[14] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transitionmechanism_en#:%7E:text=Territorial%20just%20transition%20plans%20define,to%20be%20met%20by%202030
[15] https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-long-term-strategies_en

developing economies (see Figure below). The financial market has a vital role to play in directing capital to the required capital investment.

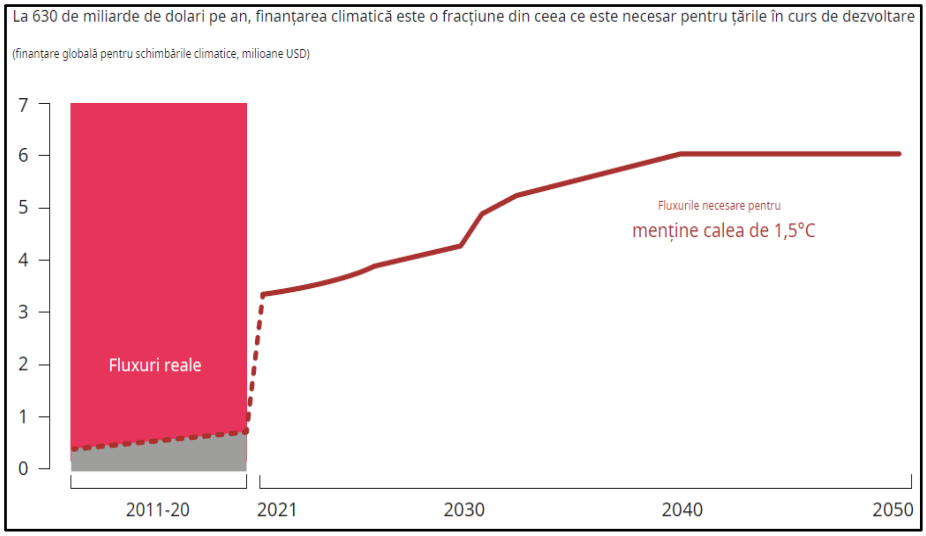

Figure 2. **Climate change financing gap in developing countries**

Source: "The public sector must play a major role in catalyzing private finance for climate change" (K. Georgieva and T. Adrian), International Monetary Fund, August 2022, www.imf.org

Green bonds have become the main sustainable financing tool in the market. Since the first green bond was issued in 2007 by the European Investment Bank, the green bond market has grown into a cumulative issuance market of US$1.6 trillion. Issuance of green bonds in 2021 increased by 75% from the previous year, exceeding 500 billion dollars. According to Dutch bank ING, global ESG bond supply will likely reach $905 billion in 2024. Having topped $1 trillion in 2021, the global supply of ESG bonds has struggled to maintain the same pace. The outlook for sovereign and municipal green bond issuance remains strong in the US, where corporate deals have tailed off. Meanwhile, reports towards the end of 2023 indicate ESG fund flows face growing headwinds, impacting their popularity.

Green bonds are fixed-income securities that resemble conventional bonds; however, the funding raised through the issuance of these bonds is primarily directed toward environmental sustainability. The introduction of the Green Bond Principles (GBP) in 2014 played a significant role in promoting the green bond market by providing guidelines on best practices for issuing green bonds. The GBP established four core components to determine whether a bond qualifies as green:

1. *Use of Proceeds:* The proceeds must be exclusively allocated to eligible green projects, which should be clearly described in the legal documentation of the bond.
2. *Project Evaluation and Selection Process:* The issuer must clearly communicate the environmental sustainability objectives of the eligible green projects to investors. This includes detailing how the issuer determines the

projects' alignment with eligible green categories and providing additional information on how they identify and manage perceived social and environmental risks associated with the relevant projects.

3. *Management of Proceeds:* The net proceeds from the green bond, or an equivalent amount, should be credited to a sub-account, transferred to a sub-portfolio, or otherwise tracked by the issuer in a manner that is appropriate and certified by the issuer through a formal internal process linked to their lending and investment operations for eligible green projects.
4. *Reporting:* Issuers are required to provide and maintain updated information on the use of proceeds, which should be renewed annually until complete and timely allocation, especially in the case of significant developments.

The European Commission is also establishing a EU Green Bond Standard as part of the European Green Deal— the EU's growth strategy aimed at transitioning the EU economy to a sustainable economic model, including the goal of becoming the world's first climate-neutral continent by 2050.

By leveraging the capabilities of distributed ledger technology, the entire bond issuance and subscription process, along with related lifecycle events, were modelled from creation to maturity, involving stakeholders such as investors, placement institutions, issuers, and green data providers. While maintaining critical functionalities, the following enhancements have been introduced:

- *Embedded Market and Processing Rules:* Each step of the process is validated in an observable and auditable manner, ensuring compliance with established market rules.
- *Encoding of Legal Agreements:* The legal terms of real-world agreements are encoded and preserved within Daml smart contracts, which explicitly define the roles, rights, and obligations of all stakeholders involved in the workflow.
- *Strict Privacy and Data Segregation:* Privacy is rigorously enforced through Daml's need-to-know data model, which is implemented via the smart contract coding framework and integrates with a cryptographically secured blockchain platform.
- *Simultaneous Settlement Across the Holding Chain:* Settlement occurs simultaneously throughout the entire holding chain, enhancing asset mobility while effectively eliminating counterparty risk from the process.

All these combined elements between digital, green and circular can be found in the Genesis 2.2 Project. launched in 2022 (Fig.3, Fig.4 and Fig.5).

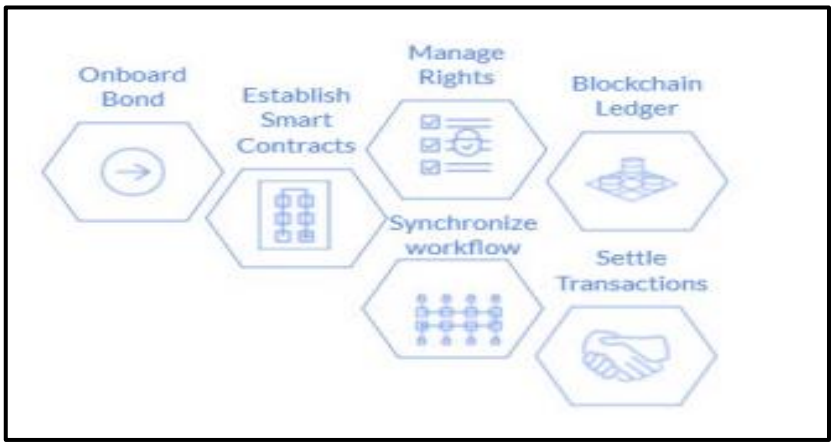

Figure 3. **Bond Onboarding with Smart Contracts**
Source: Genesis Project 2.0., 2022

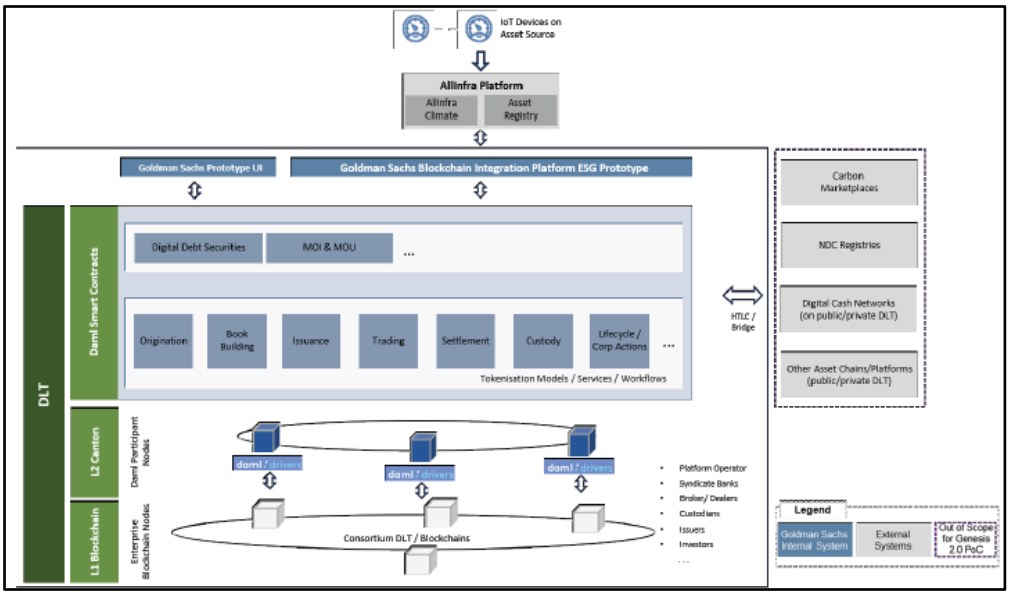

Figure 4. **DAP ESG prototype technical architecture**
Source: Genesis Project 2.0., 2022

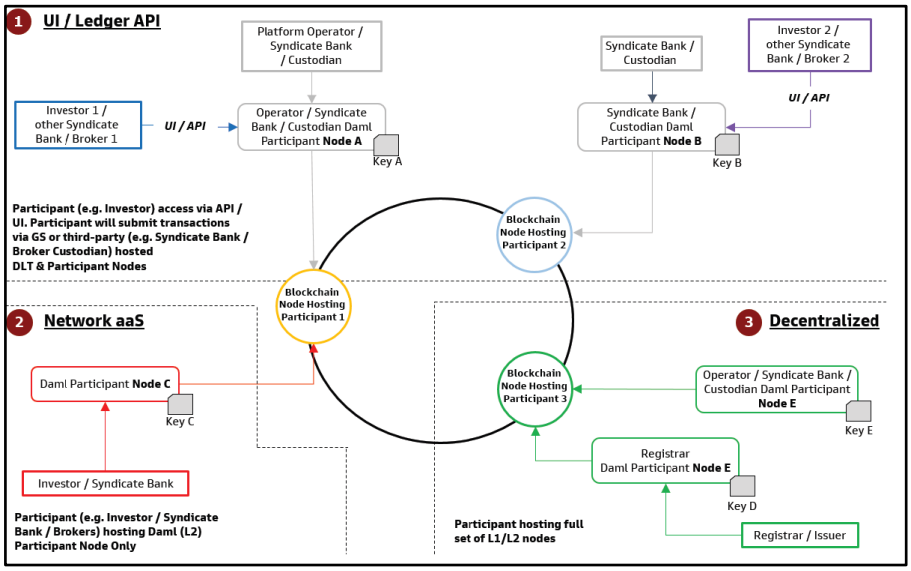

Figure 5. **Implementation architecture of the "green bond" participant**
Source: Genesis Project 2.0., 2022
Project Genesis 2.0 Solutions

Efficiency Gains Through Digitalization

The prototype enhances efficiency by fully digitizing the bond issuance process. By utilizing this prototype, issuers can completely digitize the subscription, allocation, and settlement processes for green bonds and MOI (Measurable Outcome Indicator) assets. This allows for direct delivery to investors' digital wallets. As a result, issuers can engage directly with investors, eliminating redundant steps, shortening the settlement cycle, and ultimately reducing costs, risks, and capital requirements in the market.

Transparency in Environmental Impact

The prototype ensures transparency regarding the ecological impact of funded projects by tracking MOIs, effectively mitigating the risk of greenwashing. It facilitates on-demand monitoring of real-time, unverified MOI data for the environmentally friendly activities financed through green bonds. This capability enhances the clarity surrounding the environmental impact of projects and the progress of commitments related to ecological attributes (i.e., MOI bonds). Consequently, it enables all stakeholders to make informed decisions based on their investment objectives. Furthermore, it helps limit instances of ecological misconduct by allowing investors to monitor the MOI achievements of the issuer and facilitating the direct allocation of any associated ecological certificates to investors.

The sustainable finance market has experienced significant growth, with a strong investor appetite for products that address social issues. Social, gender, and sustainability bonds and loans offer pathways to direct capital towards reducing persistent inequalities between women and men; however, they are not being utilized to their full potential. This note provides guidance to the market on how sustainable debt instruments could be employed to promote gender equality in both the public

and private sectors. We hope to encourage stakeholders in the capital markets to go beyond traditional activities in addressing gender inequalities and to unlock the financing opportunities presented by sustainable instruments.

At the European level, the "Green Index 3.0" has been developed through the Inclusive and Climate-Smart Green Finance Action Group. The Green Index serves as the primary indicator for assessing the current performance of a financial actor, including green financing, and for defining an action plan to improve it.

Green Index 3.0 is aligned with existing primary standards, initiatives and regulations, ensuring simpler reporting and compliance for stakeholders using Green Index 3.0. Sample initiatives, standards and regulations from among the 70+ reviewed.

Figure 6. **Standards, initiatives and regulations**
Source: own processing, EMN, Green Index 3.0., 2022

As of 2021, "Green" is one of the 7 dimensions of USSEPM and is integrated into the SPI. USSEPM Dimension 7 is a lighter version of Green Index 3.0.

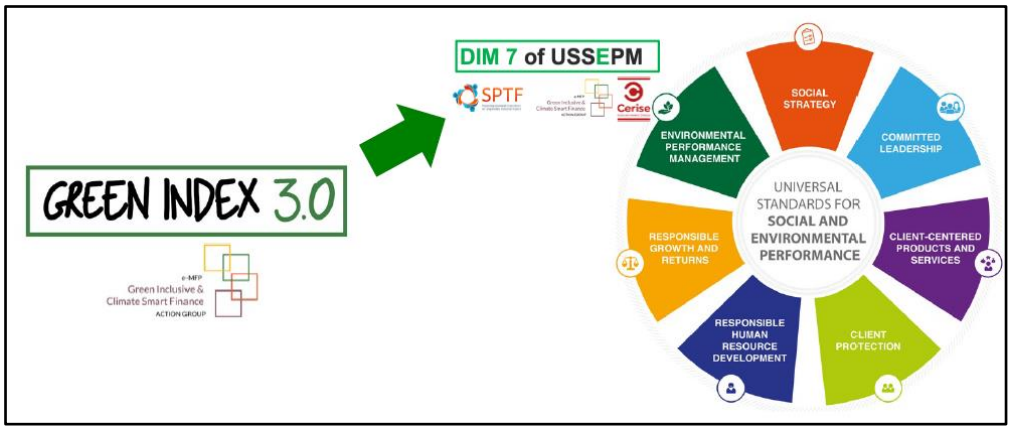

Figure 7. **Integrating environmental performance into USSEPM**
Source: own processing, EMN, Green Index 3.0., 2022

Innovation is crucial for enhancing Europe's competitiveness and ensuring the health and well-being of its citizens. It shapes markets, transforms economies, and drives significant improvements in public services. Additionally, innovation is essential for achieving the ambitious goals of both the green and digital transitions.

Green bonds play a vital role in fostering financial innovation that is green, digital, and inclusive.

A notable example of the impact of green bonds as a financing instrument was realized through the Recovery and Resilience Mechanism. In this initiative, EU countries were required to outline a cohesive package of projects, reforms, and investments across six policy areas in their recovery plans. The European Commission's largest program, NextGenerationEU, is a recovery tool amounting to approximately €800 billion in current prices, equivalent to 5% of EU GDP. This marks the first time that financial instruments are being supported through capital markets. To finance this program, the Commission is backing the issuance of securities on international capital markets as part of its diversified financing strategy. Approximately 30% of the funds for this initiative are being raised through the issuance of NextGenerationEU Green Bonds.

The European Commission is already issuing bonds to fund loans to the EU and third countries under four programs, including up to €100 billion for the SURE program to support jobs and keep people in work. To raise up to around €800 billion in current prices by 2026 for NextGenerationEU under the best financial conditions – 5% of EU GDP – the Commission will use a diversified financing strategy.

 loan for financing the recovery.

 the NextGenerationEU diversified financing strategy.

The European Commission is empowered by the EU Treaty to borrow from the international capital markets, on behalf of the European Union. It is a well-established name in the debt securities markets with a solid track record of successful bond issues over the last 40 years. These bond transactions are denominated exclusively in euros.

Loan repayment. he repayment of the loan will start from 2028 and will take place over a long-time horizon – until 2058. The loans will be repaid by the borrowing Member States. The grants will be reimbursed from the EU budget.

To help repay the loan, the Commission will propose new own resources to the EU budget (or sources of income), in addition to the existing ones. They could also be used for early repayment before 2028.

Table 1. **Presentation of bond syndication for NextGenerationEU financing**

(millions of euros)

EU000A3KSXE1	22-06-21	10 y	04-07-31	20 000	0.09%	0.00%	142 000
EU000A285VM2	06-07-21	30 y	06-07-51	6 000	0.73%	0.70%	83 000
EU000A3KTGV8	06-07-21	5 y	06-06-26	9 000	-0.34%	0.00%	88 000
EU000A283859	20-07-21	20 y	04-07-41	10 000	0.47%	0.45%	96 000
EU000A3KWCF4	21-09-21	7 y	04-10-28	9 000	-0.28%	0.00%	103 000
EU000A3K4C42	**19-10-21**	**15 y**	**04-02-37**	**12 000**	**0.45%**	**0.40%**	**135 000**

Source: own data processing European Commission, 2021

Table 2. **Presentation of NextGenerationEU funding bond auctions**

(millions of euros)

ISIN	type	Data	trance	maturity	The allocated volume *	Old outstanding amount *	The new outstanding amount *	Weighted average price	Lowest price accepted	% awarded at the lowest accepted price	Weighted average yield	Coverage rate
EU000A3KTGV8	Tap	29-09-21	15 y	06-07-26	2 495	9 000	11 495	102.35	102.20	22.11 %	-0.487 %	2.33
EU000A3KWCF4	Tap	27-10-21	7 y	04-10-28	2 497	9 000	11 497	100.81	100.67	59.70 %	-0.117 %	1.58

Source: own data processing European Commission, 2021

The interactions between Sustainalytics and corporate clients issuing green bonds, as well as government institutions and local administrations, have led to numerous benefits. These benefits, which the green bond issuing clients emphasized as highly significant, align with the findings from respondents of the Climate Bonds Initiative[16].

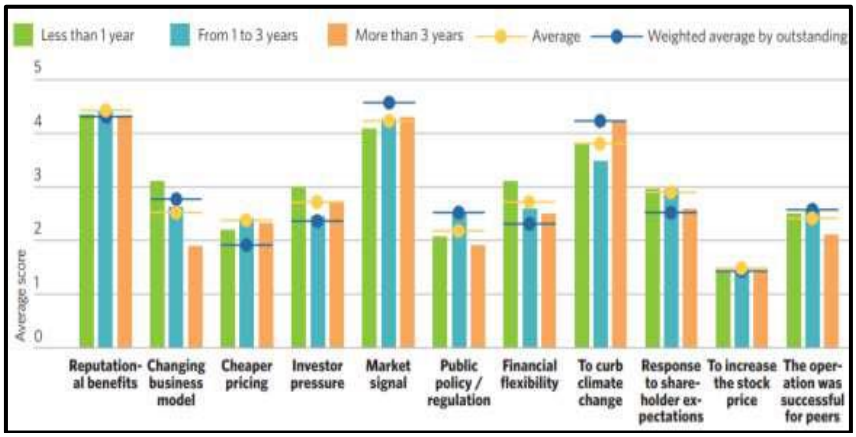

Figure 8. **Benefits reported by green bond issuers**

Sursa: Climate Bonds Initiative, 2020

Currently, green bonds stimulate the diversification of the investment client base for issuing clients through two major advantages. On one hand, these bonds are generally oversubscribed, and on the other hand, they provide a much higher level of

[16] Climate Bonds Initiative, *Green Bond Treasurer Survey 2020,* disponibil la: https://www.climatebonds.net/files/reports/climate-bonds-gb-treasurer-survey-2020-14042020final.pdf

price/volume stability. Additionally, this type of issuance helps raise awareness of social and environmental issues and opportunities. Most new green bond issuers emphasize that these financial instruments assist them in promoting sustainability goals and transitioning their business models toward more sustainable practices.
According to Regulation (EU) 2019/2088 of the European Parliament and Council, it is crucial to define the key actors involved in financing transactions. Bond markets provide an additional source of green financing that complements bank loans and serve as an important signaling mechanism for companies and investors. Green bonds utilize capital markets as a financial instrument to raise funds, particularly for investment projects such as renewable energy, energy efficiency, and clean water. The literature introduces the concept of "sustainable, social, and green bonds," which are also essential investment tools for achieving sustainable development goals. These bonds require issuers to report on and disclose the use of proceeds to connect investors with assets expected to have a positive impact on sustainability.

Discussion and conclusions. The increasing urgency to address climate change and environmental degradation has positioned sustainable finance as a critical component of global economic policy. Financial instruments, particularly green bonds, have emerged as pivotal tools in promoting sustainable practices and supporting the transition towards a circular economy. As highlighted in recent regulations, such as Regulation (EU) 2019/2088 of the European Parliament and Council, defining the roles of key stakeholders in financing transactions is essential for the effective implementation of these instruments.

Green bonds facilitate the diversification of the investment client base for issuers, offering dual advantages: they are often oversubscribed and provide greater price and volume stability. This has led to a growing interest from both corporate clients and governmental entities, which recognize the importance of these financial tools in achieving their sustainability goals. By tapping into capital markets, green bonds create a significant source of financing that complements traditional bank loans, thereby enhancing the overall funding landscape for sustainable projects.

Furthermore, the promotion of social and environmental awareness through these financial instruments underscores their broader impact. New green bond issuers frequently emphasize how these tools not only help finance specific projects, such as renewable energy and energy efficiency initiatives, but also play a crucial role in transitioning their business models toward more sustainable practices. This aligns with the emerging concepts of sustainable, social, and green bonds, which are increasingly recognized as vital investment vehicles for achieving the United Nations' Sustainable Development Goals (SDGs).

The obligation for issuers to report on the use of proceeds from green bonds is essential for ensuring transparency and accountability. By connecting investors with assets expected to yield positive sustainability impacts, these financial instruments foster greater confidence in the market, thereby attracting more investment into sustainable ventures. This shift toward a more accountable and transparent financial

landscape is not only beneficial for individual issuers and investors but is also vital for advancing the circular economy.

Limitations of the Research

Despite the promising findings regarding the role of financial instruments in promoting sustainable finance, this research has several limitations. First, the analysis primarily focuses on green bonds, which, while significant, represent only one segment of the broader sustainable finance landscape. Other instruments, such as sustainability-linked bonds or social bonds, warrant further exploration. Additionally, the study's reliance on secondary data from regulatory documents and market reports may limit the depth of insight into the motivations and experiences of stakeholders involved in these transactions.

Moreover, the rapidly evolving nature of sustainable finance means that the research may not fully capture the most recent trends or regulatory changes that could impact the effectiveness of financial instruments. The geographical scope is also limited, as the focus has primarily been on the European context, which may not fully represent global dynamics in sustainable finance.

Future Research

Future research should aim to address these limitations by expanding the scope to include a wider variety of financial instruments used in sustainable finance, such as impact investing and social bonds. Comparative studies across different regions and markets could provide valuable insights into the effectiveness and adoption of these instruments in diverse contexts.

Additionally, qualitative research, including interviews and surveys with stakeholders such as issuers, investors, and regulatory bodies, could enrich the understanding of the motivations, challenges, and best practices associated with sustainable finance initiatives. Finally, examining the long-term impacts of financial instruments on sustainability outcomes, particularly in relation to the circular economy, would provide crucial insights into their effectiveness in achieving desired social and environmental goals.

In conclusion, the role of financial instruments in promoting sustainable finance and facilitating the transition to a circular economy is significant. As the landscape of sustainable investment continues to evolve, it is imperative that stakeholders, including governments, financial institutions, and businesses—collaborate to enhance the effectiveness of these instruments. By doing so, they can ensure that sustainable finance becomes an integral part of the broader economic framework, ultimately leading to a more sustainable and resilient future.

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EXPERIENȚA INTERNAȚIONALĂ ÎN SPRIJINUL FINANCIAR ȘI INSTRUMENTAL PENTRU DEZVOLTAREA SUSTENABILĂ A CLUSTERELOR

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Abstract. *Regional cluster development plays a key role in increasing economic competitiveness and sustainability. This article analyzes international experience in financial and instrumental support for sustainable cluster development, with a focus on adapting best practices to the Moldovan context. In developed countries, regional competitiveness has been strengthened through strong clusters: Finland and Sweden have built their success around the pulp and paper industries, Germany has created synergies in the mechanical and automotive sectors, and Italy has developed flexible clusters in the fashion, leather and furniture sectors. The US and Denmark also provide examples of how regional potential can be used and companies integrated in a form of territorial collaboration. These models demonstrate how financial support and the implementation of effective tools can stimulate regional growth and innovation. The research methods used include qualitative and quantitative research methods, as well as comparative literature review on cluster development at international level, statistical analysis and assessment of financial and sustainability strategies. Particular attention is given to public-private partnerships and their role in financing green modernization measures and cluster development.*
Key words: *sustainable development, cluster, finance, expirience, public-private partnership, synergy.*
JEL: *M00, M13, M21*
CZU: *332.133.6*

Introducere. Pentru a sprijini dezvoltarea clusterelor în Republica Moldova, este necesar să se dezvolte instrumente detaliate care să ia în considerare în mod correct, clar și structurat toate nevoile clusterelor din regiune și caracteristicile specifice ale sistemului economic regional. La elaborarea instrumentelor, este esențial să se valorifice experiența pozitivă străină, adaptând metodele și practicile de succes la specificul economic și social din Republica Moldova.

În țările dezvoltate, competitivitatea internațională a regiunilor a fost, inițial, susținută prin clustere dezvoltate independent:

- Industriile finlandeze și scandinave au o acoperire largă de clustere. De exemplu, impulsul pentru dezvoltare și competitivitate din industria celulozei și hârtiei din Suedia, care a fost dat de industriile de lemn și hârtie, de rutile de transport și de unele industrii de consum conexe (de exemplu, producția de chibrituri);
- În Germania, sinergiile dintre industria mecanică și cea auto sunt posibile datorită dezvoltării avansate a producției pentru aceste sectoare.
- În SUA, majoritatea întreprinderilor sunt reunite în formațiuni de tip cluster, iar principiul localizării teritoriale este respectat în cea mai mare măsură posibilă, datorită căruia întreprinderile din cadrul clusterului sunt localizate într-o regiune și utilizează la maximum potențialul natural, uman și de integrare al acesteia în lanțuri valorice. De regulă, produsele clusterului sunt orientate spre export sau spre substituirea importurilor;
- Modelul italian de cluster se caracterizează prin interacțiuni intra-cluster bazate pe cooperare între companiile membre, fie ele mici, mijlocii sau mari, respectând principiul „egalității" și menținând legături flexibile. În Italia, clustere speciale s-au dezvoltat în districte industriale, unde s-au conturat combinații de industrii precum: prelucrarea metalelor pentru unelte de tăiere, moda și designul, pielea și încălțămintea, prelucrarea lemnului și fabricarea mobilei.

În multe țări din Uniunea Europeană este implementat modelul clusterului scoțian, în care nucleul producției comune este reprezentat de o întreprindere mare ce reunește în jurul său mai multe firme mici. Danemarca este un exemplu de experiență în formarea de grupuri teritoriale de subsectoare interconectate. În Danemarca există clustere de industrii competitive legate de bunuri de uz casnic (mobilier și articole de uz casnic) și îngrijire a sănătății (produse farmaceutice, echipamente medicale etc.). Clusterul din industria de îngrijire a sănătății este legat de clusterul agricol, prin intermediul cerințelor tehnologice și de materii prime (Business and Economy of the Netherlands, 2024).

Printre exemplele celor mai renumite formațiuni de grupuri din străinătate se numără:

- în domeniul ingineriei informatice și al tehnologiei informației - în Silicon Valley (SUA);
- în domeniul comunicațiilor și telecomunicațiilor - la Helsinki;
- în domeniul producției de film - la Hollywood (SUA);
- Clusterul Bio Valley, situat la confluența frontierelor Franței, Germaniei și Elveției.

Experiența internațională demonstrează că modelul de cluster are un impact semnificativ asupra competitivității regionale și industriei, cu diverse forme adaptate contextului național. Aceste modele reușesc să stimuleze inovarea și creșterea sustenabilă, sprijinindu-se reciproc și adaptându-se cerințelor de piață și tehnologice distincte.

Rezultate și dicuții. Analizând experiențele străine de clusterizare economică, putem identifica un anumit tipar. Cea mai mare acumulare de clustere se observă în țările cu economii dezvoltate. În aceste țări, conceptul de clustere industriale este un element-cheie în elaborarea strategiilor de dezvoltare economică a regiunilor, contribuind la crearea unei politici economice și industriale regionale eficiente. Regularitatea menționată în introducere este clar evidențiată pe harta Europei, unde sunt marcate clusterele (Figura 1). În acest articol, urmează să evaluăm experiența de implementare a tehnologiilor de cluster și a sprijinului financiar deja consolidat în unele țări dezvoltate.

Experiența SUA este relevantă în acest sens. Datorită clusterizării statului California și creării unei zone de inovare de înaltă tehnologie în cadrul acestuia, potențialul și atractivitatea investițională a teritoriului au crescut. Astăzi, acest teritoriu atrage nu numai investitori americani, ci și investitori din întreaga lume. Cel mai impresionant rezultat al aplicării instrumentelor financiare de dezvoltare a clusterelor este gradul ridicat de grupare și competitivitate a economiei din Silicon Valley (California, SUA). După ce s-a constatat că producția TIC din SUA tinde să se concentreze pe un anumit teritoriu, guvernul țării a început să stimuleze formarea și dezvoltarea clusterelor prin crearea activă de parcuri tehnologice, precum și prin elaborarea și implementarea unui program de încurajare a formării de alianțe tehnologice regionale (Weber, 2023, p. 45).

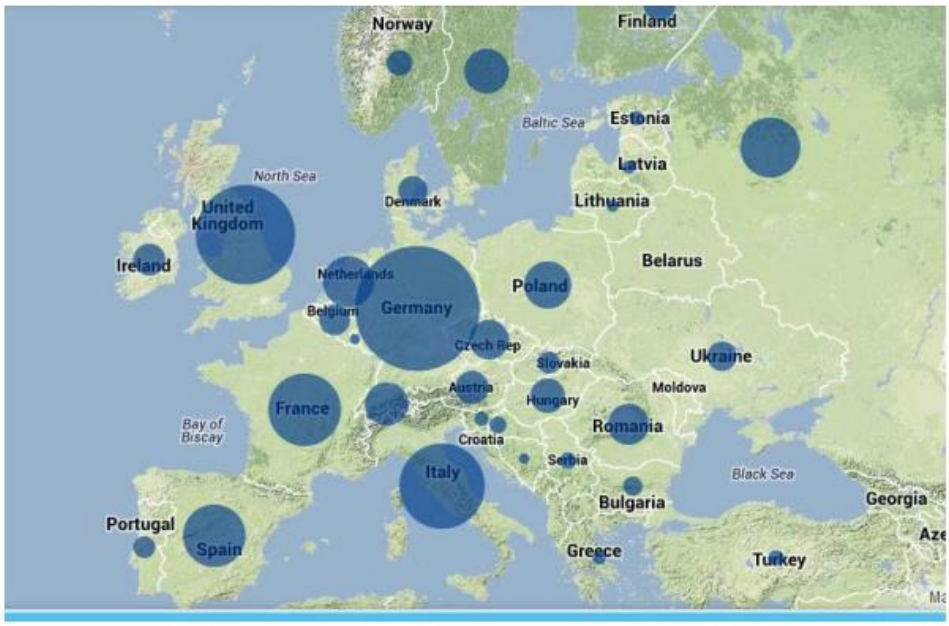

Figura 1. **Răspândirea tehnologiilor de cluster în Europa**
Sursa: Platforma ECCP, 2024

După cum știm, sloganul principal al politicii americane de inovare este „…investiția în tehnologie înseamnă investiția în viitorul Americii”, în același timp,

sprijinul statului se concentrează pe acele inovații care asigură dezvoltarea afacerilor pe termen lung. În SUA, autoritățile de stat sprijină și stimulează în mod activ formarea de clustere de (Growing Clusters For American Prosperity Overview, 2023). În prezent, în SUA există peste 200 de technoparcuri, care pot fi împărțite în două tipuri: cele care au apărut spontan și cele care au apărut la inițiativa statului (state individuale). Unul dintre exemplele primului tip de tehnoparcuri a fost Silicon Valley, care s-a transformat într-un cluster de inovare.

Practica de grupare a economiei olandeze include, în primul rând, instrumente de sprijinire a inițiativelor de grupare și de formare a infrastructurii de dezvoltare a grupărilor, cum ar fi, crearea de zone economice speciale (în Antile) și implementarea proiectului pilot de creare a unei zone de investiții comerciale.

Întreaga economie a fost împărțită în 10 "mega-clustere": industrii de asamblare, industrii chimice, energie, agro-industrie, construcții, mass-media, sănătate, servicii comerciale, servicii necomerciale și transporturi. Analiza „fluxurilor de cunoștințe" între clustere a permis să identificăm trăsăturile caracteristice ale proceselor financiare și de inovare. A reieșit că 3 clustere (industriile de asamblare, industriile de servicii comerciale și industriile chimice) servesc drept „exportatori" de cunoștințe către alte clustere. Între timp, primele reprezintă „exportatorii" generali care exportă cunoștințe către toate celelalte clustere. Industriile de servicii de sănătate și de servicii non-profit (care dispun de mari unități din industria cunoașterii) sunt, de asemenea, exportatori de cunoștințe, deși într-o măsură mai mică. Două clustere sunt importatoare nete de cunoștințe: Construcție; Media.

Trei clustere (agribusiness, energie și transporturi) sunt autosuficiente și produc cunoștințe în principal pentru ele însele (Business and Economy of the Netherlands, 2024).

În Țările de Jos, a fost creată o platformă la nivel național pentru a sprijini industriile de înaltă tehnologie, grupurile de inovare și dezvoltarea inovatoare a economiei țării în ansamblu. Ca urmare a acestei abordări, a apărut o regiune specială de înaltă tehnologie care reunește o serie de clustere de inovare din Țările de Jos, precum și din țările vecine Germania și Belgia, numită „Brainport". Regiunea a devenit principalul centru de înaltă tehnologie din Țările de Jos și pretinde a fi centrul cheie de înaltă tehnologie din Europa.

Țările de Jos creează, de asemenea, condiții atractive pentru companiile inovatoare din industria agricolă și alimentară, ca sprijin guvernamental pentru dezvoltarea de clustere. Rezultatul unei astfel de politici de stat este proiectul Food Valley. Companii de renume mondial și de succes precum DSM, Unilever, Nestle, Friesland Campina, Danone și alte aproximativ 1 000 de companii diferite cooperează cu Valea alimentară olandeză.

Ideea definitorie care stă la baza creării „Food Valley" este introducerea intensivă a noilor tehnologii în toate sferele afacerilor agricole pentru a obține un produs final inovator. Guvernul olandez oferă subvenții și fonduri specifice pentru

susținerea clusterelor de înaltă tehnologie, precum „Brainport” și „Food Valley”. Sectoarele prioritare ale activității de afaceri ale clusterului sunt:

- producția vegetală;
- tehnologia de prelucrare a produselor lactate;
- producția de carne;
- cercetarea în domeniul științei alimentare;
- produse alimentare care conțin aditivi sănătoși;
- hrana pentru animale;
- siguranța alimentară;
- uleiuri și grăsimi vegetale (rafinate);
- reciclarea apelor uzate;
- tehnologii de producție a culturilor de seră;
- floricultură și logistică;
- producția de biocombustibili.

Pe lângă Valea alimentelor, în această țară s-a format și Valea sănătății. Aceasta este o rețea de institute de cercetare biomedicală, companii de dezvoltare farmaceutică, furnizori de servicii medicale și furnizori de tratamente generale. Clusterul biomedical include, de asemenea, universități medicale, institute de cercetare și clinici academice, organizații implicate în monitorizarea și îngrijirea pacienților; procese de medicină regenerativă și de reabilitare; produse farmaceutice; dezvoltarea, producția și controlul administrării de medicamente; diagnosticare moleculară; inginerie de precizie; dezvoltarea de tehnologii inovatoare și echipamente medicale de ultimă generație.

Așadar, ca instrumente de dezvoltare a clusterelor în Țările de Jos, vom evidenția: în primul rând, crearea de zone economice speciale, precum și crearea unei zone de investiții comerciale; și, în al doilea rând, dezvoltarea unui mediu de afaceri favorabil și a unei infrastructuri dezvoltate pentru sectoarele prioritare ale economiei țării, în special pentru tehnologiile medicale și industria farmaceutică.

Practica germană de implementare a tehnologiilor de dezvoltare economică prin clustere pe exemplul clusterelor de automobile. Datorită problemelor istorice și nevoilor de dezvoltare economică a Germaniei în anii postbelici, autoritățile statului german s-au confruntat cu sarcina de a crea o industrie competitivă în cel mai scurt timp posibil. După cum știm, acolo unde se așteaptă progrese importante sunt clusterele care s-au dovedit a fi cele mai eficiente. Prin urmare, a fost destul de rațional pentru autoritățile germane să aplice abordarea de cluster împreună cu structurile de afaceri. Punctul central al aplicării tehnologiilor de cluster a fost industria auto (Clusters: Lessons from the German Experience, 2024).

Următorul exemplu este despre impactul instrumentelor de sprijin de stat și al disponibilității sprijinului de infrastructură, pentru dezvoltarea de clustere. După reunificarea țării, a existat un dezechilibru în dezvoltarea fostei Germanii de Est și a celei de Vest. Astfel, partea estică se caracterizează prin costuri de producție mai mici în comparație cu Germania de Vest, prin prezența unei infrastructuri favorabile pentru dezvoltarea industriei auto: prevalența întreprinderilor mici și mijlocii cu un

număr mic de angajați în economia acestui teritoriu, cu un nivel suficient de ridicat de competențe și infrastructură educațională. Acest lucru a dus la relocarea industriei auto în estul țării.

În prezent, industria automobilelor este unul dintre sectoarele de vârf ale economiei naționale germane, ceea ce demonstrează, fără îndoială, eficiența abordării de cluster și a politicii de cluster a statului.

Experiența canadiană de dezvoltare a clusterelor denotă implementarea acestei abordări în următoarele sectoare:

- cluster de biotehnologie localizat în Montreal, Toronto, Vancouver, Ottawa, Halifax;
- cluster de informații și telecomunicații (Vancouver, Calgary, Quebec etc.);
- cluster de înaltă tehnologie (Montreal, Ontario etc.);
- cluster multimedia (Montreal, Toronto, Vancouver);
- cluster de vinuri (Niagara);
- clusterul industriei alimentare (Toronto).

Sprijinul pentru inițiativele de cluster în Canada a fost acordat la toate nivelurile de guvernare. Nu există un concept unic de implementare a abordării cluster la nivel de stat. Cu toate acestea, guvernul țării elaborează reguli economice generale, care reprezintă vectorul de dezvoltare a sistemelor economice teritoriale. Și, de asemenea, autoritatea de stat din Canada poate desemna regiuni-provincii și municipalități, pentru a pune în aplicare inițiative specifice de cluster. Și, în același timp, strategia națională de inovare a țării este elaborată la nivel de stat, din care face parte și strategia de cluster. Implementarea strategiei de inovare se află sub controlul Consiliului Național de Cercetare (National Research Council Canada, 2024). Acesta, la rândul său, elaborează și implementează inițiativele privind clusterele tehnologice, care s-au axat pe următoarele grupuri de țări canadiene:

- Saguenay Aluminium Technologies - 48 de întreprinderi principale, o universitate, colegii tehnice, trei asociații industriale;
- Edmonton Nanotechnologies - 21 de companii importante, o universitate, o asociație industrială;
- Vancouver Fuel and Hydrogen Technology Association -35 de companii importante, trei universități, două asociații industriale importante);
- Saskatoon Food Industry -17 mari companii locale, o universitate, o rețea regională, aproximativ 50 de membri din provinciile învecinate);
- Winnipeg Biomedical Technologies -25 de companii locale importante, două universități locale, un colegiu, mai multe institute de cercetare, laboratoare și spitale, două asociații;
- Tehnologii fotonice în Ottawa -peste 60 de companii locale importante, mai multe asociații industriale, trei universități, mai multe centre de cercetare publice).

La nivel regional, operatorii Sistemului național de inovare sunt responsabili de implementarea acestui program. Totodată, Consiliul Național de Cercetare și Guvernul Canadei sprijină, de asemenea, clusterele în implementarea politicilor de

atragere a investițiilor, finanțării, de asistență în vânzarea produselor companiei pe pieţele străine, de reglementare a pieței muncii, de investiții în cercetare și dezvoltare, de creare de programe educaționale și de protecție a proprietății intelectuale (Azevedo, Brandenburg, Carvalho & Cruz-Machado, 2014, p. 67).

Rezultatele analizei aplicării instrumentelor de dezvoltare a clusterelor în practica internațională sunt prezentate în Tabelul 1.

Tabelul 1**. Analiza comparativă a instrumentelor de dezvoltare a clusterelor în străinătate**

Europa	America de Nord
Țările de Jos: - crearea de zone economice speciale; - punerea în aplicare a unui proiect pilot pentru crearea unei zone de investiții comerciale; - Crearea unei Platforme de investiții și inovare la nivel național pentru a sprijini industriile de înaltă tehnologie și grupurile de inovare; - Subvenții și fonduri de inovare - Crearea unui mediu de afaceri favorabil pentru tehnologia medicală și farmaceutică. din industria de sănătate (Health Valley). Germania: - Parteneriate public-private; - crearea unei infrastructuri favorabile (costuri de producție scăzute în landurile estice în comparație cu Germania de Vest); - predominanța întreprinderilor mici și mijlocii cu un număr mic de angajați în economia acestui teritoriu; - dezvoltarea capitalului uman (creșterea nivelului de calificare); - dezvoltarea infrastructurii educaționale; - prin scheme precum „WBSO" (Scheme for Research and Development), companiile beneficiază de deduceri fiscale care sprijină activitățile de cercetare și dezvoltare, facilitând investițiile în inovație.	S.U.A: - crearea activă de parcuri tehnologice; - dezvoltarea și implementarea a unui program de încurajare a formării de alianțe tehnologice regionale; - sprijin pentru investiții în inovații și grupuri de inovare; - crearea unei zone de inovare de înaltă tehnologie în California. Canada: - elaborarea strategiei naționale de inovare pentru țară; - Instituirea unor autorități de coordonare la nivel de stat și regional (Consiliul Național de Cercetare și operatorii regionali ai Sistemului Național de Inovare); - dezvoltarea și implementarea a inițiativelor privind clusterele tehnologice; - sprijin de stat pentru clustere în implementarea politicilor de atragere a investițiilor; - asistență în vânzarea produselor companiilor pe pieţele externe; - reglementarea pieței muncii; - investirea în cercetare și dezvoltare științifică; - crearea de programe educaționale; - sprijin financiar; - protecția proprietății intelectuale.

Sursa: Sistematizat de autori, (INCE, 2018)

Rezultatele studiului literaturii de specialitate oferă o prezentare sistematizată a instrumentelor de dezvoltare a clusterelor în practica mondială, sintetizate în Tabelul 2.

Tabelul 2. **Complexul de instrumente pentru sprijinirea și dezvoltarea clusterelor în practica mondială**

Țara / Instrumente dezvoltarea de clustere	S.U.A.	Franța	Japonia	Suedia	Anglia	Germania	Elveția	Olanda	Austria	Australia	Canada
sprijin financiar direct	+	+									+
preferințe fiscale			+								
acordarea de împrumuturi, inclusiv împrumuturi fără plata dobânzii				+							
fonduri de inovare					+	+	+	+			
împrumuturi nerambursabile pentru inovații						+					
Reducerea taxelor de stat pentru inventatorii individuali și acordarea de stimulente fiscale	+			+		+			+		
o infrastructură specială de sprijinire a inventatorilor individuali și a asigurării economice a acestora			+								
amânarea sau scutirea de la plata taxelor dacă invenția se referă la economisirea energiei									+		
gestionarea gratuită a birourilor pentru inventatorii individuali, servicii gratuite de consultanță în brevete, scutire de plata taxelor.						+		+			
programe guvernamentale de reducere a riscurilor și de compensare a pierderilor cauzate de riscuri			+								
programe pentru găsirea și atragerea de specialiști străini	+		+			+				+	
fundații care acordă granturi			+								
instituții speciale de dezvoltare și creare de rețele	+										
autoritățile de coordonare	+										+
granturi specifice pentru cercetare și dezvoltare	în aproape toate țările										
organizarea de evenimente publice	în aproape toate țările										
protecția proprietății intelectuale și a drepturilor de autor	în aproape toate țările										

Sursa: Sistematizat de autori

Tabelul evidențiază rolul esențial al instrumentelor financiare în dezvoltarea clusterelor la nivel global. Țări precum SUA, Germania și Olanda oferă sprijin financiar direct, granturi de cercetare și fonduri de inovare pentru a stimula activitățile de cercetare și dezvoltare, iar Elveția și Franța se axează pe programe de reducere a riscurilor și împrumuturi fără dobândă. Instrumentele financiare, cum ar fi împrumuturile nerambursabile și preferințele fiscale, sunt esențiale pentru susținerea inovării și reducerea costurilor, fiind implementate în special în țări cu un

sector tehnologic puternic. Astfel, fiecare stat își adaptează sprijinul financiar pentru a răspunde cerințelor și obiectivelor naționale în materie de competitivitate economică și inovare. Fondurile pot fi utilizate atât din bugetul central, cât și din bugetele regionale, pe principiul cofinanțării. Cu toate acestea, merită făcută o corecție: statul ar trebui să fie principalul investitor în etapa inițială a dezvoltării clusterului, iar apoi este de dorit o finanțare mixtă (public-privată) și autofinanțare pentru dezvoltarea cu succes a structurilor de cluster. Sprijinul de stat ar trebui să devină un stimulent pentru a atrage organizații în cluster în etapa în care aceste organizații realizează avantajele clusterului. În caz contrar, în absența unei finanțări din partea autorităților de stat, abordarea clusterului poate rămâne nerevendicată.

Republicii Moldova. În ceea ce privește practica Republicii Moldova de clusterizare a economiilor regionale și dezvoltarea unui set de instrumente pentru susținerea clusterelor în sistemul economic regional, este necesar să se realizeze un studiu complex dedicat clusterelor din Republica Moldova. În acest context, implementarea unui Program Național dedicat clusterelor ar oferi suport structurat pentru dezvoltarea, extinderea și integrarea acestora în lanțurile valorice regionale și internaționale, contribuind astfel la creșterea competitivității economiei naționale. Pentru aceasta, este nevoie de o organizație umbrelă, o asociație națională a clusterelor, care să coordoneze activitățile, să faciliteze schimbul de bune practici și să reprezinte interesele clusterelor la nivel național și internațional. Această asociație va juca un rol esențial în promovarea politicilor de susținere a clusterelor, accesarea finanțărilor, organizarea de evenimente și programe de formare, consolidând astfel rețeaua de clustere și contribuind la dezvoltarea economică sustenabilă a Republicii Moldova. Asociația va colabora îndeaproape cu instituțiile guvernamentale și organizațiile internaționale, asigurându-se că politicile și inițiativele de susținere a clusterelor sunt aliniate la standardele internaționale și beneficiază de resurse și expertiză adecvată. Prin parteneriate strategice, asociația va facilita accesul clusterelor la finanțări, consultanță și oportunități de networking internațional, consolidând poziția Republicii Moldova în cadrul economiei regionale și internaționale.

Concluzii. Expertiza internațională în ceea ce privește sprijinul financiar și instrumental pentru dezvoltarea clusterelor, arată valoarea unei abordări integrate care combină finanțarea directă, stimulentele fiscale și sprijinul organizațional pentru creșterea competitivității regionale și sectoriale. Istoriile de succes ale clusterelor la nivel internațional au demonstrat că un mediu de sprijin pentru adaptare, inclusiv participarea activă a organizațiilor neguvernamentale, parteneriatele public-privat și colaborarea cu instituții guvernamentale și organizații internaționale – poate stimula inovarea și integrarea în lanțurile valorice globale. În cazul Republicii Moldova, adoptarea acestor practici, alături de crearea unui program național dedicat clusterelor și unei asociații naționale de coordonare, ar putea contribui semnificativ la dezvoltarea economică sustenabilă și la creșterea competitivității pe plan internațional.

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