



TECHNICAL UNIVERSITY OF MOLDOVA

JOURNAL OF SOCIAL SCIENCES

Scientific publication founded on June 1, 2018

2025

Vol. VIII (3)

ISSN 2587-3490
eISSN 2587-3504

TECHNICAL UNIVERSITY OF MOLDOVA (PUBLISHING HOUSE)
„TEHNICA UTM” (PRINTING HOUSE)

Editor-in-Chief

Prof. univ. Larisa Bugaian

Technical University of Moldova

larisa.bugaian@adm.utm.md

Editorial Board

Ala Cotelnic, Dr. hab., Professor, Academy of Economic Studies of Moldova

Alexandru-Mircea Nedelea, PhD, Associate Professor, „Stefan cel Mare” University of Suceava, Romania

Alexandru Stratan, Dr. hab., Professor, Corr. Member of the Academy of Sciences of Moldova

Anca Păunescu, PhD, Professor, University of Craiova, Romania

Carmen Nastase, PhD, Professor, „Stefan cel Mare” University of Suceava, Romania

Gabriela Prelipcean, PhD, Professor, „Stefan cel Mare” University of Suceava, Romania

Georgeta Stepanov, Dr. hab., Professor, Moldova State University

Inga Stoianova, PhD, Associate Professor, Free International University of Moldova

Iuliu Turcan, PhD, Associate Professor, Technical University of Moldova

Larisa Bugaian, Dr. hab., Professor, Technical University of Moldova

Lilia Chiriac, PhD, Associate Professor, Technical University of Moldova

Ludmila Ungureanu, PhD, Associate Professor, Technical University of Moldova

Margareta Florescu, PhD, Professor, Institute of Advanced Research of the Academy of Economic Studies of Bucharest, Romania

Maria Gheorghita, Dr. hab., Professor, Technical University of Moldova

Nelly Turcan, Dr. hab., Professor, Moldova State University, Information Society Development Institute

Nicolae Samson, PhD, Associate Professor, “Gheorghe Asachi” Technical University of Iasi, Romania

Olivia-Cristina Rusu, PhD, Professor, Academy of Economic Studies of Bucharest, Romania

Rafael Ciloci, PhD, Associate Professor, Technical University of Moldova

Rodica Cujba, PhD, Technical University of Moldova

Rodica Sturza, Dr. hab., Professor, Technical University of Moldova

Romeo V. Turcan, PhD, Professor, Aalborg University, Denmark

Svetlana Albu, Dr.hab., Professor, Technical University of Moldova

Svetlana Mira, PhD, Cardiff University, UK

Svetlana Caterenciuc, PhD, Associate Professor, Technical University of Moldova

Viorica Răileanu, PhD, Associate Professor, Institute of Philology, Republic of Moldova

Responsible Editor

Dr. hab. Rodica STURZA

Technical University of Moldova

rodica.sturza@chim.utm.md

Editorial Production:

Dr. hab. Aliona GHENDOV-MOȘANU

Dr. Nicolae Trifan

Dr. Svetlana Caterinciuc

Dr. Rodica Cujba

**According to the Decision of the NAQAER No. 15 from 26.02.2021, JSS is classified as
B+ journal**

The Journal of Social Sciences is indexed in:

1. DOAJ (Directory of Open Access Journals)
2. ROAD (Directory of Open Access scholarly Resources)
3. CEEOL (Central and Eastern European Online Library GmbH)
4. INDEX COPERNICUS (IC)
5. ZENODO
6. ERIH PLUS (European Reference Index for the Humanities and the Social Sciences)

Main subjects areas of the Journal:

- Economics Policy and Economic Policies
- Economics and Management
- Finance and Accounting
- Marketing and Logistics
- Arts and Design
- Pedagogy and Psychology
- Sociology
- Philosophy
- History
- Philology and linguistics
- Law

How to publish a paper:

1. Send the manuscript and information about the author to the **Editorial Board address:** jes@meridian.utm.md, rodica.sturza@chim.utm.md
2. Manuscripts are accepted only by e-mail, in template file (<https://jss.utm.md/>)
3. Articles are accepted in original language, with name, abstract and keywords in English.
4. After a review, you will be notified of the editorial board's decision.
5. After the Journal has been published, we will send it to you immediately by mail.

CONTENT

<i>Piyooosh Rautela, Meenakshi Bist, Deepshikha Rawat Bhatt</i>	<i>Towards a resilient and prosperous Himalayan Region: a critical analysis of the development paradigms.....</i>	<i>6</i>
<i>Beauty Zindi, Malefetsane Mofolo</i>	<i>Measures to improve fiscal sustainability and debt management at the provincial level: a case of South Africa ...</i>	<i>19</i>
<i>Abdelwaheb Sakhri</i>	<i>The role of government support in accompanying entrepreneurial enterprises to achieve inovation in Algeria....</i>	<i>34</i>
<i>Rafael Ciloci, Iuliu Turcan</i>	<i>The economy of the Republic of Moldova from the perspective of sustainable development</i>	<i>49</i>
<i>Alexandru Alexeev, Rina Turcan, Ina Gumeniuc</i>	<i>Exploring the economic and environmental impact of wine tourism in emerging and developed economies</i>	<i>60</i>
<i>Lino Bianco</i>	<i>Architecture, cultural values and politics: the case for Sofia...</i>	<i>74</i>
<i>Svetlana Cangas, Elena Florea-Burduja, Aliona Raru</i>	<i>Popular wear a source of creation in the development of modern clothing forms</i>	<i>87</i>
<i>Ali Haider, HabibUlla Shalmani</i>	<i>Body esteem and self- esteem among university students in Pakistan.....</i>	<i>99</i>
	<i>It was excluded because this article made use of generative AI</i>	
<i>Mariana Goras</i>	<i>The professional transition from university to the school environment.....</i>	<i>110</i>
<i>Cristina Lazariuc</i>	<i>The impact of European values on youth mindsets in the Republic of Moldova.....</i>	<i>126</i>
<i>Jonathan Enguta Mwenzi, Nassy Mutunga Nassy, Carmy Tshayima Mayunga</i>	<i>Addiction to pornography among teenagers in kinshasa and its determinants</i>	<i>142</i>
<i>Rodica Sturza, Aliona Ghendov-Moşanu, Veronica Dragancea, Dmitri Lazacovici</i>	<i>Migration of chemical compounds from food packaging: regulatory aspects and assessment of potential risks</i>	<i>151</i>
<i>Petru Marian Cârlescu</i>	<i>Review of the book "Equipment and installations in the agri-food products industry", published by the Romanian Academy Publishing House, author prof. univ. dr. Ioan Țenu.....</i>	<i>172</i>

CONȚINUT

Piyoosh Rautela, Meenakshi Bist, Deepshikha Rawat Bhatt	<i>Către o regiune Himalayană rezilientă și prosperă: o analiză critică a paradigmelor de dezvoltare</i>	6
Beauty Zindi, Malefetsane Mofolo	<i>Măsuri de îmbunătățire a sustenabilității fiscale și a gestionării datoriei la nivel provincial: un caz al Africii de Sud.....</i>	19
Abdelwaheb Sakhri	<i>Rolul sprijinului guvernamental în însoțirea activităților antreprenoriale pentru realizarea inovației în Algeria.....</i>	34
Rafael Ciloci, Iuliu Turcan	<i>Economia Republicii Moldova din perspectiva dezvoltării durabile</i>	49
Alexandru Alexeev, Rina Turcan, Ina Gumeniuc	<i>Explorarea impactului economic și de mediu al turismului vitivinicol în economiile emergente și dezvoltate</i>	60
Lino Bianco	<i>Arhitectură, valori culturale și politică: cazul orașului Sofia...</i>	74
Svetlana Cangas, Elena Florea-Burduja, Aliona Raru	<i>Portul popular - sursă de creație în dezvoltarea formelor vestimentare moderne.....</i>	87
Ali Haider, HabiBulla Shalmani	<i>Stima corporală și stima de sine în rândul studenților universitari din Pakistan</i>	99
Mariana Goras	<i>Articolul a fost exclus - a fost depistată utilizarea IA generative</i> <i>Adaptarea cadrelor didactice debutante în procesul de tranziție din medul universitar în mediul școlar.....</i>	110
Cristina Lazariuc	<i>Impactul valorilor europene asupra mentalității tinerilor din Republica Moldova.....</i>	126
Jonathan Enguta Mwenzi, Nassy Mutunga Nassy, Carmy Tshayima Mayunga	<i>Dependența de pornografie în rândul adolescenților din Kinshasa și factorii săi determinanți.....</i>	142
Rodica Sturza, Aliona Ghendov-Moșanu, Veronica Dragancea, Dmitri Lazacovici	<i>Migrarea compușilor chimici din ambalaje alimentare: aspecte normative și evaluarea riscurilor potențiale.....</i>	151
Petru Marian Cârlescu	<i>Recenzie a cărții "Utilaje și instalații în industria produselor agroalimentare", publicată la Editura Academiei Române, autor prof. univ. dr. Ioan Țenu</i>	172

[https://doi.org/10.52326/jss.utm.2025.8\(3\).01](https://doi.org/10.52326/jss.utm.2025.8(3).01)
CZU 614.8.084:551:504(1-925.36)



TOWARDS A RESILIENT AND PROSPEROUS HIMALAYAN REGION: A CRITICAL ANALYSIS OF THE DEVELOPMENT PARADIGMS

Piyooosh Rautela ¹, ORCID: 0000-0001-7280-4655,
Meenakshi Bist ², ORCID: 0000-0002-6066-0954,
Deepshikha Rawat Bhatt ³, ORCID: 0000-0002-8666-0346

¹ Disaster Management Initiatives and Convergence Society, Hyderabad, Telangana, India

² School of Computer Application, IMS Unison University, Dehradun, Uttarakhand, India

³ Advisory Support Group, Chief Minister's Office, Dehradun, Uttarakhand, India

* Corresponding author: Piyooosh Rautela, rautelapiyoosh@gmail.com

Received: 06. 27. 2025

Accepted: 08. 29. 2025

Abstract. The increasing frequency and magnitude of disasters in the Himalayan region are not solely attributable to natural forces. The prevailing development paradigm, characterized by unsustainable tourism, large-scale hydropower projects, and a disregard for traditional ecological knowledge, has exacerbated the region's vulnerability. While technocrats and experts often advocate for investment in warning systems after each devastating event, such solutions alone cannot ensure the safety and security of communities in the Himalayan region. This paper argues for a paradigm shift in Himalayan development, one that prioritizes disaster risk reduction (DRR) and embraces a flexible, participatory approach. This new framework must integrate local knowledge, aspirations, and an understanding of the region's inherent fragility to foster both resilience and vibrant economic growth.

Keywords: *Himalayas, Development paradigm, Disasters risk reduction, Sustainability.*

Rezumat. Frecvența și magnitudinea tot mai mari ale dezastrelor din regiunea Himalaya nu sunt atribuibile exclusiv forțelor naturale. Paradigma de dezvoltare predominantă, caracterizată prin turism nesustenabil, proiecte hidroenergetice la scară largă și o ignorare a cunoștințelor ecologice tradiționale a exacerbât vulnerabilitatea regiunii. Deși tehnocrații și experții pledează adesea pentru investiții în sisteme de avertizare după fiecare eveniment devastator, astfel de soluții singure nu pot asigura siguranța și securitatea comunităților din regiunea Himalaya. Această lucrare pledează pentru o schimbare de paradigmă în dezvoltarea Himalayei, una care să prioritizeze reducerea riscului de dezastre și să adopte o abordare flexibilă și participativă. Acest nou cadru trebuie să integreze cunoștințele locale, aspirațiile și înțelegerea fragilității inerente a regiunii pentru a promova atât reziliența, cât și o creștere economică vibrantă.

Cuvinte cheie: *Himalaya, Paradigmă de dezvoltare, Reducerea riscului de dezastre, Sustenabilitate.*

1. Introduction

The Himalayan region, characterized by its rugged terrain and limited arable land, has always supported a sparsely populated and dispersed settlement pattern. The habitations in this terrain are often located in the proximity of geomorphologically favourable sites formed by landslides where water and agricultural land are available. These resources are however not abundant and can support limited population size. Moreover, the steep topography, deep gorges, and fast-flowing rivers limit interaction between communities residing in this region, fostering a self-sufficient and self-contained lifestyle, and a unique cultural identity. This relative isolation, coupled with the region's natural beauty, has long attracted people seeking respite from urban life, further shaping its development trajectory.

Recent decades have however witnessed a shift towards emulating Western development models that prioritize connectivity, infrastructure, and economic indicators [1] and accordingly the Himalayan region was labelled as "underdeveloped" and its inhabitants "backward", a narrative reinforced by popular media portrayals. Globalization and increasing international pressure have further fuelled this drive for development, often at the expense of local knowledge, environmental sustainability, and disaster risk reduction. Policymakers, eager to shed the stigma of backwardness, have often rushed to implement development schemes ill-suited to the region's unique challenges and fragilities.

This paper argues that such a conventional approach to development has contributed to the increasing frequency and magnitude of disasters in the Himalayan region, besides deteriorating the quality of life of its inhabitants. A critical re-evaluation and realignment of the development paradigm is therefore needed, one that prioritizes local wisdom, environmental sustainability, and disaster risk reduction while fostering genuine economic growth.

2. The Quest for Development

Availability of water and land for agriculture, together with proximity to the forest and pastures decided suitability of a place in the Himalayan region for human habitation, and the magnitude of these resources decided the population size of these habitations. Distribution of these resources not being uniform and continuous, population in the Himalayan region has been sparsely distributed and geomorphic constraints imposed by the terrain resulted in limited connectivity and communication between the inhabitants of these habitations as also poorly developed infrastructure and public amenities.

The drive to develop the Himalayan region has thus been interwoven intricately around the quest to overcome these constraints imposed by nature.

2.1 Water

With the topography promoting prompt runoff and the water of glacier fed rivers being unfit for human consumption during summers [2], inhabitants of the Himalayan region have always faced scarcity of water despite ample rains since the stabilisation of south-west monsoon over the Indian subcontinent [3]. The quantity of available water thus had a major influence on the size of the habitations in the region.

To overcome the limitations imposed by water availability on population growth, ambitious schemes were implemented to pump drinking water, often from distant sources. These projects however frequently overlooked the socio-cultural, hydrological and ecological consequences of such large-scale water transfer.

With piped water readily available, traditional water sources were gradually neglected by both the state and communities that now required these only for ritualistic purposes.

This shift severed the age-old bonds between the communities and their water sources, including the crucial recharge zones, disrupting the socio-ecological services these sources provided. Consequently, many traditional water sources became unproductive and were even encroached upon [4].

This had far-reaching implications for the hydrology and stability of the Himalayan region. Firstly, it disrupted the delicate water balance of the exploited watersheds, leading to water scarcity in those areas. This, in turn, triggered a cascade effect, with water being transferred from one watershed to another with little consideration for hydrological or geological impacts. Secondly, the recipient watershed now had water far in excess of its capacity for safe disposal, which had adverse impact on slope stability. Thirdly, the decay of traditional water sources led to increased groundwater retention. Previously, subsurface water would naturally discharge through these sources, maintaining the pore water pressure within safe limits. However, with encroachment and reduced outflow, pore water pressure has increased, rendering hillsides more susceptible to landslides and instability.

2.2 Housing

The geomorphic constraints of the Himalayan region traditionally limited horizontal expansion of settlements, resulting in compact habitations with predominantly one or two-story structures. This constraint was however challenged with the promotion of multi-storied, reinforced cement concrete (RCC) buildings.

The damage inflicted on traditional houses during the 1991 Uttarkashi and 1999 Chamoli earthquakes in Uttarakhand [5] fuelled the perception that the traditional structures were inherently weak and unsafe [6]. This perception unfortunately overlooked the underlying causes of seismic losses, leading to the wholesale dismissal of traditional building practices without proper investigation.

The RCC houses, were however constructed initially by affluent families with outside exposure, and these became symbols of social status [6]. This led to widespread imitation, even among those who could not afford proper construction, with many replacing traditional light weight slated roofs with heavy RCC slabs that the walls of the traditional houses were not designed to support.

While the 1991 Uttarkashi earthquake exposed the risks of such poorly modified and constructed buildings, the lessons learned were not effectively retained due to what psychologists call the Fading Affect Bias [7] - the tendency to forget the emotional impact of previous traumatic incidences over time.

Compounding the problem is the lack of accessible structural engineering advice and the absence of institutional mechanisms to train local masons in safe construction practices using new materials. Most construction workers, including bar-benders and masons, are self-taught, and there exists no system to ensure the engagement of certified professionals. This has resulted in a proliferation of non-engineered structures with questionable seismic safety [8].

Paradoxically, awareness programs promoting earthquake-safe construction practices have inadvertently reinforced the belief in the invincibility of beam-column structures. This has emboldened residents, relying on the expertise of self-taught masons, to append additional stories to their homes and even encroach upon previously avoided areas, such as those near drainage lines, steep slopes and over agricultural land.

The cumulative effect of these factors is a significant increase in seismic vulnerability and risk across the Himalayan region. The replacement of traditional earthquake-resistant

construction [9] with multi-storied houses built with dubious seismic safety has amplified the potential for catastrophic damage.

Moreover, the increased population density due to multi-storied buildings and the extensive use of concrete have led to greater wastewater discharge and surface runoff. This, coupled with inadequate drainage systems, further elevates pore water pressure and piping of fines from the old landslide debris over which most habitations are presently located, leading to ground instability and landslides. The recent instability of Joshimath town in Uttarakhand serves as a stark reminder of these interconnected challenges [10].

2.3 Wider Roads

Historically, distances in the Himalayan region were measured in travel time rather than physical distance, which reflects the challenges put forth by terrain and limited road infrastructure. The desire to reduce the travel times and align the connectivity standards with other regions however fuelled a drive for wider and straighter roads. This pursuit of faster connectivity has often come at a steep environmental and social cost.

Road construction and widening projects necessitate extensive excavation and cutting into fragile hillsides, destabilizing slopes that had been stable for decades. Despite claims of safe and scientific debris disposal, much of the excavated material is often dumped downslope, triggering new landslides and reactivating old ones. This not only poses a direct threat to water sources, settlements and infrastructure but also increases the volume of debris available for mobilization during flash floods, transforming these into devastating mudflows.

Furthermore, the push for increased connectivity has extended to railway construction, with extensive tunnelling and blasting through the fragile Himalayan landscape. While these projects aim to boost economic activity and accessibility, these raise serious concerns about the long-term impacts of vibrations induced by train movements on slope stability. The potential of these vibrations to trigger landslides and exacerbate existing geological weaknesses cannot be ignored.

2.4 Harnessing Hydropower

Hydropower is often touted as a renewable and green energy source, and the Himalayan region, with its steep gradients and abundant water resources, appears to be an ideal location for harnessing this potential. Consequently, numerous small and large dams and barrages have been constructed throughout the region [11].

However, the construction of these dams and the subsequent regulation of river flows can have significant downstream impacts. Reduced discharge adversely affect the sediment transport capacity of rivers, leading to increased deposition of sediments in the upper reaches. This process of riverbed aggradation results in raised riverbed level, increasing the risk of flooding in areas previously considered safe. Uttarkashi town in Uttarakhand is currently grappling with the consequences of riverbed aggradation caused by upstream and downstream dams [12].

Furthermore, the construction of hydropower projects often involves blasting and excavation, which can destabilize slopes and trigger landslides. The impoundment of water behind dams can also induce seismic activity, increasing the risk of earthquakes in the region [13,14].

Therefore, while hydropower can contribute to clean energy generation, it is essential to carefully consider the potential environmental and geological consequences of large-scale hydropower development in the fragile Himalayan ecosystem. A comprehensive assessment

of the risks and benefits is crucial to ensure that such projects do not inadvertently increase the vulnerability of communities to disasters.

2.5 Unchecked Tourism

While tourism can contribute to economic growth and development, unchecked tourism in ecologically fragile regions like the Himalayas is having detrimental consequences. The very infrastructure development intended to promote tourism – wider roads, recreational amenities, and luxury hotels – are exacerbating these negative impacts.

The focus on attracting large numbers of tourists, often weekend thrill-seekers, has already started to strain the carrying capacity of popular destinations, leading to overcrowding, traffic congestion, environmental degradation, and resource depletion. This trend is often further amplified by state policies that prioritize tourist headcount as a measure of success, rather than promoting sustainable tourism practices that prioritize environmental protection and community well-being [15].

The influx of tourists also disrupts local cultures and traditions, leading to social tensions and the erosion of traditional values. Furthermore, the concentration of tourists in specific areas increases the vulnerability of these areas to disasters, as large crowds hinder evacuation and emergency response efforts [16,17].

Therefore, it is crucial to adopt a more balanced approach to tourism development in the Himalayan region, one that prioritizes sustainability, respects local communities, and minimizes environmental impacts. This may involve implementing measures to regulate tourist numbers, promote responsible tourism practices, and diversify tourism activities to reduce pressure on popular destinations.

3. The Consequences

The Himalayan region is inherently vulnerable to a range of natural hazards [18,19] and the prevailing development paradigm, as discussed in the previous sections, has exacerbated this vulnerability, increasing the risk faced by communities. This is evidenced by a series of recent disasters across the Himalayan region, including the Kedarnath flood in 2013 [19], the Dhauliganga flood in 2021 [20], the Amarnath flash flood in 2022 [21], the Joshimath ground subsidence in 2023, the Kullu-Manali-Mandi floods in 2023, and the South Lhonak glacial lake outburst flood in 2023 [22].

These events highlight the urgent need to critically evaluate and realign the development trajectory in the Himalayan region. A new paradigm is required - one that acknowledges the region's unique geological fragility, incorporates traditional knowledge and practices, and prioritizes the aspirations of local communities [23,24]. This paradigm shift needs to focus on (i) integrating DRR into all development planning and implementation processes, (ii) prioritizing environmental protection and sustainable resource management, (iii) ensuring meaningful participation of local communities in decision-making processes, and (iv) respecting and preserving the unique cultural heritage of the Himalayan region.

By adopting a more holistic and sustainable approach to development, the Himalayan region can build resilience to disasters and ensure a more secure and prosperous future for its inhabitants.

4. Navigating the Complexities of Himalayan Development

4.1 Strategic Considerations and Development

The construction of wider and straighter roads in the Himalayan region is often justified on strategic grounds, citing the need to match infrastructure development on the

other side of the border. This argument however overlooks the significant geological and geomorphological differences between the Indian and Chinese sides of the Himalayas.

The Himalaya on the Indian side is characterized by steep gradients, narrow valleys, high relative relief, and highly disturbed rock mass [25,26], making large-scale infrastructure development inherently challenging and prone to triggering landslides and other hazards. In contrast, the Tibetan Plateau, across the Indus-Tsangpo Suture Zone, exhibits lower relative relief, a more plain-like geomorphology, and relatively stable ground conditions [27,28], making infrastructure development less hazardous.

Therefore, simply comparing infrastructure development strategies in these two distinct geological environments is misleading and can result in misguided policies. While China is able to construct and maintain extensive road networks in the Tibetan Plateau [29], replicating such an approach in the Indian Himalayas could have severe environmental and social consequences.

Instead of focusing solely on road infrastructure, India needs to explore alternative strategies to address strategic considerations in an environmentally sustainable manner. This could involve leveraging the heavy airlift capabilities of the Indian Air Force and developing airfields and logistics facilities at strategic locations near the border, so as to minimize the need for extensive road networks that disrupt fragile ecosystems.

4.2 Quality Over Quantity: Redefining Tourism Led Growth

The second narrative attached to wider roads emphasises tourism development often putting forth increased visitor numbers as a key indicator of success and economic growth. This approach however overlooks the crucial distinction between visitor numbers and actual economic gains.

While increased tourist arrivals can generate economic activity, the true measure of success lies in the amount of money tourists spend on local products and services during their stay. In other words, the duration of stay and spending pattern of tourists are more important indicators of economic benefits than mere headcount.

From this perspective, the focus on wider and straighter roads aimed at facilitating faster travel may actually be counterproductive. By reducing travel time and encouraging tourists to bypass traditional halting stations, such infrastructure development can lead to decreased economic benefits for local communities. This trend is already evident in Uttarakhand, where traditional halting stations along the Char Dham Yatra route, such as Devprayag, Srinagar, Rudraprayag, and Chamoli, are experiencing declining economic activity due to reduced tourist stays [30,31].

Instead of prioritizing speed and volume, a more sustainable approach to tourism development needs to focus on attracting visitors who are genuinely interested in experiencing the unique culture and natural beauty of the Himalayan region and who are willing to spend more time and money on local amenities. This could involve promoting ecotourism, cultural tourism, and other forms of sustainable tourism that prioritize quality over quantity

4.3 Recognising and Mitigating Risks

Asi Ganga flood of August 2012 as also Dhauliganga flood of February 2021, in Uttarakhand tragically demonstrated the devastating consequences of inadequate risk assessment and mitigation in hydropower development. These floods, triggered respectively

by cloudburst and avalanche, devastated hydropower project on Asi Ganga, Rishiganga and Dhauliganga rivers [20,32].

Geological evidences of historical damming and flood along Rishiganga and Dhauliganga rivers were ignored while planning major projects along these rivers [20]. Similarly, the glacial lake outburst flood (GLOF) risk of South Lhonak Lake in the Teesta valley [33,34] was ignored while planning the Teesta III Dam that was devastated by the breach of South Lhonak Lake in October 2023.

These incidents underscore a critical gap in current development practices to adequately recognize, assess, and mitigate risks. Whether due to a lack of comprehensive risk assessment, downplaying of perceived risks, or inadequate implementation of mitigation measures, the consequences of such oversights can be catastrophic.

To ensure the safety and sustainability of development in the Himalayan region, it is imperative to prioritize comprehensive risk assessment and implement robust mitigation measures through (i) identification of potential hazards and vulnerabilities, (ii) clear and transparent communication of risks to the decision-makers and communities, (iii) implementing effective mitigation measures to minimize potential impacts, and (iv) regularly reviewing and updating risk assessments and mitigation strategies in response to changing conditions.

By acknowledging and addressing risks proactively, the Himalayan region can pursue development pathways that prioritize both economic growth and the safety and well-being of its communities.

5. Charting a Sustainable Course for the Himalayas

In the context of identified causes of mounting vulnerability of the Himalayan communities and enhanced risk of hazards to which the Himalayan region is exposed, it is essential to realign the current development paradigm.

5.1 Redefining Connectivity in the Himalayan Context

Given the extensive destabilization already caused by road widening projects, immediate efforts need to focus on slope stabilization and treatment to mitigate further damage. Looking ahead, both local communities and policymakers must recognize that providing road connectivity to every hamlet in the Himalayas is neither feasible nor desirable, and the pursuit of such a goal is to have disastrous consequences for the fragile mountain ecosystem.

Instead of expanding the road network further, the focus should shift to maintaining existing roads and ensuring their safety and resilience. This requires a paradigm shift in road construction practices, prioritizing stability and disaster risk reduction over speed and connectivity by (i) undertaking detailed geo-tectonic assessments before planning road alignments to avoid unstable zones and minimize the risk of landslides, (ii) aligning new roads at higher elevations and away from streams and rivers to minimize disruptions to hydrological systems and reduce the risk of flood damage, and (iii) involving local communities in road planning and maintenance to ensure that the infrastructure development aligns with their needs and priorities.

By adopting a more cautious and sustainable approach to connectivity, the Himalayan region can ensure safe and reliable access while preserving its fragile environment and reducing disaster risk.

5.2 Regulating Construction for Safety and Sustainability

Unregulated and haphazard construction on fragile Himalayan slopes has contributed to numerous disasters, highlighting the urgent need for stricter regulations and context-sensitive building practices.

The unique geological conditions, slope gradients, drainage patterns, and soil depths of each site in the Himalayan region demand a nuanced approach to construction. Generalized building codes and bye-laws, developed for and suiting less dynamic environments, are often inadequate and result in unsafe and unsustainable built environment.

Therefore, it is crucial to invest in detailed geological and geotechnical investigations to inform the development of locally relevant building codes that essentially incorporate earthquake, landslide and flash flood safety measures.

These codes should also promote the use of local building materials, traditional architectural styles, and the skills of local artisans [2,6,35]. Besides enhancing safety and sustainability this approach promises to preserve the unique cultural heritage of the region that in turn is sure to promote tourism.

Furthermore, given the high seismic vulnerability of the Himalayan region [5,8,36], special emphasis must be placed on promoting earthquake-resistant construction practices. This requires establishing institutional mechanisms for training construction workers, particularly masons and bar-benders, in the latest seismic design and construction techniques. By adopting a more controlled and context-sensitive approach to construction, the Himalayan region can ensure the safety and resilience of its built environment while preserving its unique character and promoting sustainable development.

5.3 Prioritising Hazard Mapping and Land Use Planning

Previous disaster incidences have repeatedly highlighted the vulnerability of new settlements in the Himalayan region, which are often established in areas traditionally considered unsuitable for habitation [2,6,35]. This highlights the critical need for comprehensive hazard assessment and effective land-use planning to guide development away from high-risk areas and involves (i) undertaking in-depth mapping of all potential hazards, including landslides, floods, earthquakes, and avalanches, to identify areas at high risk, (ii) implementing measures to discourage or prohibit construction and settlement in hazard-prone areas, which can be achieved through legal notifications, public awareness campaigns, and collaboration with insurance companies to incentivize safe development, (iii) designating areas in close proximity to streams, rivers, natural springs, and traditional water sources, as well as aquifer recharge zones, as protected areas and this would help in maintaining hydrological stability, reduce erosion, and minimize flood risk, and (iv) incorporating local knowledge and traditional land-use practices into planning processes, recognising and respecting that the communities possess valuable insights into local hazards and sustainable land management techniques.

By prioritizing hazard mapping and implementing effective land-use planning policies, the Himalayan region can guide development towards safer and more sustainable pathways, minimizing the risk to both human lives and the environment.

5.4 Implementing Effective Drainage Measures

Inadequate drainage, coupled with the encroachment and blockage of natural drainage channels, has been a major contributing factor to several disasters in the Himalayan region, including the recent ground subsidence in Joshimath town of Uttarakhand [10].

To prevent such occurrences, it is crucial to (i) implement and enforce strict regulations to maintain buffer zones around drainage lines free from construction and human intervention, and this requires clear demarcation of these zones and effective monitoring mechanisms to ensure compliance, (ii) design and construct efficient drainage systems to ensure prompt and effective disposal of rainwater and household wastewater and this includes a network of well-maintained drains, culverts, and retention ponds to prevent water accumulation and soil erosion, (iii) encourage the use of permeable surfaces in construction and landscaping to allow for natural infiltration of rainwater and reduce surface runoff, which would also help in groundwater recharge and maintain soil moisture balance, and (iv) involve local communities in the planning, construction, and maintenance of drainage systems to ensure their long-term effectiveness and foster a sense of ownership.

By prioritizing drainage management and implementing effective measures to control water flow and prevent erosion, the Himalayan region can significantly reduce the risk of landslides, ground subsidence, and other water-induced disasters.

5.5 Implementing a Comprehensive Debris Disposal Policy

Construction and development activities in the Himalayan region inevitably generate large amount of debris. If not managed responsibly, this debris can lead to a range of environmental problems, including land and forest degradation, landslides, enhanced erosional power of floods, riverbed aggradation, and siltation of reservoirs [19,20,32].

To address this, a comprehensive Debris Disposal Policy is urgently needed and this needs to incorporate (i) responsibilities of agencies and individuals generating debris for its safe disposal with a system of accountability with penalties for non-compliance and provisions for compensating affected communities in case of negligence, (ii) identification and designation of suitable disposal sites based on detailed geological and environmental assessments ensuring these to be located away from water bodies, settlements, and ecologically sensitive areas, (iii) environmentally sound disposal methods that minimize the impact on surrounding ecosystems, (iv) promotion of recycling and reusing construction and demolition waste to minimize the volume of debris requiring disposal, and (v) a robust monitoring and enforcement mechanism to ensure compliance with the policy.

By implementing a comprehensive and strictly enforced Debris Disposal Policy, the Himalayan region can minimize the negative impacts of development activities and ensure the long-term health of its environment.

5.6 Diversifying Tourism Destinations and Managing Visitor Flow

Himalayan states have traditionally focused on promoting a limited number of well-known tourist destinations, leading to overcrowding and environmental strain in these areas. While attracting tourists is important for economic development, it is equally crucial to diversify tourist destinations and manage visitor flow to ensure sustainability and minimize environmental impacts.

This involves (i) identification and promotion of alternative destinations with the potential to attract diverse interests, such as ecotourism, adventure tourism, cultural tourism, health and wellness tourism, and spiritual tourism, supplemented by development of basic infrastructure and amenities in these areas to distribute tourist traffic more evenly and reduce pressure on popular hotspots, (ii) prioritisation of sustainable tourism infrastructure that minimizes environmental impact in remote and ecologically fragile areas by promoting eco-friendly accommodations like nature villas, tents, and homestays, as well as promoting

trekking and other low-impact activities, (iii) implementing measures to limit the number of visitors within the carrying capacity, particularly in the fragile higher Himalayan regions, by setting limits on daily or annual visitor numbers, implementing permit systems, and promoting off-season tourism, and (iv) carefully managing the development and promotion of new destinations to avoid replicating the overcrowding and environmental degradation seen in existing hotspots through proactive planning, strict regulation, and continuous monitoring.

The recent visit of Prime Minister Narendra Modi to Jageshwar and Jollingkong – Gunji - Adi Kailash-Parvati Kund in Uttarakhand is a positive step towards promoting lesser-known destinations. However, it is crucial to learn from the previous experiences, such as the increased tourist influx to Kedarnath following the Prime Minister's visit, and implement measures to ensure that the development of these pristine areas remains sustainable and respectful of their ecological and cultural significance.

5.7 Rethinking Carrying Capacity in Ecologically Sensitive Areas

The concept of carrying capacity, while useful, can be misleading when applied to managing human presence in ecologically fragile environments and can be artificially inflated by the development of infrastructure and facilities, even in areas that are inherently unsuitable for large-scale human presence.

This is particularly true in the Himalayas, where the construction of roads, hotels, and other amenities can dramatically increase the number of people a given area can accommodate, but at a significant cost to the environment. Kedarnath, located in the ecologically sensitive Alpine zone of Uttarakhand, serves as a prime example of this phenomenon.

Therefore, it is essential to redefine carrying capacity in the Himalayan context, decoupling it from the availability of infrastructure and focusing instead on the ecological limits of the environment by (i) conducting thorough ecological assessments to determine the true carrying capacity of sensitive areas, considering factors such as biodiversity, soil stability, water availability, and waste assimilation capacity, (ii) consciously limiting the development of infrastructure and facilities in ecologically sensitive areas, even if it means restricting visitor numbers, (iii) prioritising the conservation of natural ecosystems and biodiversity over maximising tourist numbers, and (iv) engaging local communities in the decision-making process to ensure that tourism development aligns with their values and protects their natural and cultural heritage.

By adopting a more holistic and ecologically-informed approach to managing carrying capacity, the Himalayan region can ensure that tourism development remains within sustainable limits and contributes to the long-term health of its environment.

5.8 Mandating Disaster Risk Reduction (DRR) in Development Projects

Effective disaster risk reduction (DRR) requires a thorough understanding of the historical and potential hazards in a region. Currently, a comprehensive inventory of previous disaster events is lacking for the Indian Himalayan region, which hinders accurate hazard profiling and risk assessment.

To address this gap, it is crucial to (i) invest resources in compiling a detailed inventory of previous disaster events, including their location, magnitude, and impacts, and ensuring that this database is regularly updated and made accessible to researchers, policymakers, and the public, (ii) make it mandatory for all major development projects in the Himalayan region

to undertake comprehensive risk assessments that account for potential hazards, including extreme events with long recurrence intervals together with evaluation of the potential impacts of the project on disaster risk and proposing mitigation measures, (iii) make risk assessment reports publicly accessible to promote transparency and accountability so as to ensure that the communities, insurance companies, and other stakeholders evaluate the safety of proposed projects and make informed decisions, and (iv) integrate DRR considerations into all stages of project planning, design, and implementation, which includes incorporating appropriate building codes, land-use planning, and early warning systems.

By mandating DRR and ensuring transparency in risk assessment, the Himalayan region can promote responsible development that prioritizes the safety and well-being of its communities and ecosystems. Making these reports public can also leverage market forces, as insurance companies may either refuse coverage for unsafe projects or charge prohibitively high premiums, effectively discouraging unsustainable development.

6. Conclusion

The Himalayan region, with its unique geological fragility and cultural richness, faces a critical juncture in its development trajectory. The pursuit of conventional development models, often prioritising economic growth over environmental sustainability and disaster risk reduction, have led to a series of devastating consequences. To ensure a more secure and prosperous future, a paradigm shift is urgently needed, one that recognises the interconnectedness of human activities, environmental health, and disaster resilience.

This paper has highlighted several key areas for action that include (i) investment on understanding the factors that contribute to flash flood events and implement measures to reduce their impact, which includes regulating settlement patterns, protecting riparian zones, and implementing effective drainage systems, (ii) development and enforcement of strong land-use policies that discourage development in hazard-prone areas and protect ecologically sensitive zones and this requires comprehensive hazard mapping, clear regulations, and effective enforcement mechanisms, (iii) thorough investigations into the causes and consequences of previous disasters to identify lessons learned and improve future preparedness and response and this includes establishing a comprehensive disaster database and making all relevant information publicly accessible, (iv) implementation of mandatory building codes that prioritise earthquake safety, promotion of traditional architecture and local building materials, and training of construction workers in appropriate techniques, (v) shifting the focus from expanding road networks to maintaining existing roads and developing alternative modes of transport, such as ropeways and heli-connectivity to minimise environmental impacts and promote sustainable tourism, (vi) promoting lesser-known destinations, developing sustainable tourism infrastructure, and managing carrying capacity to ensure that tourism benefits local communities while minimising environmental damage, (vii) compulsive comprehensive risk assessments for all major development projects and integrating DRR considerations into all stages of planning and implementation, (viii) recognising the pivotal role of local communities in DRR and incorporating their traditional knowledge and aspirations into policymaking, (ix) investing in education and awareness programs to empower communities to ensure their active participation in DRR efforts and ensuring risk informed decisions about their safety and well-being, and (x) development of a "hazard rating" system for settlements and facilities so as to provide clear and accessible information about disaster risk, enabling individuals and communities to make informed choices and prioritize safety.

Some additional points to be considered while developing future road map for the Himalayan region include, (i) integrating climate change adaptation into all development planning and implementation processes, which includes assessing the potential impacts of climate change on hazards and vulnerabilities and developing strategies to build resilience, (ii) promoting Eco-DRR approaches that utilize natural ecosystems to reduce disaster risk, which may involve restoring forests, wetlands, and other natural buffers to mitigate the impacts of floods, landslides, and other hazards, (iii) strengthening regional cooperation on disaster risk reduction and climate change adaptation, which is crucial for addressing transboundary hazards and sharing knowledge and resources, and (iv) investing in research and innovation to develop new technologies and approaches for disaster risk reduction and sustainable development in mountain regions.

By embracing these principles and adopting a more holistic and sustainable approach to development, the Himalayan region can build resilience to disasters, protect its unique environment, and ensure a more secure and prosperous future for its people.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Alden, C.; Large, D.; Mendez, A. The Western Way of Development: A Critical Review. In: *New Development Assistance: Emerging Economies and the New Landscape of Development Assistance*, Jing Y. (ed.), Palgrave 2020, pp. 19-38, DOI:10.1007/978-981-13-7232-2_2.
2. Rautela, P. Traditional practices of the people of Uttarakhand Himalayan in India and relevance of these in disaster risk reduction in present times. *International Journal of Disaster Risk Reduction* 2015, 13, pp. 281–290.
3. Kale, V.S.; Gupta, A.; Singhvi, A.K. Late Pleistocene-Holocene palaeohydrology of monsoon Asia. *Journal of Geological Society of India* 2004, 64, pp. 403 – 417.
4. Rautela, P. Water resources in the Himalayas: Harvesting, tradition and change. *Concept Publishing Company, New Delhi, India*, 2000, 123 p.
5. Nayak, M.; Sitharam, T. G.; Kolathayar, S. A revisit to seismic hazard at Uttarakhand. *International Journal of Geotechnical Earthquake Engineering* 2015, 6(2), pp. 56-73.
6. Rautela, P.; Bist, M.; Bhatt, D.R.; Raushan, K. The Wisdom of the Mountains: Traditional Knowledge for Resilience and Disaster Risk Reduction. *International Journal of Environment and Climate Change* 2025, 15 (4), 71-90. <https://doi.org/10.9734/ijecc/2025/v15i44794>.
7. Skowronski, John J.; Walker W. R.; Bond, G. D.; Henderson, D. X. The fading affect bias: Its history, its implications, and its future. *Advances in Experimental Social Psychology* 2014, 49, pp. 163-218. DOI: 10.1016/B978-0-12-800052-6.00003-2.
8. Joshi, G.C.; Ghildiyal, S.; Rautela, Piyoosh. Seismic vulnerability of lifeline buildings in Himalayan province of Uttarakhand in India. *International Journal of Disaster Risk Reduction* 2019, 37, 101168, pp. 1-10.
9. Rautela, Piyoosh; Joshi G.C. Earthquake safety elements in traditional Koti Banal architecture of Uttarakhand, India. *Disaster Prevention and Management: An International Journal* 2009, 18(3), pp. 299 – 316.
10. Khanduri, S.; Saklani, R.D.; Chetry, B.M. Increasing Risk of Silent Disaster in Uttarakhand Himalaya: An Example from Higher Himalaya. *Afet ve Risk Dergisi* 2023, 6(3), 20. DOI: 10.35341/afet.1237378
11. Alley, K. D.; Hile, R.; Mitra, C. Visualizing Hydropower Across the Himalayas: Mapping in a time of Regulatory Decline. *Himalaya* 2014, 34(2). Available at: <https://digitalcommons.mcalester.edu/himalaya/vol34/iss2/9>
12. Kamlesh, K.; Singh, A.; Singh, D.; Garg, K. P. Uttarakhand Himalayas: Hydropower developments and its impact on environmental system. *Trans Himalaya* 2013, 5, pp. 10-15.
13. Pandey, M. R.; Tandukar, R. P.; Avouac, J. P.; Vergne, J.; Heritier, T. Seismotectonics of the Nepal Himalaya from a local seismic network. *Journal of Geophysical Research: Solid Earth* 1995, 100(B8), pp. 15411-15429.
14. Gupta, H. K. A review of recent studies of triggered earthquakes by artificial water reservoirs with special emphasis on earthquakes in Koyna, India. *Earth-Science Reviews* 2002, 58(3-4), pp. 2279-2310.
15. Shrestha, R. K.; Nepal, S. K. Ecotourism development in protected areas of Nepal: Institutional and policy challenges. *Journal of Sustainable Tourism* 2010, 18(1), pp. 55-73.
16. Ives, J. D.; Messerli, B. The Himalayan dilemma: Reconciling development and conservation. *Routledge London UK* 1989, 324 p. DOI: 10.4324/9780203169193.

17. Chhetri, P.; Arrowsmith, C. Climate change and tourism in the Hindu Kush-Himalayas. *CSPO Regional Paper* 2013, pp. 1-24.
18. Shrestha, A. B.; Eriksson, M.; Mool, P.; Ghimire, S.; Mishra, B. Climate change in the Hindu Kush Himalayas: Impacts on cryosphere, hydrology and hazards. *Regional Environmental Change* 2015, 15(1), pp. 171-182.
19. Rautela, Piyooch. Lessons learnt from June 16/17 2013 disaster of Uttarakhand, India. In: Science and Technology in Disaster Risk Reduction in Asia: Potentials and challenges, Eds. Rajib Shaw, Koichi Shiwaku and Takako Izumi, Elsevier Academic Press 2018, pp. 273-300.
20. Rautela, Piyooch; Khanduri, S.; Kundalia, S.; Joshi, G.C.; Jugran, R. Sequential damming induced winter season flash flood in Uttarakhand province of India. *Journal of Environmental and Earth Sciences* 2021, 3(02), pp. 61-71.
21. Sain, K.; Mehta, M.; Kumar, A. Heavy Rainfall-triggered Flash Floods around the Amarnath Holy Cave. *Journal of Geological Society of India* 2022, 98, pp. 1323-1324.
22. Dahal, D.R.; Mehta, M.; Bhatt, C.M.; Luirei, K. Flash floods and their cascading tumults: an example from Teesta River valley, Eastern Himalaya, Sikkim, India. *Current Science* 2024, 126(10), pp. 1280-1284.
23. Jodha, N.S. *Life on the edge: Sustaining agriculture and community resources in fragile environments*. Oxford University Press, Noida, India 2001, 327 p.
24. Ives, J. D. Himalayan perceptions: Environmental change and the well-being of mountain peoples. *Routledge, London, UK* 2004, 296 p.
25. Gansser, A. Geology of the Himalayas. *Wiley InterScience Publishers, New York, USA* 1964, 289 p.
26. Valdiya, K.S. Geology of Kumaun Lesser Himalaya. *Wadia Institute of Himalayan Geology, Dehraadun, India*, 1980, 291 p.
27. Yin, A.; Harrison, T. M. Geologic evolution of the Himalayan-Tibetan orogen. *Annual Review of Earth and Planetary Sciences* 2000, 28(1), pp. 211-280.
28. Zhong, D.; Ding, L. Rising process of the Qinghai-Xizang (Tibet) Plateau and its mechanism. *Science in China Series D: Earth Sciences* 2000, 43(4), pp. 369-379.
29. Foggin, J. M. Environmental Conservation in the Tibetan Plateau Region: Lessons for China's Belt and Road Initiative in the Mountains of Central Asia. *Land* 2018, 7(2), 52. <https://doi.org/10.3390/land7020052>
30. Nautiyal, S.; Kaechele, H. Carrying capacity assessment of tourism in the fragile Himalayan environment: A case study of the Nanda Devi National Park and Biosphere Reserve, India. *Environmental Monitoring and Assessment* 2008, 147(1), pp. 395-416.
31. Sharma, V.; Giri, S. Pilgrim tourism and transportation-Opportunities, problems and challenges. *Indian Journal of Marketing* 2009, 39(11), pp. 25-30.
32. Gupta, V.; Dobhal, D.P.; Choudhury, S. August 2012 cloudburst and subsequent flash flood in the Asi Ganga, a tributary of the Bhagirathi River, Garhwal Himalaya, India. *Current Science* 2013, 105(2), pp. 249-253.
33. Aggarwal, S.; Rai, S.C.; Thakur, P.K.; Emmer, A. Inventory and recently increasing GLOF susceptibility of glacial lakes in Sikkim, Eastern Himalaya. *Geomorphology* 2017, 295, pp. 39-54.
34. Sattar, A.; Goswami, A.; Kulkarni, A.V.; Emmer, A.; Haritashya, U.K.; Allen, S.; Frey, H.; Huggel, C. Future glacial lake outburst flood (GLOF) hazard of the South Lhonak Lake, Sikkim Himalaya. *Geomorphology* 2021, 388, 107783.
35. Rautela, P. Indigenous technical knowledge inputs for effective disaster management in the fragile Himalayan ecosystem. *Disaster Prevention and Management: An International Journal* 2005, 14(2), pp. 233-241.
36. Bilham, R.; Gaur V.K.; Molnar, P. Himalayan seismic hazard. *Science* 2001, 293 (5534), pp. 1442-1444.

Citation: Rautela, P., Bist, M.; Bhatt, D.R. Towards a resilient and prosperous Himalayan region: a critical analysis of the development paradigms. *Journal of Social Sciences*, 8 (3), pp. 6-18. [https://doi.org/10.52326/jss.utm.2025.8\(3\).01](https://doi.org/10.52326/jss.utm.2025.8(3).01).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).02](https://doi.org/10.52326/jss.utm.2025.8(3).02)
CZU 336.2:005.915(680)



MEASURES TO IMPROVE FISCAL SUSTAINABILITY AND DEBT MANAGEMENT AT THE PROVINCIAL LEVEL: A CASE OF SOUTH AFRICA

Beauty Zindi*, ORCID: 0000-0003-4790-5379,
Malefetsane Mofolo, ORCID 0000-0001-6764-0991

*University of Walter Sisulu Faculty of Management and Public Administration Sciences. Private Box X3182,
Butterworth, Eastern Cape, South Africa*

* Corresponding author: Beauty Zindi, bzindi@wsu.ac.za

Received: 06. 27. 2025

Accepted: 08. 30. 2025

Abstract. Public debt and fiscal sustainability are pressing issues for provincial governments in South Africa, posing significant challenges to effective governance and service delivery. Using desktop research, the article explores the impact of inefficient financial management, corruption, and governance weaknesses which exacerbate fiscal pressures and hinder sustainable development. The results showed that a plethora of factors contributed to rising public debt and fiscal instability in provinces, including limited revenue-generation capabilities, heavy reliance on national transfers, escalating costs of service delivery, and unfunded mandates. The article recommends that South African provincial governments can modernise revenue collection systems, adopt cost-saving technologies, revise the equitable share formula, and strengthen financial accountability and transparency. The study underscores the importance of innovative and collaborative approaches to ensure long-term economic stability and equitable development across South Africa's provinces. By implementing these strategies, provincial governments can reduce their debt burdens, improve fiscal sustainability, and enhance their capacity to deliver essential services.

Keywords: *public debt; debt management, fiscal sustainability, provincial governments; financial management.*

Rezumat. Datoria publică și susținabilitatea fiscală sunt probleme prezente pentru guvernele provinciale din Africa de Sud, care prezintă provocări semnificative pentru o guvernare eficientă și furnizarea de servicii. Folosind cercetări documentare, articolul explorează impactul managementului financiar ineficient, al corupției și al deficiențelor de guvernare, care exacerbează presiunile fiscale și împiedică dezvoltarea durabilă. Rezultatele au arătat că o multitudine de factori au contribuit la creșterea datoriei publice și a instabilității fiscale în provincii, inclusiv capacitățile limitate de generare a veniturilor, dependența mare de transferurile naționale, creșterea costurilor de furnizare a serviciilor și mandatele nefinanțate. Articolul recomandă ca guvernele provinciale sud-africane să modernizeze sistemele de colectare a veniturilor, să adopte tehnologii de economisire a costurilor, să revizuiască formula de partajare echitabilă și să consolideze responsabilitatea și transparența financiară.

Studiul subliniază importanța abordărilor inovatoare și colaborative pentru a asigura stabilitatea economică pe termen lung și dezvoltarea echitabilă în provinciile Africii de Sud. Prin implementarea acestor strategii, guvernele provinciale își pot reduce povara datoriilor, pot îmbunătăți sustenabilitatea fiscală și își pot spori capacitatea de a furniza servicii esențiale.

Cuvinte cheie: *datorie publică; gestionarea datoriei, sustenabilitate fiscală, guverne provinciale; management financiar.*

1. Introduction

Public debt has become a central issue in discussions about fiscal sustainability, particularly in developing economies. In South Africa, provincial governments face increasing pressure to deliver essential public services while managing their finances responsibly [1]. Rising public debt levels, exacerbated by structural economic challenges and the lingering impacts of global crises, pose significant threats to fiscal sustainability. For provincial governments, balancing the competing demands of addressing social inequalities, fostering economic growth, and maintaining fiscal discipline is an enduring challenge [2]. South Africa's fiscal framework delegates substantial responsibilities to provincial governments, including education, healthcare, and infrastructure development. These responsibilities often exceed the revenue-generating capacities of the provinces, leading to dependence on transfers from the national government. In addition, [3] mentions that while this intergovernmental fiscal structure aims to ensure equitable service delivery, it also creates vulnerabilities when national finances are strained.

In recent years, South Africa has experienced rising debt levels due to persistent budget deficits, slow economic growth, and external shocks such as the COVID-19 pandemic. Nevertheless, Covid-19 struck at a time when South Africa was already experiencing financial difficulties. Provincial governments are not directly responsible for national debt, but their budgets are significantly affected by fiscal consolidation efforts and reductions in transfers [4]. Furthermore, provinces face challenges in managing their own financial resources, including increasing contingent liabilities and inefficient expenditure patterns. Addressing these issues is critical for ensuring long-term fiscal sustainability and maintaining the capacity to meet developmental objectives [5].

The provincial governments in South Africa are grappling with the dual challenge of rising public debt and maintaining fiscal sustainability. National fiscal constraints have led to reduced allocations to provinces, straining their ability to deliver essential services. At the same time, inefficiencies in financial management, limited revenue-raising capacities, and mounting contingent liabilities exacerbate fiscal pressures [1]. Without targeted strategies to address these issues, provincial governments risk financial instability, reduced service delivery quality, and the erosion of public trust. It is against this background that the article seeks to achieve the following objectives

- To identify the factors contributing to fiscal pressures in South African Provincial government.
- To discuss key Challenges faced by South African provincial governments due to public debt and lack of fiscal sustainability.
- To recommend measures to improve fiscal sustainability and debt management at the provincial level.

2. Literature Review

2.1 Guiding theory - Fiscal Federalism Theory

Fiscal Federalism theory examines the allocation of fiscal responsibilities and resources among different levels of government. It provides a framework for understanding the fiscal challenges faced by country provinces, like South African provinces, particularly the tension between expenditure responsibilities and revenue constraints [6]. Fiscal federalism theory highlights the need for effective intergovernmental coordination and equitable resource distribution to achieve fiscal sustainability.

According to [7] argues that the theory explores the principles of revenue generation, expenditure assignments, and intergovernmental transfers, which are critical in understanding the financial interdependencies and imbalances within a federal system. South Africa operates within a quasi-federal framework where provinces are constitutionally mandated to deliver key services such as education, healthcare, and infrastructure, but lack significant autonomous revenue-raising powers. The bulk of provincial revenues over 95% come from equitable share allocations and conditional grants from the National Treasury [2]. This creates tension between the expansive expenditure responsibilities of provinces and their limited ability to generate their own revenue.

Furthermore, fiscal federalism theory advocates for fair resource allocation to reduce disparities among provinces. In South Africa, the equitable share formula is intended to address such disparities, but debates persist regarding whether the formula adequately accounts for provincial needs, particularly in rural and underdeveloped areas [8]. Provinces like the Eastern Cape and Limpopo receive larger transfers due to their higher levels of poverty and service delivery backlogs. However, these funds often prove insufficient to address the scale of infrastructure and human resource deficits [4].

In addition, the theory underscores the need for robust governance structures to ensure efficient use of resources. Mismanagement and corruption undermine fiscal sustainability, as seen in the Auditor-General's reports highlighting irregular expenditure across provinces. In 2023, Limpopo's Department of Education was flagged for irregular expenditure exceeding R1 billion, reflecting inadequate financial oversight and inefficiencies in resource utilization [9].

2.2 Conceptualising Public Debit

Public debt refers to the total amount of money that a government owes to external or internal creditors, including foreign governments, financial institutions, and private investors [10]. It is typically the result of borrowing to finance budget deficits, where government expenditure exceeds revenues. Public debt can take various forms, such as bonds, loans, or treasury bills. Public debt is a critical tool for economic management, enabling governments to fund infrastructure projects, public services, or emergency responses [11]. However, excessive public debt can burden future generations and lead to economic instability.

As shown above, South Africa's provincial governments play a crucial role in delivering public services such as health, education, housing, and infrastructure development. However, they face significant challenges in balancing rising expenditures with limited revenue-generation capabilities [12]. The provincial governments have limited autonomy to incur debt due to their reliance on equitable share allocations and conditional grants from the national government as prescribed by the Constitution of the Republic of South Africa, 1996. Public debt emerges indirectly through several ways such as unfunded mandates where provinces

often bear the burden of providing services that exceed the funding allocated by the national government [13]. More so, public debt can be caused through contingent liabilities where provincial entities such as public utilities or state-owned companies can indirectly increase provincial financial pressures leading to public debt. Provinces may resort to alternative borrowing mechanisms, such as Public-Private Partnerships (PPPs), which can result in long-term financial commitments [14].

2.2 The concept of Fiscal Sustainability

Fiscal sustainability refers to the ability of a government to maintain its current spending, tax, and borrowing policies over the long term without risking insolvency or defaulting on its debt obligations [12]. Fiscal sustainability is also defined as the government's capacity to maintain solvency without increasing taxes, reducing expenditures, or resorting to deficit monetization [11]. Fiscal sustainability is essential for an economy and, consequently, for sustainable economic development. Post-financial crisis, South Africa experienced a substantial rise in public debt attributed to the execution of extensive expenditure initiatives aimed at economic support [13].

Fiscal sustainability for provinces depends on their ability to balance expenditures with available revenues without compromising future financial stability. Provinces' face increasing costs for healthcare, education, and infrastructure due to population growth, urbanization, and socio-economic inequalities [2]. More importantly, provincial governments have restricted authority to raise revenue. They rely heavily on transfers from the national government, which are often insufficient to meet service delivery demands [4]. Many provincial governments lack robust mechanisms to monitor and manage debt, especially contingent liabilities arising from provincial entities [1]

2.3 An overview of public debt and fiscal sustainability in South African provincial governments

Public debt and fiscal sustainability are critical concerns for South African provincial governments, which are tasked with delivering essential services. The delivery of these services, however, is often carried out under significant financial strain. As pointed out above, provinces primarily rely on national transfers, including the equitable share and conditional grants, to fund their operations [15]. While these transfers provide the bulk of provincial revenue, they often fall short of covering the rising costs of service delivery, leaving provinces financially vulnerable. Limited revenue-generation capacity further exacerbates the problem, as provinces lack substantial mechanisms to raise their own funds [3]. This reliance on national transfers restricts their fiscal autonomy and ability to respond to localized needs or emergencies.

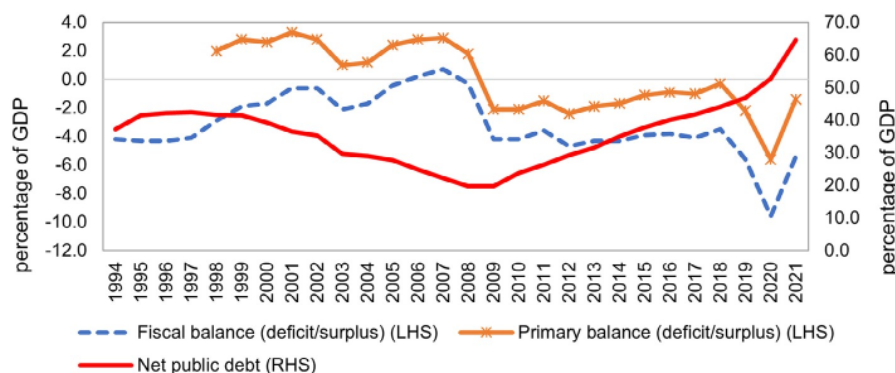


Figure 1. South African Gross Domestic Product: 1994-2021.

Source: (South African Reserve Bank, 2022).

The diagram above presents a graphical representation of three key macroeconomic indicators as a percentage of GDP over the period from 1994 to 2021. The chart uses two different Y-axes. The Left Y-axis (LHS - Percentage of GDP) represents the fiscal balance (deficit/surplus) and the primary balance (deficit/surplus). The dashed blue line represents the fiscal balance, which fluctuates over time, showing periods of both surplus and deficit. A notable downward trend is observed after 2008, indicating increasing fiscal deficits. The orange line with markers represents the primary balance, which follows a similar trend to the fiscal balance but remains relatively higher in most periods. A sharp decline around 2008 and fluctuations afterward suggest economic shocks affecting public finance.

The Right Y-axis (RHS - Percentage of GDP) represents net public debt, illustrated by the solid red line. The net public debt shows a consistent increase over time, with a noticeable upward trend beginning in the early 2000s. A sharp rise after 2010 suggests increasing borrowing levels, which accelerates significantly after 2019. The fiscal and primary balances were relatively stable between 1994 and 2007, but both declined significantly after the 2008 global financial crisis. Despite some periods of recovery, fiscal deficits persist, particularly post-2015, reflecting growing expenditure pressures. The net public debt steadily increases, particularly after 2008, and rises sharply post-2019, likely due to the economic impact of the COVID-19 pandemic and increasing government borrowing.

The global economic recession of 2008–2009 affected various economies worldwide, including South Africa's. Government debt and fiscal deficits increased as a result of the inadequacy of monetary policy in promoting and sustaining economic growth. Output growth declined significantly from 3.6% in 2008 to -1.7% in 2009 [16]. A recovery took place in 2010, characterized by a growth rate of 2.9%, succeeded by a decline of 1.2% in 2015 [12]. Following the global financial crisis, South Africa's primary balance positions deteriorated, registering -3.1% in 2009 and -2.7% in 2010 (IMF, 2018). The primary deficit trend persisted from 2010 to 2017, declining from 2.8% in 2010 to -0.6% in 2017. The debt-to-GDP ratio of South Africa increased significantly from 22.2% in Q4 2008 to 46% in Q3 2016 [2]. From the fourth quarter of 2011 to the third quarter of 2016, the economic condition of the country exhibited weakness, as evidenced by an average primary balance ratio of -1.3% [14].

At the beginning of the 2012/13 financial year, the South African government implemented an expenditure limit, shifting medium-term expenditures from baseline projections to numerical targets [11]. This strategic move was aimed at improving fiscal discipline and curbing excessive government spending, ensuring that expenditure aligned more closely with revenue collection trends. By enforcing these numerical limits, the government sought to prevent unsustainable budget deficits while maintaining the delivery of essential public services.

In 2014, the National Treasury took further steps to strengthen fiscal management by establishing the Fiscal Risk Committee. This committee was tasked with identifying, monitoring, and mitigating fiscal risks that could derail the government's financial targets. Through this initiative, the government aimed to enhance fiscal sustainability by proactively addressing economic uncertainties, debt vulnerabilities, and potential shocks to revenue collection.

The 2016 Medium Term Budget Policy Statement (MTBPS) Fiscal Risk Statement acknowledged that South Africa had several institutional strengths that contributed to fiscal sustainability [17]. Among these strengths was the Public Finance Management Act (PFMA) of 1999, which provided a legal framework for transparent, accountable, and effective

financial management in the public sector. The Medium-Term Expenditure Framework (MTEF) was another critical strength, facilitating multi-year budget planning and promoting predictability in fiscal decision-making. Additionally, the reduction in debt financing from domestic currency and bond markets helped manage the cost of debt servicing, ensuring that South Africa did not become overly reliant on expensive external borrowing.

Despite these institutional strengths, the MTBPS Fiscal Risk Statement also highlighted significant risks. These included rising debt levels, economic stagnation, and fiscal pressures from State-Owned Enterprises (SOEs). The increasing reliance on borrowing, particularly to fund operational expenditures rather than capital investments, posed a long-term risk to fiscal stability. Additionally, persistent revenue shortfalls, declining investor confidence, and growing social spending pressures added to the complexity of achieving fiscal sustainability [9; 14.]

Despite worsening financial conditions, decreasing economic growth, and inadequate regulation, South Africa's financial sector maintained effective financial management, credibility in fiscal policy, and transparency in its budgetary systems [18]. The government demonstrated fiscal credibility by increasing the primary surplus and decreasing the primary deficit in reaction to escalating public debt. The monetary policy strategies of South Africa for addressing fiscal debt and deficits rely on strict adherence to financial management protocols and the national budgeting process. Between 2009 and 2021, South Africa consistently faced deficits in its fiscal and primary balance-to-output ratios [9].

2.4 Audit findings in South African provincial governments

Although, the South African provinces are facing fiscal sustainability challenges, on the other hand, they appear to be having weak governance structures. This is evident from the Auditor-General of South Africa's (AGSA) reports. AGSA plays a critical role in promoting accountability by auditing public sector financial management. However, the recurring findings in AGSA's Annual Reports reveal significant inefficiencies, including fruitless, wasteful, and irregular expenditures, which compromise fiscal discipline and intensify funding shortfalls in provincial governments [19]. Irregular expenditure arises when procurement and financial transactions deviate from prescribed laws and regulations. This issue is frequently reported in provincial departments, reflecting weak compliance mechanisms and governance structures. Repeated audit findings showing mismanagement of public funds undermine citizens' confidence in provincial governments' ability to manage resources effectively [20].

In 2023, Limpopo's Department of Public Works recorded over R1.2 billion in irregular expenditure and this amount included procurement processes that bypassed competitive bidding procedures, often due to inadequate oversight and collusion among officials [9]. The expenditure that could have been avoided, such as penalties for late payments or unused contracted services, contributes significantly to fiscal inefficiencies. The Eastern Cape Department of Health incurred millions in fruitless expenditure in 2022, including payments for ambulances that were never delivered and penalties on overdue invoices to suppliers [19]. Weak financial management systems and lack of capacity in provincial departments exacerbate inefficiencies [21]. Issues such as poor record-keeping, delayed reconciliations, and ineffective monitoring of budgets are prevalent. The Free State Department of Education failed to account for R800 million in conditional grant funding for school nutrition programs in 2022 due to incomplete records, leading to questions about the effective use of fund [19].

Non-compliance with SCM regulations, such as failure to follow transparent procurement processes, is a major issue highlighted in AGSA reports. This results in inflated costs and compromised service delivery. The KwaZulu-Natal Department of Transport was flagged in 2023 for awarding contracts worth R500 million to unqualified suppliers, leading to substandard road maintenance projects [9].

Primary factors contributing to fiscal pressures in South African provincial governments South African provincial governments face persistent fiscal pressures due to a combination of external economic conditions, policy decisions, and internal inefficiencies. These factors strain their budgets, limiting their ability to deliver essential services and meeting their developmental mandates. The factors are discussed below.

2.5 External economic conditions

The sluggish economic growth in South Africa has limited national revenues, hence diminishing equitable share payments to provinces that depend significantly on these transfers. In KwaZulu-Natal, reduced allocations have led to budgetary reductions in health and education, compelling the government to diminish essential infrastructure investments [22]. Inflation intensifies these constraints by elevating the expense of goods and services, especially in sectors like healthcare and education. The Gauteng province has experienced escalating healthcare expenses due to urban migration and population expansion, which have increased the need for medical services [12]. Furthermore, worldwide problems like the COVID-19 pandemic interrupted economic operations and heightened service delivery requirements, especially in Gauteng and the Western Cape, where escalating healthcare expenses resulted in budget excesses and postponed infrastructure initiatives [3].

2.6 Policy decisions

Policy decisions also contribute to fiscal pressures, especially where provinces are tasked with implementing unfunded mandates. In the Free State, the Department of Health has struggled with rising contingent liabilities due to medical negligence claims, without corresponding financial support from the national government [23]. In the Eastern Cape, a significant portion of the provincial budget is allocated to paying salaries for teachers and healthcare workers, leaving limited resources for developmental projects or infrastructure maintenance [17]. Similarly, rigid conditions attached to national grants, intended to address specific issues, often reduce provincial flexibility in addressing broader needs. Limpopo has faced challenges in utilizing conditional grants for housing, resulting in missed targets and growing housing backlogs [11].

2.7 Internal inefficiencies

Internal inefficiencies within provincial governments further deepen fiscal pressures. Mismanagement and corruption are pervasive issues, with Auditor-General reports frequently highlighting cases of irregular expenditure. Mpumalanga and North West provinces have faced scrutiny for misallocated funds that were meant for infrastructure projects, leading to delays and wasted resources [19]. Inefficient resource allocation is another common challenge. In the Eastern Cape, funds allocated for school infrastructure remain unspent due to poor planning and project delays, leaving learners in unsafe and inadequate facilities [24]. Additionally, growing contingent liabilities, such as lawsuits, are a burden on provincial budgets. The Free State's Department of Health has accrued billions of rands in liabilities from medical negligence claims, further straining its financial capacity [9]. Many provinces

also face lack of skilled personnel, which hampers the effective implementation of projects. For instance, in Limpopo, delays in housing project rollouts have been attributed to inadequate technical capacity within the Department of Human Settlements [12].

3. Materials and Methods

This article is based on a qualitative secondary literature review. Both grey and academic literature identified using 'public debt' and 'fiscal sustainability' as the key word in South African provincial governments were reviewed. Literature review was combined with abstraction since some of the issues raised in the article require in-depth analysis and not mere empirical evidence that is in the form of numbers as in quantitative studies or direct quotations of qualitative studies. The documents selected were widely published on public debt, debt sustainability, fiscal sustainability, financial repression and fiscal policy sustainability informed the writing of this article. There was no rigid criterion used to identify the texts that were used in this article. Instead, the authors relied on texts that provided detailed information on public debt and fiscal sustainability in South African provincial governments that are summarised in this study. This loose research approach, however, presents a particular limitation. It is the authors' conviction that future researchers will be motivated to engage in writing more articles on evaluating the sustainability of the fiscal policy in South Africa.

4. Challenges faced by South African provincial governments

South African provincial governments operate within a tightly constrained fiscal framework. Their primary source of funding comes from the national government in the form of equitable share allocations and conditional grants [25]. While these allocations aim to address inequality and ensure uniform service delivery, they are increasingly insufficient in the face of rising expenditure pressures. Fiscal sustainability in provincial governments is being tested by systemic inefficiencies, external economic challenges, and a growing reliance on national support amid declining revenue bases [8].

4.1 Heavy reliance on national transfers

Provinces in South Africa operate under a highly centralized fiscal framework, where the bulk of their budgets relies on equitable share allocations and conditional grants from the national government [2]. These transfers aim to address inequality and ensure equitable access to essential services such as education, healthcare, and infrastructure. Provinces lack significant own-revenue sources, depending on transfers that constitute over 95% of their budgets [1]. Reductions in national transfers due to fiscal consolidation efforts have left provinces with limited capacity to address pressing service delivery needs. The national government's fiscal consolidation measures, aimed at curbing debt and reducing budget deficits, have directly impacted provincial allocations. During the 2023/24 budget cycle, provinces experienced a combined reduction of over R20 billion in equitable share allocations and conditional grants [19]. These reductions severely constrained provincial governments' ability to sustain critical services, forcing cutbacks in key areas. Provincial Department of Basic Education like the Eastern Cape and Limpopo faced difficulties in maintaining school infrastructure and staffing levels [9].

The Eastern Cape Department of Basic Education faced severe funding challenges in replacing unsafe mud schools. In 2023, budget reductions led to delays in the completion of 50 planned school infrastructure projects [24]. This hindered efforts to create safe and

conducive learning environments for rural learners. Reduced funding led to the delay of infrastructure projects aimed at replacing mud schools and unsafe classrooms, directly impacting learners' safety and access to quality education [26]. Additionally, teacher shortages became more pronounced, particularly in rural areas. Furthermore, conditional grants allocated for infrastructure projects, such as the Provincial Roads Maintenance Grant, were reduced, delaying critical upgrades to transport infrastructure. In provinces like the Free State and Western Cape this contributed to worsening road conditions, impeding economic activity and access to services [27]. The Western Cape government, although better resourced, struggled with increasing healthcare demands amid reduced funding. In 2023, delays in disbursing conditional grants affected the rollout of the province's vaccination programs and expansion of healthcare facilities in rural districts [4]. With limited own-revenue sources and reduced national transfers, the Northern Cape government faced setbacks in maintaining its extensive road network. This hampered access to remote areas and negatively affected local economies reliant on agriculture and mining.

4.2 Rising contingent liabilities

South African provincial governments operate under fiscal rules that restrict borrowing to prevent unsustainable debt accumulation. However, they face rising contingent liabilities, which include unpaid accruals, legal claims, and guarantees for public entities [2]. For example, the Eastern Cape Department of Health reported unpaid invoices exceeding R4 billion in 2022, highlighting the burden of accrued liabilities on fiscal sustainability [9]. These liabilities, while not direct debt, pose significant risks to provincial finances, potentially destabilising budgets and diverting resources from essential service delivery. Accruals arise when payments for goods and services procured by provincial departments are delayed due to budget constraints or inefficiencies in financial management [4]. The failure to pay suppliers within the prescribed 30-day period has become pervasive across provinces, creating a cascading effect on service delivery and supplier sustainability. The Eastern Cape Department of Health reported unpaid invoices exceeding R4 billion in 2022 [19]. This backlog strained healthcare delivery as suppliers withheld critical goods such as medicines and medical equipment, jeopardizing patient care.

In addition, provinces face increasing legal liabilities due to litigation arising from service delivery failures, malpractice, and breaches of contract. Departments, particularly in healthcare and public works, are frequent targets of lawsuits, which often result in substantial financial settlements or judgments against the government. The Gauteng Department of Health faced medico-legal claims exceeding R20 billion in 2023 [9]. These claims stemmed from cases of medical negligence in public hospitals, including incidents of birth injuries and surgical errors, forcing the department to divert funds from critical operations to settle claims. Some provincial governments provide financial guarantees for public entities under their jurisdiction, such as development agencies and utilities. When these entities face financial difficulties, the provinces may be required to fulfill their obligations, adding to fiscal pressure [27]. In Limpopo, the provincial government provided support to the Limpopo Economic Development Agency (LEDA). Financial difficulties within the entity resulted in liabilities that the provincial treasury had to absorb, impacting its fiscal sustainability. More so, [28] pointed out that delays in paying suppliers and the diversion of resources to settle legal claims hinder the effective delivery of services in critical sectors such as education, healthcare, and

infrastructure. Mismanagement and irregular expenditure are common in provincial departments, diverting resources away from critical needs.

4.3 Expenditure pressures in key sectors

South African provincial governments are tasked with managing and delivering critical services in high-cost sectors, including healthcare, education, and infrastructure development. According to [18] expenditure pressures in healthcare, education, and infrastructure development remain a critical challenge for South African provincial governments. These sectors account for most provincial budgets due to their centrality to social and economic development. However, rising expenditure pressures, inefficiencies, and mismanagement have strained provincial finances, undermining their ability to meet the growing demands of service delivery [14].

The healthcare sector is a significant cost driver for provincial governments. Provinces face rising operational costs due to increased patient volumes, expensive medical supplies, aging infrastructure, and a growing burden of non-communicable diseases [29]. In KwaZulu-Natal, the healthcare budget has consistently exceeded available funding, with the department incurring an irregular expenditure of over R6 billion in 2023 due to supply chain inefficiencies and lack of financial controls [19]. Challenges such as delayed supplier payments and over-reliance on costly temporary staff further compound fiscal stress. More so, The Free State provincial government has also faced criticism for its inability to maintain and upgrade critical road infrastructure. Budget cuts and inefficient project management have resulted in deteriorating road conditions that negatively affect local economies and public safety [27]. Reductions in conditional grants from the national government have exacerbated funding shortfalls, leaving provinces with limited resources to address critical infrastructure backlogs and operational needs. The Free State Department of Education failed to account for R800 million in conditional grant funding for school nutrition programs in 2022 due to incomplete records, leading to questions about the effective use of funds [19].

Furthermore, the education sector represents another high-cost area for provinces, with expenditures directed towards teacher salaries, school infrastructure, and learner support programs. The Eastern Cape Department of Education struggles to eliminate unsafe and inadequate school infrastructure. In 2023, budget constraints forced the Department to delay the completion of more than 30 school construction projects, leaving learners in dilapidated classrooms or makeshift facilities [24]. Provinces face challenges in maintaining aging school infrastructure, meeting the demand for new schools in growing communities, and addressing teacher shortages.

4.4 Infrastructure backlogs in South African provincial governments

Infrastructure development is a critical enabler of effective service delivery in South Africa, particularly in sectors such as education and healthcare. However, provincial governments face persistent infrastructure deficits, characterized by aging facilities, poorly maintained assets, and unmet demands for new construction [20]. These backlogs hinder the quality of services provided and exacerbate socio-economic disparities, particularly in rural areas and under-resourced.

Infrastructure deficits in the education sector have left many schools operating in unsafe and unsuitable conditions. Challenges include the prevalence of mud schools, insufficient classrooms, and lack of basic amenities such as water and sanitation. In the Eastern Cape Department of Basic Education, infrastructure backlogs are particularly severe

and there are delays in completing school upgrades that have left learners attending classes in unsafe mud structures [24]. For instance, the Accelerated School Infrastructure Delivery Initiative (ASIDI), aimed at eradicating mud schools, faced significant delays in 2023 due to mismanagement and budget constraints.

Provincial healthcare facilities are often under-resourced and unable to accommodate growing volumes of patients. Aging infrastructure, equipment shortages, and the slow pace of new hospital construction exacerbate the challenges. The Limpopo Department of Health struggled in the 2023 financial year to complete several hospital renovation projects, including the long-delayed Limpopo Academic Hospital, which has seen multiple budget overruns and missed deadlines [30]. These delays impact on healthcare delivery, particularly in underserved areas. Poor road conditions in provinces, particularly rural areas, hinder economic activity and access to essential services [23]. Backlogs in road maintenance and construction limit mobility and increase transport costs.

4.5 Rising of unfunded mandates

Provinces in South Africa frequently struggle with unfunded mandates, which occur when they are tasked with implementing policies or delivering services without sufficient funding from the national government. This challenge exacerbates financial pressures and creates significant gaps in service delivery, as provinces are forced to divert limited resources to fulfill these mandates. The Free State Department of Health has faced significant lawsuits due to unpaid medical negligence claims, resulting from systemic failures in healthcare management [12]. These liabilities increase financial strain, as funds that could be used to improve healthcare delivery are redirected to settle legal claims. Between 2020 and 2023, the Free State Department of Health faced mounting negligence claims amounting to billions of rands, which provincial budgets could not adequately accommodate [13]. In addition, [27] argue that negligence claims were caused by chronic understaffing, outdated medical equipment, poor facility maintenance, and inadequate funding for operational costs exacerbated the risk of lawsuits. The provincial health department operates under growing deficits, which limit its ability to address ongoing operational challenges.

4.6 Rising costs of service delivery

South African provinces are experiencing increased costs in delivering essential services due to factors such as population growth, urbanization, and inflation. These pressures are particularly acute in sectors like healthcare, education, and infrastructure, where demand continues to outpace available resources. The Gauteng Province is the most populous in South Africa and has faced immense pressure on its healthcare system. The province attracts internal migrants seeking better economic opportunities, placing additional strain on public hospitals and clinics [31]. The emergence of COVID 19 significantly increased demand for healthcare services, leading to a rise in operational costs for Personal protective equipment (PPE), patient care, and vaccine rollouts [32]. The rising costs of delivery have several consequences for provinces like Gauteng. Funds meant for other sectors are redirected to cover immediate healthcare needs, leaving education, infrastructure, and social development underfunded.

4.7 Weak Revenue Generation Capabilities

South African provinces have limited authority to generate their own revenue, relying heavily on national transfers such as the equitable share and conditional grants. According

to [31] this dependency creates vulnerabilities, especially when these allocations are insufficient to meet growing demands. Furthermore, lack of diversified revenue sources restricts the provinces' ability to fund additional expenditures or respond effectively to emergencies. Essential services such as education, healthcare, and infrastructure development suffer due to insufficient funds. The Mpumalanga province has faced budget shortfalls in education, resulting in overcrowded classrooms and a lack of learning materials. Importantly, [20] added that outdated systems and poor enforcement mechanisms result in low compliance rates for vehicle license renewals and property rate payments. High unemployment and poverty levels in rural areas reduce the ability of citizens to pay fees and rates, leading to reduced provincial income [2]. Instances of financial mismanagement further erode revenue collection efficiency and trust in the provincial government.

5. Conclusion

Public debt and fiscal sustainability remain critical challenges for provincial governments in South Africa, requiring urgent and coordinated action. The heavy reliance on national allocations, limited revenue-generation capabilities, and escalating costs of service delivery exacerbated by population growth, urbanization, and unfunded mandates have strained provincial budgets and undermined financial sustainability. Additionally, issues such as rising contingent liabilities, poor financial management, and governance inefficiencies further compound these fiscal pressures.

Addressing these challenges demands a multi-pronged approach that includes improving revenue collection mechanisms, strengthening fiscal discipline, and diversifying provincial revenue streams. Moreover, effective expenditure management, enhanced intergovernmental collaboration, and the adoption of cost-saving technologies can help alleviate the financial strain while improving service delivery. Ultimately, fostering fiscal sustainability requires a strategic balance between meeting immediate service delivery needs and ensuring long-term economic stability. By adopting innovative financial strategies and promoting accountability, provincial governments can overcome fiscal challenges, reduce their debt burdens, and play a more effective role in driving inclusive and sustainable development across South Africa.

6. Recommendations

The following are the recommendations that can be adopted by the South African provincial governments in improving financial sustainability.

6.1 Strengthen Revenue Collection Mechanisms

The South African Provincial governments are recommended to modernize revenue collection systems through digital platforms to improve efficiency and reduce leakages in revenue streams like vehicle licensing and property rates. There is a need to increase enforcement measures for compliance and introduce incentives for early or full payment of provincial taxes and fees. The South African Provincial government is encouraged to develop targeted awareness campaigns to educate citizens on the importance of paying rates and levies.

6.2 Revise the equitable share formula

The South African provincial governments should advocate for adjustments to the equitable share formula to account for disparities in population growth, migration, and

urbanization. There is a need to prioritize additional funding for provinces experiencing significant service delivery pressures, such as Gauteng and the Western Cape.

6.3 Diversify Revenue Streams

The South African Provincial governments are recommended to introduce innovative revenue sources, such as tourism levies, green taxes, or user fees for public facilities and services. There is a need to develop Public-Private Partnerships (PPPs) to fund infrastructure projects, reducing the burden on provincial budgets.

6.4 Improve expenditure management

The South African Provincial governments should implement stricter financial controls to prevent overspending and ensure that funds are used effectively. They should conduct regular audits to identify and eliminate wasteful expenditure. They are also encouraged to adopt zero-based budgeting, which requires all expenses to be justified annually, to prioritize essential services.

6.5 Address rising contingent liabilities

The South African provincial governments are recommended to improve risk management frameworks to minimize legal claims, particularly in health and education sectors. They should establish dedicated contingency funds for unforeseen liabilities, such as medical negligence claims, to avoid diverting resources from essential services. Importantly there is a need to invest in staff training and infrastructure improvements to reduce operational errors that lead to lawsuits.

6.6 Promote fiscal accountability and transparency

The South African provincial governments are recommended to strengthen internal audit processes and financial reporting to ensure proper oversight of provincial finances. They should publish detailed reports on debt levels, expenditure patterns, and financial risks to improve accountability and public trust. There is a need to enhance the role of provincial legislatures in scrutinizing budget proposals and monitoring debt accumulation.

6.7 Advocate for clearer mandates and adequate Funding

The South African Provincial governments should engage the national government to ensure that mandates assigned to provinces, such as delivering basic services, are accompanied by sufficient funding. They are also recommended to negotiate for flexibility in reallocating funds within provincial budgets to address urgent needs.

6.8 Build capacity for financial management

The South African Provincial governments should invest in training programs for provincial financial managers to improve budgeting, debt management, and expenditure tracking. There is a need to establish partnerships with academic institutions and professional organizations to build expertise in fiscal sustainability practices.

6.9 Adopt debt management strategies

The South African Provincial governments should develop comprehensive debt management policies that include ceilings on borrowing and mechanisms for regular debt servicing. More so, they limit short-term borrowing and ensure that loans are directed toward investments with long-term benefits, such as infrastructure development.

Acknowledgement: The authors acknowledge Walter Sisulu University for its affiliation support.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Plaatjies, C.; Twala, B.; Dlamini, C. Fiscal sustainability analysis in selected SADC region countries with emphasis on South Africa: dynamic modeling, nonlinear causality, and machine learning approaches [version 1; peer review: awaiting peer review]. *F1000Research* 2024, 13(2), pp. 109-116.
2. Brothwell, R. South Africa Lost 1 million Jobs Because of the 2008 Recession-Here's Why This One Could Be Even Worse, 2020. Available online: <https://businesstech.co.za/news/technology/379079/south-africa-lost1-million-jobs-because-of-the-2008-recession-heres-why-this-one-could-be-even-worse/> (accessed on 27 January 2025)
3. Blom, P.P. The administration and management of public debt by the National Treasury in South Africa: lessons for sub-Saharan African countries, 2021. Unpublished Master of Administration (Public Management and Policy), University of Pretoria.
4. Chen, J. Debt. Investopedia, 2020. Available online: <https://www.investopedia.com/terms/d/debt.asp>. (accessed on 21 January 2025).
5. Karadam, D. Y. An Investigation of Nonlinear Effects of Debt on Growth. *Journal of Economic Asymmetries* 2018, 18(2), pp. 1–13.
6. Ulgenturk, L. *The Role of Public Debt Managers in Contingent Liability Management*. OECD Publishing, Paris, France, 2017, 14 p.
7. Caza, V. E. J. C. D. E. Fiscal fatigue and debt sustainability: Empirical evidence from the Eurozone 1980–2013. *Cuadernos de Economía* 2018, 41(115), pp. 69–78
8. Paret, A. C. Debt sustainability in emerging market countries: Some policy guidelines from African chart approach. *Economic Modelling* 2017, 63(3), pp. 26–45
9. Auditor General South Africa Integrated Annual Report. Elevating our insights to improve public sector accountability. 2023/2024. Available online: <https://www.agsa.co.za/Reporting/AnnualReport.aspx> (assessed on 29 January 2025).
10. Xaba, N. *The Impact of Interest Rates on Savings and Investments in South Africa*. 2018. Unpublished Master of Business Administration Dissertation. Johannesburg: University of Witwatersrand.
11. Mackiewicz, M. The sustainability of fiscal policy in southern African countries – a comparative empirical perspective. *International Journal of Emerging Markets* 2021, 18(2), pp. 337–350.
12. Nyambe, J. M.; Kaulihowa, T. Public debt dynamics and fiscal sustainability in Namibia: An intertemporal budget constraint analysis. *Journal of Economics and Business* 2020, 3(3), pp. 1095–1104.
13. Nzimande, N.; Ngalawa, H. Fiscal policy sustainability in SADC countries. *African Finance Journal* 2019, 21(1), pp. 86–97.
14. Nyambe, J. M.; Matundu, M. S. The Impact of Fiscal Policy on Financial Sustainability in Sub-Saharan Africa. *Journal of Development Finance* 2020, 10(1), pp. 45–60.
15. Ganyaupfu, E. M.; Robinson, Z. C. Fiscal sustainability and interdependence of primary balance and public debt in South Africa. *Acta Universitatis Danubius. OEconomica* 2019, 15(3), pp. 318–334
16. International Monetary Fund (IMF). Fiscal Monitor: Capitalizing on Good Times, 2018. Available online: <https://www.imf.org/en/Publications/FM/Issues/2018/04/06/fiscal-monitor-april-2018> (accessed on 21 April 2025)
17. National Treasury. *Supplementary Budget*. Government Printer, Pretoria, Republic of South Africa, 2020, pp. 1-54
18. Pham, T. South Africa: High Fiscal Consolidation Commitment but Weak Budget Viability, 2020. Available online: <https://think.ing.com/articles/south-africa-high-fiscal-consolidation-commitment-but-weak-budget-viability> (accessed on 14 January 2025).
19. Auditor General Sout Africa Integrated Annual Report. Promoting a culture of accountability, 2022/23. Available online: <https://www.agsa.co.za/Reporting/AnnualReport.aspx> (accessed on 28 January 2025)
20. Nabieu, G.A., Bokpin, G.A., Osei, A.K.; Asuming, P.O. The effects of fiscal governance on fiscal performance in Sub-Saharan Africa. *International Journal of Finance & Economics* 2020, 26(4), pp. 5746–5761

21. Zindi, B.; Sibanda, M.M. Barriers to effective supply chain management: The case of a metropolitan municipality in the Eastern Cape. *Journal of Local Government Research and Innovation* 2022, 3, a54. <https://doi.org/10.4102/jolgr.v3i0.54>
22. MacroTrend. South African GDP Growth Rate 1961–2019. 2019. Available online: <https://www.macrotrends.net/countries/ZAF/south-africa/gdp-growth-rate> (accessed on 2 January 2025).
23. Rahman, N. H. A.; Ismail, S.; Ridzuan, A. R. How Does Public Debt Affect Economic Growth? A Systematic Review. *Cogent Business & Management* 2019, 6(1), pp. 1–16.
24. Eastern Cape Department of Education. *Annual Report 2023/24*, 6, 242 p.
25. Parliamentary Monitoring Group. Quarter 3 Spending Challenges: Treasury Report, 2020. Available online: <https://pmg.org.za/committee-meeting/29813/> (accessed on 11 January 2025).
26. Business Insider SA. SA's Coronavirus Budget: What You Need to Know. 2020. Available online: <https://www.businessinsider.co.za/sas-2020-coronavirus-supplementary-budget-what-you-need-to-know-2020-6> (accessed on 9 January 2025).
27. Gladys, A.; Nabieu, A.; Minlah, M.; Mensah, D. Public debts, fiscal balance and sustainability: What can African governments learn from debt sustainability models? *Cogent Economics & Finance* 2023, 11(3), pp. 223-258
28. Gillespie, F.; Saner, P. Financial Repression: Here to Stay and Stronger Than Ever. Swiss Re Institute, 2020. Available online: <https://www.swissre.com/institute/research/topics-and-risk-dialogues/economy-andinsurance-outlook/expertise-publication-financial-repression-here-to-stay.html> (accessed on 26 January 2025)
29. Rahman, N. H. A.; Ismail, S.; Ridzuan, A. R. How Does Public Debt Affect Economic Growth? A Systematic Review. *Cogent Business & Management*. 2019, 6(1), pp. 1–16.
30. Limpopo Department of Health. *Annual Report*. 2023/24. Vote No. 7. Limpopo, <https://www.ldoh.gov.za/ldoh-admin/documents/latestnews/documents/ANNUAL%20REPORT%2020232024.pdf>.
31. Parliamentary Monitoring Group. Quarter 3 Spending Challenges: Treasury Report. 2020. Available online: <https://pmg.org.za/committee-meeting/29813/>. (Accessed on 11 January 2025).
32. Zindi, B.; Shava, E. COVID-19 and the attainment of Sustainable Development Goal 6 (Clean Water and Sanitation) in South Africa. *Journal of Local Government Research and Innovation* 2022, 3, a58. <https://doi.org/10.4102/jolgr.v3i0.58>.

Citation: Zindi, B.; Mofolo, M. Measures to improve fiscal sustainability and debt management at the provincial level: a case of South Africa. *Journal of Social Sciences*, 8 (3), pp. 19-33. [https://doi.org/10.52326/jss.utm.2025.8\(3\).02](https://doi.org/10.52326/jss.utm.2025.8(3).02).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).03](https://doi.org/10.52326/jss.utm.2025.8(3).03)
CZU 005.411:334.722-053.6(65)



THE ROLE OF GOVERNMENT SUPPORT IN ACCOMPANYING ENTREPRENEURIAL ENTERPRISES TO ACHIEVE INOVATION IN ALGERIA

Abdelwaheb Sakhri *, ORCID: 0009-0001-3387-1887

Badji Mokhtar University, P.B 12, Annaba, 23000, Algeria

* Corresponding author: Abdelwaheb Sakhri, abdelwaheb.sakhri@univ-annaba.org

Received: 07. 21. 2025

Accepted: 09. 05. 2025

Abstract. The research paper aims to highlight the importance of the efforts made by state agencies to improve the ways of success of entrepreneurial enterprises in Algeria, and to focus on the innovation promoting within them in light of modern developments in the economic environment, Descriptive and analytical approaches were used, as well as the statistical approach, as required by the nature of the subject. The study reached in a set of results, the most important of which are: the Algerian government is working to provide all forms of support and accompaniment to small and medium-sized enterprises, particularly in the areas of financial support and technical advice. Algeria has also launched numerous national and international initiatives and programs to promote start-up innovation and support their entrepreneurial way. Despite all this, these businesses still suffer from weak regulatory and legislative frameworks and a lack of awareness of the importance of innovation and technological progress in the fields of finance and business.

Keywords: *accompanying ecosystem, creativity, project financing, young entrepreneurs.*

Rezumat. Lucrarea își propune să evidențieze importanța eforturilor depuse de agențiile statului pentru a îmbunătăți realizările activităților antreprenoriale din Algeria și să se concentreze pe promovarea inovării în cadrul acestora, în lumina evoluțiilor moderne din mediul economic. Au fost utilizate abordări descriptive și analitice, precum și abordarea statistică, așa cum o impune natura subiectului. Studiul a ajuns la un set de rezultate, dintre care cele mai importante sunt: Guvernul algerian depune eforturi pentru a oferi toate formele de sprijin și însoțire întreprinderilor mici și mijlocii, în special în domeniile sprijinului financiar și consultanței tehnice. Algeria a lansat, de asemenea, numeroase inițiative și programe naționale și internaționale pentru a promova inovația în startup-uri și a sprijini demersul lor antreprenorial. În ciuda tuturor acestor lucruri, aceste întreprinderi încă suferă de cadre de reglementare și legislative slabe și de o lipsă de conștientizare a importanței inovării și a progresului tehnologic în domeniile finanțelor și afacerilor.

Cuvinte cheie: *ecosistem însoțitor, creativitate, finanțare de proiecte, tineri antreprenori.*

1. Introduction

Today, entrepreneurship represents great opportunities in the markets, and it also represents the appropriate strategies that are the basis for enterprises seeking to achieve competitive advantages [1]. One of the main drivers of entrepreneurship is the creation of new enterprises, including small and medium enterprises and start-ups, due to their positive impact on their continuity [2]. Most governments focus on making entrepreneurship one of the basic strategies, with the aim of achieving economic growth and sustainable development, with a clear understanding of the factors that drive entrepreneurial enterprises to survive and succeed [3].

Entrepreneurial enterprises are considered a basic symbol in economic and social development, and most societies pay great attention to them, due to their ability to create job opportunities, ensure quality, efficiency and productivity, and they also constitute an important engine for promoting innovation, achieving business ideas and transforming economic structures [4]. In the same context, SMEs seek entrepreneurship to improve emerging competencies or to venture into new, more innovative product areas, and technology-based start-ups are often adept at identifying abundant and new entrepreneurial opportunities [5].

Over the past few years, the subject of business accompaniment has become an important topic in the field of entrepreneurship [6], various forms of accompaniment such as: incubators, government institutions and agencies, and technology parks, create a kind of dynamism, stimulate markets and encourage the creation of new companies, These structures offer a wide range of services: from accommodation to training, financing, coaching, individual and group counselling and guidance services, and play an important role in supporting small and medium-sized enterprises and start-ups and maximizing their chances of survival [7].

Algeria has implemented a series of reforms aimed at supporting entrepreneurship as a social and economic phenomenon; this is evident in the important tasks and roles played by financial and non-financial support agencies and programs, such as providing loans of various types and the ongoing and renewed efforts to provide training and technical support to entrepreneurs, and university graduates [8,9].

The study is based on the hypothesis that the Algerian government is currently helping to shape entrepreneurial intentions and capabilities. The study assumes that support and guidance mechanisms foster entrepreneurial innovation among young entrepreneurs, SME owners, and start-ups managers, facilitate access to financial support, and reduce barriers to project creation.

Our contribution in this research paper is to reveal the role of accompaniment in supporting entrepreneurial enterprises, providing various financial and non-financial assistance to emerging companies, and also to cite various government agencies and programs in Algeria dedicated to supporting young entrepreneurs and project holders and supporting them towards innovation.

2. Entrepreneurial Enterprises in Algeria

The term entrepreneurial enterprises refer to innovative projects and activities, that lead to the introduction of new services and products, and are also viewed as an exploration of pioneering opportunities and new activities [10], Entrepreneurial enterprises mean the presence of entrepreneurial intentions, which are interpreted as the desire to create or develop a new business venture [11].

It can be said that the process of establishing an entrepreneurial enterprise targets everything that is new in terms of innovative goods and services, based on good economic knowledge, or in other words, it is entering into the new economic system, as these institutions aspire towards entrepreneurship related to change and how to expand their activities, It also involves a certain degree of management and direction, and the general pattern of organizing tasks within it has a formal and informal character, and it enjoys the advantages of flexibility in local markets. From another perspective, it can be said that the entrepreneurial project is the work in which Investors have to create their own structures, and make a set of decisions at their level, or find a ready-made structure in which they are prepared, to perform their activities and adapt to it [12]. Entrepreneurship is the ambition of all organizations regardless of their age or size (start-ups, small or medium enterprises), and its importance is reflected in supporting economic growth. It is referred to as a vision of the business opportunities that lie behind the establishment of a new institution, by integrating the knowledge and skills of entrepreneurs, and financial and technical capabilities in an environment characterized by risk and uncertainty [13]. Entrepreneurial firms are those ideas that need financial and non-financial resources, in addition to having legitimacy and market knowledge; they need resources to survive and achieve success and are often described as weak projects in their beginnings. However, entrepreneurs believe in the innovations they create, and the expected value behind their work. In many references, the initial opportunity that entrepreneurial firms exploit is highlighted, with the need to interact, adapt, and transform, while learning new information in the face of uncertainty [14].

Small and Medium Enterprises-Sized (SMEs), Start-upson the Path to Entrepreneurship

There are several factors that make SMEs and start-ups similar in their reliance on entrepreneurship, While SMEs focus on niche and local markets, innovative start-ups aim to innovate and expand globally, this diversity of goals suggests that these companies do not feel threatened by each other and do not suffer from a lack of trust [15]. Small and medium enterprises play a crucial role in all national economies, and many literatures have addressed the fact that these enterprises are the most important part of entrepreneurship, SMEs have low costs, which gives innovative entrepreneurs more efficient organizational structures and streamlined decision-making processes, that enable them to quickly change their operations to take advantage of new opportunities or respond to new challenges [16]. The creation of small and medium enterprises affects any type of business activity, in urban or rural areas, Jobs, growth and investment in SMEs are achieved once the regulatory environment is cleared, strict regulations are not imposed, and the entrepreneurial climate is enhanced and jobs are created [17]. The need to develop entrepreneurship in many economies around the world cannot be denied, as the entrepreneur's ability to innovate helps improve economic growth by developing small and medium enterprises and supporting them with the programs and capabilities they need [18].

Given the situation in Algeria, we see that small and medium enterprises are constantly increasing, meaning that these institutions are showing a great desire to move towards entrepreneurship, as their number in 2017 was approximately 1074503, but this number has increased to reach 2022by 1359803, and the overwhelming percentage belongs to the private sector at the expense of the public sector. This can be explained by the fact that project holders establish their enterprises with private funds or from family and friends, without resorting to public subsidies, and the below Table shows all of this.

Table 1

Evolution of the number of SMEs by Legal nature 2017-2022						
	2017	2018	2019	2020	2021	2022
Private SMEs (1)	1074236	1141602	1193096	1230844	1286140	1359580
Legal persons	609344	643493	671267	689383	720495	762769
natural persons	464892	498109	521829	541461	565645	596811
Liberal professions	222570	237457	247275	252737	262040	272726
Craft activities	242322	260652	274554	228724	303605	324085
Public SMEs (2)	267	261	243	229	225	223
Total	1074503	1141863	1193339	1231073	1286365	1359803

Source: elaborated by authors based on data [19].

As we mentioned earlier, small and medium enterprises are active in many economic activities and fields. According to the Table 2, we see that the services sector comes at the top of the list with 703499 projects, followed by craftsmanship 324085 enterprises, and then the construction and public works sector with 204452 establishments, with acceptable statistics for the industrial and agricultural sectors.

Table 2

Distribution of SMEs by economic sectors						
Sector of activity	2017	2018	2019	2020	2021	2022
Agriculture	6687	7168	7481	7690	8010	8404
Hydrocarbons, Energy, Mines and related services	2890	2985	3066	3115	3243	3371
Public Works Building and Hydraulics	179326	185137	109170	193964	199331	204452
Manufacturing industries	95010	99938	103693	106121	109991	115992
Services	548268	585983	614375	631459	662185	703499
Craftsmanship	242322	260652	274554	288724	303605	324085
Total	1074503	1141863	1193339	1231073	1286365	1359803

Source: elaborated by authors based on data [19].

Table 3 presents that most small and medium enterprises are located in the eastern regions and states, where 945153 enterprises were recorded in 2022. This is attributed to the capabilities available in the northern region, and the presence of awareness and entrepreneurial culture of the importance of establishing entrepreneurial projects, unlike the southern regions, which experience a kind of deficiency and injustice in the direction towards the entrepreneurial path with 113905 enterprises, due to weak development, which requires more efforts to enhance the establishment of small and medium enterprises.

Table 3

Distribution of SMEs by Areas						
Areas	2017	2018	2019	2020	2021	2022
North	424659	794633	830438	856779	894882	945153
Highlands	133177	251007	262340	270736	283416	300745
South	51508	96174	100561	103558	108068	113905
Total	1074503	1141863	1193339	1231073	1286365	1359803

Source: elaborated by authors based on data [19].

The concept of startups and entrepreneurship is a group of people who have the ability to start a business and work on making it grow very quickly, or It is the search for a scalable business model, through which new products, services and innovative ideas are launched, with high income and high potential to change the competition, In many studies, start-ups are viewed from the perspective of using IT innovations and high potential, as they relate to two well-established terms of entrepreneurship: entrepreneurial orientation and entrepreneurial self-efficacy [20]. Its size does not matter because it contributes to development and growth that is higher than large businesses, but the lack of knowledge about start-ups, which is their most important feature, affects the entry of new companies into this field. Among its main factors are economic fragmentation, weak or non-existent entrepreneurship culture, and many studies have proven that intellectual capital and entrepreneurship climate have a positive impact on the establishment and survival of start-ups [3], many scientific research papers have provided clear evidence that entrepreneurial opportunities contribute to the creation of many new businesses and start-up companies with high growth, distinguished performance and competitiveness. They also play an important role for these companies in creating solutions to social, economic and environmental problems, ultimately leading to a positive impact on economic performance and its development [21].

According to the global ranking of the number of start-ups, Algeria ranked 17th in 2024 with 808 start-ups (expressed in Figure 1), taking the lead on the African continent, which is a good position compared to 2020, when it achieved only 41 companies. This means that Algeria is experiencing a qualitative leap in the field of promoting the establishment of start-ups and harnessing all possibilities and means to support their owners. In the same context, the first place went to the United States of America with 83373 companies. At the Arab level, in light of the trend adopted by the Gulf countries towards digitization and innovation, the United Arab Emirates ranked first among the countries of the region with 1404 start-ups.

facilitate the creation of knowledge and marketing of their entrepreneurial activity, through policies to support the creation of businesses or the transfer of technology, as the industry of entrepreneurial Accompaniment and support has developed tremendously, through the multiplicity of actors, government agencies and even associations [25].

Regarding Algeria's situation in terms of entrepreneurial support, the government has made every effort to develop and grow entrepreneurial enterprises and support them in various ways, The Algerian state has established the Agency for the Development of Small and Medium Enterprises and the Promotion of Innovation by virtue of Executive Decree No. 18-170 of June 26, 2018, amended and supplemented by Executive Decree No. 25-331 of November 22, 2020, The agency is responsible for implementing the policy of developing small and medium enterprises in the field of creating, growing and sustaining these institutions in coordination with the relevant sectors. Its services include providing support and advisory centers as well as business incubators [26]:

- **Support and Consulting Centers.** It provides programs and policies to support SMEs development and sustainability. Table 4 summarizes statistics of these centers in Algeria.

Table 4

Number of enterprises benefiting from Accompaniment at the end of 2022		
Sector of Activity	Number of projects supported	Number of innovative projects
Industry	122	01
Tourism	16	0
Services	60	13
Public Works Building and Hydraulics	22	1
Crafts	29	0
Commerce	2	0
Agriculture	48	1
Renewable Energy	2	0
Environment	4	0
ICT	0	0
Agri-food	15	1
Start-up	2	1
Other services	9	0
Total	331	18

Source: elaborated by authors based on data [19].

- **Business incubators** is an integrated framework that provides environment containing equipment, services, facilities, support mechanisms, consultation and organization, dedicated to helping owners of ideas or newly established enterprises, and managing SMEs. The following table provides important details about local incubation data.

Table 5

Number of enterprises hosted in Incubators at the end of 2022

Sector of Activity	Number of projects hosted	Number of SMEs created	Number of jobs created
Industry	58	26	264
ICT	81	26	40
Renewable Energy	18	7	13
Services	58	27	134
Public Works Building and Hydraulics	16	6	32
Agriculture	8	7	73
Environment, recovery, sorting, recycling, waste treatment	13	1	11
Tourism	1	1	18
Agri-food	16	10	39
Aquaculture	1	1	4
Start-up	8	2	6
Total	278	114	634

Source: elaborated by authors based on data [19].

- Launch of Programme to Support Industrial Diversification and Improve the Business Climate in Algeria, supported by the European Union and the World Bank, and thanks to the renewed involvement of the Algerian authorities (particularly the Ministry of Industry and Mines), the government is trying to accelerate the pace of reforms in order to improve the business climate, the goal being to alleviate the problems and burdens of small and medium-sized enterprises, with the aim of driving the economy and increasing employment opportunities [27].

- The National Consultation Council for the Development of Small and Medium Enterprises was created in order to promote consultation and dialogue between public authorities and SMEs represented by professional associations and organizations, to form a real partnership between the two entities in terms of developing, implementing and monitoring policies set for the development of small and medium enterprises [28].

- The President Abdelmadjid Tebboune also launched the "Algeria Disrupt" program in October 2020, which provides a legal and regulatory framework to encourage start-ups and accelerate their growth, and includes the creation of the Algerian Start-up Fund and the start-up accelerator A-Venture to support innovation and entrepreneurship in Algeria, the objective is to provide start-ups with the resources and support necessary to transform their projects into successes, and create a strong and diversified economy, based on knowledge and new technologies [29].

- The PAD-PME program aims to improve the general framework for the development of small and medium-sized enterprises in Algeria, by providing the necessary technical accompaniment to support and assistance agencies, so that they can provide quality services [26].

- GEN Algeria launched the Women Entrepreneurship Program in 2017 to support women entrepreneurs to move from informal to formal business operations, and enhance their potential for success and sustainability, especially as they face challenges in business growth. The Women Entrepreneurship Program has achieved satisfactory results through its three editions, and has been able to target thousands of women and provide them with entrepreneurial skills and opportunities. Thus, the program has helped create a strong network of women entrepreneurs, generate new cooperation opportunities, create new jobs and contribute to the country's economic growth [30].

- Issuance of Ministerial Resolution No. 1275 dated 09/27/2022, which specifies the procedures for preparing a project thesis to obtain a university degree -a start-up project for higher education students.

- Establishing university incubators pursuant to Correspondence No. 1428 dated 09/29/2022 from the Secretary-General of the Ministry of Higher Education and Scientific Research [8].

- The creation of the Entrepreneurship House in higher education institutions (universities and graduate schools), which constitutes a fundamental element in developing entrepreneurial values among students, its mission is to develop the spirit of initiative among students, value the relationship between university institutions and organize events related to the field of entrepreneurship [31].

- The Loan Guarantee Fund was established by Executive Decree No. 02-373 issued on November 11, 2002, It is a public institution with legal personality and financial independence, working to provide guarantees for small and medium-sized enterprises, undertake the follow-up of collection operations for disputed receivables, follow up on the risks arising from the Loan Guarantee Fund, ensure advice and technical assistance to project owners, and ensure receiving information about banks and financial institutions on a regular basis [32].

- By Executive Decree No. 04-14 issued on January 22, 2004, the National Agency for Microcredit Management was created as a special entity subject to the authority of the Prime Minister, enjoying legal personality and financial independence, with branches throughout the national territory, working to support beneficiaries of the microcredit system by consulting and accompanying them in carrying out their activities, in addition to being distinguished by providing different loans without charging any rewards (see Table 6) [33].

Table 6

Credits granted by type of financing at the end of 2022

Type of financing	Number	Share, %	Jobs created
Financing Purchase of Raw Materials	868562	89.89	1261671
Triangular financing "Agency-Bank-promoter"	97740	10.11	151224
Total	966302	100%	1412895

Source: elaborated by authors based on data [34].

- The National Unemployment Insurance Fund was created by Executive Decree No. 94-187 issued on July 6, 1994, It is under the supervision of the Minister in charge of Social Security,

The Fund is concerned with undertaking technical and economic studies for new business creation projects, for the benefit of the unemployed, in cooperation with public employment services, and providing various forms of assistance in order to preserve jobs [35]. The following table indicates the latest data obtained from the Fund's website.

Table 7

Projects funded and employment impact by The Fund					
Number of financial projects	Year 2022		Cumulative as of 12/31/2022		
	Employments prior to start	Total investment financing (million DZD)	Number of financial projects	Employments prior to start	Total investment financing (million DZD)
40	107	214.27	160202	340500	554780.18

Source: elaborated by authors based on data [36].

4. The Algerian Government efforts to establish a culture of innovation

Innovation encompasses all types of business sectors, is defined on the basis of approaches to discovering new products and modern forms of economic organization, and is closely related to entrepreneurship. Innovation is the process of creating new tools to do something, and the methods involved can be classified into 10 types within the categories of business formation, product offering, customer experience, and it is not only related to continuous operational improvements but also to inventions and the use of the latest technological developments [37].

Algeria has developed a set of plans and programs to support innovation, including:

- The "Innovation and Development of Small and Medium Enterprises" project INNODEV is a cooperation program with the German partner, through the German Agency for International Cooperation "GIZ", which aims to enhance the capabilities and sales services directed to them, in order to emerge as innovative, competitive and sustainable small and medium enterprises.

- Creation of the National Innovation Award for Small and Medium Enterprises. By Executive Decree No. 08-323 dated Shawwal 14, 1429 corresponding to October 14, 2008; it is a mechanism to encourage small and medium enterprises to integrate into the dynamic of permanent and continuous innovation, The eleventh (11) edition of the award is currently being organized [26].

- IncubMe is an African business incubator founded in 2018 by Algerian entrepreneurs, aiming to provide the ideal environment for project holders to realize their ideas and create their businesses; IncubMe provides consulting and guidance services, training and coaching courses for entrepreneurs and many recommendations [38].

- Algeria Startup Challenge, the largest startup program, was launched in 2018, the main objective of the program is to create innovative opportunities that bring together institutions, economic actors, innovators, startups and experts, while proposing several solutions resulting from open innovation challenges [39].

- The Algerian Foundation for the Promotion of Entrepreneurship and Support of Startups has launched the annual national program "DZ Excellence Camp", which brings

together talented, hardworking and creative participants from all over the country, is an annual program focused on innovation, creativity and originality in several fields and sectors in Algeria, which is organized in the form of a series of national mini-camps [40].

- Entrepreneurship World Cup: This program gives participants from all over the world, including Algeria, the opportunity to develop their innovative ideas and businesses, with the possibility of presenting them in a global competition to an audience.

- “Innovation Challenge to provide innovative solutions in the field of social economy”. This initiative is part of the United Nations Development Programme, and in agreement with Algeria, aims to eliminate the social and economic challenges facing creative businesses, thus contributing to the achievement of the Sustainable Development Goals [8].

-The creation of the “Algerian Innovation Fund” worth \$ 80 million, equivalent to about 11 billion dinars, through a partnership between the public accelerator “Algeria Ventures” and the Global Fund for Small Business Assistance. The agreement was signed by Sid Ali Zerouqi (General Manager of Algeria Ventures), and Hubertus van Der Vaart (Investment Director at the Global Fund), in the presence of (the Minister of Knowledge Economy, Startups and Small Businesses), Yacine El Mehdi Walid, This fund is set to operate as an Algerian investment institution under local legislation, with a focus on pumping money into startups [41].

- The World Intellectual Property Organization's Global Innovation Index (GII) is a comprehensive quantitative tool to help policymakers around the world better understand how to stimulate innovative activity, the engine of economic growth and human development. It is calculated based on two sub-indices: creativity inputs and outputs. According to the index in table 8, Algeria ranks 115th out of 132 countries in 2022, a modest ranking for Algeria given the potential and efforts it is making to promote innovation.

Table 8

Evolution of GII Index								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Ranking	126/141	113/128	108/127	110/126	113/129	121/131	120/131	115/132
Value	24.38	24.46	24.34	23.87	23.98	19.48	19.90	16.70

Source: elaborated by authors based on data [42].

Regarding the sub-indicators summarized in the Table 9 related to innovation, particular reliance was placed on those related to enhancing creativity for entrepreneurial enterprises; the sub-indicators inputs witnessed a kind of stability, starting with the institutions index, which witnessed a noticeable improvement, while the infrastructure index recorded a decline, especially through public infrastructure, As for the sub-indicators that make up the creativityoutput index, what is noticeable is the improvement that the knowledge and technological output index witnessed during the year 2022, and this after the decline recorded in 2019-2021, also attributed to the improvement in the creative output index through non-creative products.

Table 9

Ranking of Innovation sub-indicators in Algeria

Sub Indicators	2019	2020	2021	2022
Inputs Indicators				
1. Institutions	106	104	104	99
Political Climate	111	110	106	103
Regulatory Environment	109	105	108	105
Business Environment	88	92	92	77
2. Infrastructure	81	100	96	102
ICT	115	114	112	115
Public Infrastructure	10	42	50	61
Energy and Environment	74	79	83	110
3. Market Development	122	130	132	125
Loans	125	129	129	113
Investment	99	130	131	110
Trade and Competitiveness	78	99	115	120
Outputs Indicators				
1. Knowledge and Technological Outputs	113	125	125	118
Knowledge Cration	90	90	94	94
Knowledge Impact	107	119	119	116
Knowledge Dissemination	126	128	125	122
2. Creativity Outputs	117	118	118	109
Creative Goods and Services	111	115	113	98
Intangible Creative Products	125	125	128	120
Online Creations	102	101	114	106

Source: elaborated by authors based on data [43].

5. Conclusions

The research paper explored the importance of government support in encouraging the establishment of entrepreneurial enterprises, supporting their innovation, through various programs and devices provided by the Algerian government. We saw that the state has a clear and explicit direction in developing these enterprises and harnessing all capabilities to help them overcome the challenges of survival and continuity, especially the problem of financing, which is the most prominent obsessional challenge leading to closures and failure.

Algeria has been quick to adopt the idea of entrepreneurship, by supporting and encouraging entry into this type of activity that is witnessing widespread spread in many countries of the world, in an effort to revive the national economy, and strongly instill the

dynamic of development, this has been evident through the trend of establishing projects/institutions, and entering the field of entrepreneurship, with the aim of attracting young people who carry ideas and investment projects.

The study reached a set of valuable findings; the efforts made by Algeria through its government institutions in recent years have played a pivotal role in strengthening the infrastructure of entrepreneurial enterprises, through beneficial support and Accompaniment policies and substantial financial funding such as business incubators, and institutional agencies, this reflects a trend following in the footsteps of strategies employed in developed countries, To support innovation for entrepreneurial enterprises, the state is gradually adopting global best practices by establishing technology hubs, coworking spaces, and strengthening a strong government support network that fosters public-private sector collaboration, Administrative, legal, and financial challenges are among the most significant obstacles facing entrepreneurs in Algeria, However some entrepreneurs have managed to navigate these complexities in innovative ways, such as working with specialized consultants or leveraging state support, their determination to overcome these difficulties has allowed these entrepreneurs to develop their projects and achieve their goals.

Based on the findings, some recommendations can be made regarding the research topic:

- It is essential for the Algerian government and relevant stakeholders to continue their support for innovation and entrepreneurship, by developing more appropriate policies and programs that facilitate the growth and sustainability of entrepreneurial projects.
- Fostering exchanges between entrepreneurial enterprises and relevant stakeholders, and encouraging local and international cooperation, is vital to stimulating innovation and development within the sector.
- Regular monitoring and evaluation of project performance will facilitate continuous learning and improvement; ensure the sustainability of business models, contributing to the long-term viability of the start-ups and SME ecosystem in Algeria.
- Spreading the culture of entrepreneurship among the academic community by organizing scientific events and conferences and incorporating the subject of “entrepreneurship” into various academic training courses.
- Today, entrepreneurs are in dire need of training in the business world, providing skills in a few days is not enough to fully grasp business management, a medium-term approach should be used to acquire basic skills.
- Consideration should also be given to establishing a national information system, databases, and professional organizations capable of conducting real market and technical-economic studies, this will enhance and enrich entrepreneurs' knowledge of the economic environment in general and their markets in particular.

As for the future research, it is possible to delve into the field of financial technology and its role in enhancing the innovative capabilities of entrepreneurial enterprises.

Conflicts of Interest: Author declares no conflict of interest.

References

1. Suder, M.; Kusa, R.; Duda, J.; Okręglicka, M. Mediating or moderating? Innovative approach to the role of flexibility in the relationship between entrepreneurial orientation and firm growth under different market conditions. *Journal of Innovation & Knowledge* 2025, 10, pp. 01-19.
2. Vincent, V.Z.; Zakaria, K.A. Entrepreneurial Orientation and Startup Performance in Technology Business Incubation: Mediating Role of Absorptive Capacity. *Journal of Small Business Strategy* 2021, 31(05), pp. 100-116.
3. Adje, E.K. Surviving start-ups: the importance of entrepreneurial capital. *Regional Studies, Regional Science* 2021, 08(01), pp. 239-258.
4. Idalfahim, M.; EL Ouardirhi, S. The impact of entrepreneurship on economic growth for the MENA region: Empirical evidence. *African Scientific Journal* 2024, 03(24), pp. 90-100.
5. Hughes, M.; Hughes, P.; Morgan, R. E.; Hodgkinson, I. R.; Lee, Y. Strategic entrepreneurship behaviour and the innovation ambidexterity of young technology-based firms in incubators. *International Small Business Journal: Researching Entrepreneurship* 2021, 39(03), pp. 202-227.
6. Christophe, S.; Ndjambou, R.; Husson, J. Entrepreneurial accompaniment: Proposal for a critical reading. *African management review* 2016, 01(01), pp. 01-12.
7. Elafqih, B.; Messaoudi, A. Research on Entrepreneurial Support Structures: From Description to Evaluation. *African Scientific Journal* 2024, 03(24), pp. 1287-1307.
8. Grandori, A. Entrepreneurial governance and the nature of the entrepreneurial firm. *Small Bus Econ* 2024, 63, pp. 1503-1516.
9. Breznitz, S. M.; Zhang, Q. Entrepreneurship education and firm creation. *Regional Studies* 2021, pp. 940-955.
10. Langlois, R. N. The Entrepreneurial Theory of the Firm and the Theory of the Entrepreneurial Firm. *Journal of Management Studies* 2007, 44(07), pp. 1107-1124.
11. Cuervo, Á.; Ribeiro, D.; Roig, S. Entrepreneurship: Concepts, Theory and Perspective. Springer: Europaplatz3 69115 Heidelberg, Germany, 2007, pp. 01-10.
12. Mackinstitute. Power of Entrepreneurial Firms. Available online: [mackinstitute:https://mackinstitute.wharton.upenn.edu/wpcontent/uploads/2020/03/Kirtley-Jacqueline_Power-of-Entrepreneurial-Firms.pdf](https://mackinstitute.wharton.upenn.edu/wpcontent/uploads/2020/03/Kirtley-Jacqueline_Power-of-Entrepreneurial-Firms.pdf) (accessed on 15.01.2025).
13. Cavallo, A.; Ghezzi, A.; Rossi, C. Small-medium enterprises and innovative startups in entrepreneurial ecosystems: exploring an under-remarked relation. *International Entrepreneurship and Management Journal* 2021, 17, pp. 843-1866.
14. Hashi, I.; Krasniqi, B.A. Entrepreneurship and SME growth: evidence from advanced and laggard transition economies. *International Journal of Entrepreneurial Behaviour & Research* 2011, 17(05), pp. 456-487.
15. Koutsopoulos, K.C. Small and Medium-Sized Enterprises (SMEs): Towards a New Paradigm. *European Journal of Business and Management* 2021, 13(13), pp. 22-32.
16. Ajani, A. O.; Adekanmbi, O.; Akanmu, P.M. Influence of Entrepreneurship Practices on Small and Medium Enterprises Development (A Case Study of Selected SMEs in Lagos). *International Journal of Management and Humanities* 2017, 02(12), pp. 13-16.
17. Ministry of Industry and Pharmaceutical Production. Report of The SME Statistical Information Bulletin 2017-2022. Available online: <https://www.industrie.gov.dz/wp-content/uploads/documents/bis/BIS-2021-05-38.pdf>. (accessed on 31.01.2025).
18. Niyawanont, N. The influence of start-up entrepreneurship and disruptive business model on firm performance. *Entrepreneurial Business and Economics Review* 2023, 11(01), pp. 57-76.
19. Davari, A.; Farokhmanesh, T. Impact of entrepreneurship policies on opportunity to startup. *Management Science Letters* 2017, 07, pp. 431-438.
20. Startupranking. Available online: <https://www.startupranking.com/countries> (accessed on 31.01.2025).
21. Statista. Available online: <https://www.statista.com/statistics/1279543/leading-startups-in-algeria-by-total-funding/> (accessed on 31.01.2025).
22. Alaoui, M. The practices of entrepreneurial accompaniment at the start-up phase: Case of the Eastern region of Morocco. *International Journal of Management Sciences* 2019, 02(02), pp. 297-307.
23. Messeghem, K.; Sammut, S.; Chabaud, D.; Carrier, C.; Thurik, R. Entrepreneurial accompaniment, an industry in search of performance levers?, *International Management* 2014, 17(03), pp. 65-71.
24. Minisrty of Industry and Pharmaceutical Production. Support for small and medium enterprises. Available online: <https://www.industrie.gov.dz/> (accessed on 31.01.2025).

25. World Bank. Reforming the investment climate to help Algerian businesses thrive. Available online: <https://blogs.worldbank.org/en/arabvoices/reforming-investment-climate-help-algerianbusinesses-thrive> (accessed on 01.02.2025).
26. Official Gazette of the Algerian Republic. Executive Decree No. 194-17. the tasks of the National Council National for Consultation for the development of small and medium enterprises and its organization and operation. 2(36). Available online: <https://www.joradp.dz/hen/index.htm> (accessed on 01.02.2025).
27. Algerian Startup Fund. Available online: <https://asf.dz/> (accessed on 01.02.2025).
28. Genglobal. Algeria National Programs. Available online: <https://www.genglobal.org> (accessed on 02.02.2025).
29. Tegaoua, R.; Chouam, B. Startups in Algeria, a strategic axe in the era of orientation towards the digital economy: analytical and exploratory study. *Revue Abaad Iktissadia* 2023, 13(01), pp. 452-474.
30. Official Gazette of the Algerian Republic. Executive Decree No. 02-373. establishing the Loan Guarantee Fund for Small and Medium Enterprises and determining its basic law, 1-5(74). Available online: <https://www.joradp.dz/hen/index.htm> (accessed on 03.02.2025).
31. Official Gazette of the Algerian Republic. Executive Decree No. 04-14. establishing the National Agency for Microcredit Management and determining its basic law, 1-5(06). Available online: <https://www.joradp.dz/hen/index.htm> (accessed on 03.02.2025).
32. Angem. Available online: <https://www.angem.dz> (accessed on 05.02.2025).
33. Official Gazette of the Algerian Republic. Executive Decree No. 94-188. establishing the National Unemployment Insurance Fund, 2-5(44). Available online: <https://www.joradp.dz/hen/index.htm> (accessed on 05.02.2025).
34. Cnac. Available online: <https://www.cnac.dz> (accessed on 05.02.2025).
35. Alvi, F.H.; Ulrich, K. Innovation finance ecosystems for entrepreneurial firms: A conceptual model and research propositions. *Journal of Business Research* 2023, 156, pp. 01-09.
36. Incubme. Empowering people, startups and innovations. Available online: <https://incubme.com/> (accessed on 07.02.2025).
37. Algeria Startup Challenge. Algeria's leading startup program. Available online: <https://algeriastartupchallenge.com/About/> (accessed on 07.02.2025).
38. Dz Hadina Tech. Presentation of DzExcellenceCamp. Available online: <https://dzhadinatech.com/DzExcellenceCamp> (accessed on 07.02.2025).
39. Mebarki, S.; Tadjine, S. Successful Models of Startups from Algeria. *European Economic Letters* 2024, 14(02), pp. 3355-3368.
40. Directorate of Statistics, Studies and Forecasting. International Indicators Report on the Postal and Telecommunications Sector 2022. Ministry of Post and Telecommunications. Available online: <https://www.mpt.gov.dz> (accessed on 10.02.2025).
41. Insead. The Business School For The World. Index Global Innovation 2019-2022. Available online: <https://www.insead.edu/> (accessed on 10.02.2025).

Citation: Sakhri, A. The Role of Government Support in Accompanying Entrepreneurial Enterprises to Achieve Innovation in Algeria. *Journal of Social Sciences*, 8 (3), pp. 34-48. [https://doi.org/10.52326/jss.utm.2025.8\(3\).03](https://doi.org/10.52326/jss.utm.2025.8(3).03).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).04](https://doi.org/10.52326/jss.utm.2025.8(3).04)
CZU 330.34:005.936.5:504.6(478)



THE ECONOMY OF THE REPUBLIC OF MOLDOVA FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

Rafael Ciloci*, ORCID 0000-0003-1690-6897,
Iuliu Turcan, ORCID 0000-0002-2930-6682

Technical University of Moldova, 168 Ștefan cel Mare Blvd., Chisinau, Republic of Moldova

* Corresponding author: Rafael Ciloci, rafael.ciloci@fieb.utm.md

Received: 08. 24. 2025

Accepted: 09. 26. 2025

Abstract. The development of the national economy from the perspective of sustainable development is determined by complex relationships between economic, social and environmental factors in the context of global transformations determined by the challenges of climate change. In the case of the Republic of Moldova, this process is determined by many challenges, by a multitude of impediments, but also by opportunities such as, for example, integration into the European Union. Examining the sustainable development of a nation requires an integrated and interdisciplinary approach, combining statistical analysis, the evaluation of economic performance indicators to characterize how public policies influence long-term economic development. In this publication, the research methodology is based on data collection and analysis, quantitative and qualitative analysis, deduction and induction, complemented by a rigorous synthesis of the specialized literature. The results obtained support the hypothesis that the adoption of sustainable, complex strategies with clearly defined objectives, the formation of an institution responsible for the transition to a circular economy can lead to increased national economic competitiveness and improved quality of life of citizens. The study highlights the key elements necessary for the implementation of the transition to a sustainable economy such as regulatory framework, financial resources, new technologies and cultural aspects. These findings provide a reference framework for decision-makers and the academic community, facilitating the development of coherent policies that maximize the potential for sustainable economic growth of the Republic of Moldova and for the development of medium and long-term development strategies.

Keywords: *waste generation, environmental protection, sustainable development, circular economy, regulatory framework, EU integration*

Rezumat. Dezvoltarea economiei naționale din perspectiva dezvoltării durabile este determinată de relații complexe dintre factorii economici, sociali și de mediu, într-un context al transformărilor globale determinate de provocările schimbărilor climatice. În cazul Republicii Moldova, acest proces este plin de numeroase provocări, determinate de o multitudine de impedimente, dar și de oportunități precum, de exemplu, integrarea în Uniunea Europeană. Examinarea dezvoltării durabile a unei națiuni necesită o abordare

integrată și interdisciplinară, care să combine analiza statistică, evaluarea indicatorilor de performanță economică pentru a caracteriza modul în care politicile publice influențează dezvoltarea economică pe termen lung. În acest articol, metodologia de cercetare se bazează pe colectarea și analiza datelor, analiza cantitativă și calitativă, deducție și inducție, completată de o sinteză riguroasă a literaturii de specialitate. Rezultatele obținute susțin ipoteza că adoptarea unor strategii durabile, complexe, cu obiective clar definite, formarea unei instituții responsabile de tranziția către o economie circulară pot duce la creșterea competitivității economice naționale și la îmbunătățirea calității vieții cetățenilor. Studiul evidențiază elementele cheie necesare pentru implementarea tranziției către o economie durabilă, cum ar fi: cadrul de reglementare, resursele financiare, noile tehnologii și aspectele culturale. Aceste constatări oferă un cadru de referință pentru factorii de decizie și comunitatea academică, facilitând elaborarea unor politici coerente care să maximizeze potențialul de creștere economică durabilă a Republicii Moldova și pentru elaborarea unor strategii de dezvoltare pe termen mediu și lung.

Cuvinte-cheie: *generarea de deșeuri, protecția mediului, dezvoltare durabilă, economie circulară, cadru de reglementare, integrare în UE.*

1. Introduction

Circular economy is a development model for the future both for post-industrial, economically developed countries, but also for such states that are in a continuous process of transition as the Republic of Moldova. The development of a sustainable economy in the Republic of Moldova is determined both by internal factors - ecological problems that are becoming increasingly prominent, especially in the context of global warming and increasingly frequent droughts, but also due to external factors such as EU integration and, thus, adjustment to its legal framework [1].

Recently, the Republic of Moldova has taken some measures to integrate the principles of the circular economy into its economic policies, environmental strategies and social development objectives. This transformation is necessary due to the double impact, namely: to reduce the negative impact on the environment and to develop economic resilience.

The current situation is a very dynamic one, with many challenges but also opportunities, characterized by evolving institutions and legal frameworks, the gradual adoption of policies that emphasize resource efficiency, and incipient innovative practices.

The transition to a circular economy in the Republic of Moldova faces a set of impediments that must be taken into account. The legal framework, although adopted, still does not have a well-developed action plan with the allocation of the necessary resources for their implementation, a set of indicators for measuring circularity are not identified that could effectively evaluate policies, but also the performance of enterprises. This would allow determining progress towards sustainability objectives and establishing clear rules and requirements for all actors [2].

The institutional framework of the Republic of Moldova still has modest coordination capacities between various government agencies, private stakeholders and civil society regarding the adaptation to the sustainability paradigm, and bureaucratic inefficiencies and ineffective institutional dialogues may hinder the execution of integrated circular economy policies.

We have to underline that the Government of the Republic of Moldova has made preliminary efforts to align national policies with European Union standards, in particular

those related to environmental protection and waste management. As result some pilot projects have been initiated to promote recycling, reuse and more efficient use of resources in different sectors of the economy. However, the implementation of these policies often faces obstacles due to limited financial resources, lack of technical expertise and the need for better coordination of stakeholders. Therefore, while the policy framework is evolving, significant challenges remain in creating the infrastructure for the circular economy, scaling up circular economy projects and forming sustainable ecosystems.

Consumer awareness of environmental issues is another key element in the transition to a circular economy, and educational programs and media campaigns are needed to identify existing problems and determine solutions such as waste reduction, waste collection and sorting, and energy efficiency. Community projects are of major importance for implementing the principles of the circular economy, but continuous efforts are needed to change consumption habits, a process that can be long-term and requires adjustment to the local cultural context.

In the reviewed literature, great attention is paid to the need for the transition to a circular economy, the advantages but also the challenges specific to this process. In this research, we aim to examine the ecological situation of the Republic of Moldova from the perspective of waste emissions and the extent to which measures are taken to remediate it. Examining this data will allow us to identify reasoned proposals for the development of a sustainable economy for the Republic of Moldova.

2. Materials and Methods

The research examines in detail data on waste generation in the Republic of Moldova according to structure and dynamics, as well as expenditures by types of environmental protection activities in the Republic of Moldova with the aim of identifying the impact of the waste on the environment on the one hand, and on the other hand to what extent financial resources are allocated to protect the external environment.

It collects data from official sources such as the National Bureau of Statistics of Moldova [3], which allows us to consider that they are relevant, correct and can constitute a basis for certain conclusions, with the admission that not all data were recorded, but this would not constitute an impediment to that research, especially in consideration of the examination of economic trends and the comparative analysis of different sectors. The research of the study is based on data collection and quantitative and qualitative analysis, deduction and induction, complemented by a rigorous synthesis of specialized literature.

3. Results and Discussions

Sustainable development and the formation of a green economy are becoming one of the main priorities for the Republic of Moldova, especially in the context of the Republic of Moldova's integration into the EU and the need to adjust the legal framework, as well as implement best practices. These are reflected in the main policy documents of the governmental institutions, in particular in the National Development Strategy Moldova 2030, the Energy Strategy 2030, the SME Sector Development Strategy for 2012-2020, the Roadmap for Improving Competitiveness, the Agriculture Development Strategy 2013-2020, the Environment Strategy 2014-2023, the Programme for Promoting the Green Economy in the Republic of Moldova for 2018-2020 [4].

Having reviewed several sources in this field, we will seek to highlight the key opportunities of sustainable development and its impact on the country's economy.

- The Republic of Moldova's shift toward a circular economy offers a real chance to boost both resilience and competitiveness. Making this a reality will take political commitment, significant investment and a strong legal framework. While progress in renewable energy and emission reductions is encouraging, it must go hand in hand with better resource management and support for eco-innovation. Linking efficiency measures with socio-economic factors can help ensure that public policies are both coherent and truly sustainable [5].

- Over the past thirty years, the Republic of Moldova has gone through significant economic and social changes. The country has managed to diversify its economy and reduce its dependence on agriculture alone. Still, ongoing challenges like trade imbalances, the quality of water resources, and limits in domestic production, require clear and strategic action. By promoting innovation, expanding productive sectors and strengthening economic ties abroad, Republic of Moldova can secure sustainable development and build a brighter economic future [6].

- Republic of Moldova stands at a turning point. By embracing the circular economy and fostering innovative business models, the country can tackle resource shortages and ease the strain on its environment. Updating laws and creating a business-friendly climate, together with a genuine shift in how companies operate are crucial steps toward sustainable growth. The circular economy is more than just a choice, it is a strategic necessity for building a resilient and prosperous future for Moldova [7].

- Sustainable development, guided by the principles of a circular economy, is no longer just a global trend, it is a necessity for Republic of Moldova. By aligning economic policies with the protection of natural and socio-cultural ecosystems, and by actively involving all members of society, the country can build a truly sustainable circular system. Today's crises can become a catalyst, prompting a rethinking of values and guiding Republic of Moldova toward a future of lasting, responsible growth [2].

- For Republic of Moldova, sustainable economic development means more than just growth, it also requires improving people's quality of life, strengthening education, and protecting the environment, even in the face of economic and social challenges. Stronger export competitiveness and attracting foreign investment are key to moving forward. At the same time, making the most of the opportunities that come with European integration can give the country a solid path toward long-term, sustainable progress [1].

- The circular economy offers a practical way to reduce pollution and preserve natural resources, while also creating new opportunities for Republic of Moldova's development. Replacing the linear model with a circular one can support sustainable economic growth by making smarter and more responsible use of existing resources. Embracing this concept is essential not only to keep pace with global trends but also to secure a sustainable future [8].

- The introduction of an Integrated Management System in Moldova's light industry has strengthened companies' commitment to both social and environmental responsibility. This approach has not only improved the sustainability of businesses but also encouraged the adoption of circular economy principles. Putting people and society first is becoming a key driver of sustainable development [9].

- Sustainable development has become a key reference point in addressing economic growth and environmental protection, especially in the context of limited resources. First promoted internationally in the 1970s and firmly established at the 1992 UN Conference in

Rio, this approach seeks to balance natural capital with socio-economic systems. It now stands as the foundation for an integrated vision of long-term human progress [10].

- The application of sustainable development principles in Moldova, within the broader context of European integration, is aimed at boosting the competitiveness of industry while promoting economic, social, and environmental sustainability. Aligning with European strategies for long-term planning provides valuable guidance for the sustainable growth of the national industrial sector. A sustainable industrial policy is becoming a vital tool for driving both economic and social progress in the country [11].

In the next section, we take a closer look at the data on waste generation in the Republic of Moldova over recent years, highlighting key trends and developments.

The development of the circular economy is a very complex, specific process and depends, to a large extent, on the structure of national economies and, respectively, on the type of waste emitted. Thus, in order to examine the method, prospects, but also the challenges of the transition to the circular economy for the Republic of Moldova, it is necessary to carry out a quantitative and qualitative analysis of waste, which would allow identifying solutions for the national economy.

From the presented data in Table 1, we observe that in the Republic of Moldova waste generation is unstable, without a well-marked trend. Thus, we can observe that the largest share of waste is determined by agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing reaching a level of 51.11 - 78.49% at total during the examined period. A special situation is attested in 2022 when Moldova was affected by a severe drought, which determined a decrease in cereals and leguminous crops from 4690.0 thousand tons in 2021 to 1784.4 thousand tons in 2022. Therefore, a direct correlation is highlighted between the volume of production in agriculture and the waste created, so if the volume of production of cereals and leguminous crops decreased for 2021-2022 by 2.63 times, then the amount of waste created decreased by 2.22 times.

Table 1

Waste generation in the Republic of Moldova for 2020-2023, tons				
Types of wastes	2020	2021	2022	2023
From agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	325766.5	300368.1	135391.1	275503.4
Municipal (household and similar trade, industry and institutions), including separately collected fractions	49898.1	68324.6	53906.3	58910.5
From construction and demolition (including soil excavated from contaminated sites)	6208.4	13185.8	20937.6	5358.0
From the leather, fur and textile industries	652.1	1562.1	1298.1	1378.6
Others	32519.9	32328.3	53250.8	31231.6
Total	415045.0	415768.9	264783.9	372382.1

Source: Systematized by the authors based on data [3].

At the same time, we can observe that the generation of municipal waste (household and similar trade, industry and institutions), including separately collected fractions, is comparatively stable with an increasing trend, while the generation of waste in construction

and demolition (including soil excavated from contaminated sites) and the leather, fur and textile industries has an unstable character, being determined by the specific economic situation of each branch, with very large differences being attested from one year to another. In conclusion, although apparently the amount of waste is decreasing, we must note that this fact is determined by climatic conditions and the high share of waste from agriculture, thus, in the case of a good agricultural year, the amount of waste can reach high values again.

From the data in Table 2, we observe, first of all, a very large discrepancy between current expenditures and expenditures for the capital repair of fixed assets, thus this ratio in 2020 amounted to 17.59 times, and in 2023 the value is 14.3 times, the maximum being reached in 2022 with a value of 22 times. Even if a relative improvement of this indicator is attested for 2023, the result cannot be considered favorable.

Regarding current expenditures for environmental protection, we attest a constant increase, thus for the period 2020-2020 they increased by 55.3%, which can be considered positive result. However, unacceptably low expenditures are attested for conservation of biodiversity and natural areas, which constitute 173.5-404.9 thousand lei for the examined period. A substantial increase, although in absolute values the expenditures are still modest, is attested for atmospheric air protection and prevention of climate change by 9.32 times for the examined period, for waste management by 1.84 times, for protection and rehabilitation of groundwater and surface water by 1.76 times, and, unfortunately, for soil protection and rehabilitation a decrease of 31.1% is attested.

Regarding expenditures for the capital repair of fixed assets, although we note an increase of 1.91 times in 2023 compared to 2020, the situation is still quite precarious. Unfortunately, investments in environmental protection are at a fairly modest level, below the needs of an economy in transition to a green economy. If in the previous table we noted that the largest share of waste is determined by the agricultural sector, then we can conclude that both current expenditures and investments are well below the needs of this sector.

Thus, we have to underline that, although the Republic of Moldova has approved a certain regulatory framework for the transition to a circular economy, there are still no sufficient incentives or financial instruments to create an infrastructure related to the green economy. Therefore, it is necessary to create mechanisms that would stimulate investments in technologies that would reduce waste creation, waste processing or the design of products with minimal waste, which can be easily reused.

Table 2

Expenditures by types of environmental protection activities in the Republic of Moldova for 2020-2023, thousand lei

Protection activities	2020		2021		2022		2023	
	Current expenditures	Expenditures for the capital repair of fixed assets	Current expenditures	Expenditures for the capital repair of fixed assets	Current expenditures	Expenditures for the capital repair of fixed assets	Current expenditures	Expenditures for the capital repair of fixed assets
For atmospheric air protection and prevention of climate change	5553.0	5284.0	8753.2	2303.0	13844.4	1837.2	51741.3	13341.9

Continuation Table 2

For collecting and treating wastewater	182530.3	8121.4	189528.0	5920.9	204167.6	3597.6	218930.5	5383.3
For waste management	66258.6	1098.3	124585.9	2407.4	117284.6	5877.0	121786.5	6274.2
For soil protection and rehabilitation	3553.8	0.0	3205.8	0.0	1686.0	0.0	2448.3	0.0
For protection and rehabilitation of groundwater and surface water	3284.1	508.1	3119.3	8370.1	3092.0	266.7	5775.9	2439.2
For conservation of biodiversity and natural areas	173.5	0.0	125.0	0.0	89.8	0.0	404.9	0.0
For other areas	3629.2	53.6	4797.7	434.9	30465.0	5264.7	10437.1	1340.8
TOTAL	264982.5	15065.4	334114.9	19436.3	370629.4	16843.2	411524.5	28779.4

Source: Systematized by the authors based on data [3].

In particular, the textile, food and construction industries - traditional areas for the Republic of Moldova - have started to implement innovative practices, such as waste recovery, end-of-life reuse and the adoption of eco-design principles [12-14]. However, the scale of these initiatives remains limited at the local community or enterprise level and there is a substantial gap between pilot projects and large-scale industrial implementation. Thus, the systemic integration of circular economy principles requires not only technological innovation, but also investments in human capital and infrastructure.

The waste management system in Moldova is undergoing transformation, with gradual improvements in municipal waste collection and sorting, and interest in developing infrastructure for recycling and composting. Public institutions have also initiated awareness campaigns aimed at changing consumer behavior towards sustainable practices. However, Moldova faces challenges such as inefficient collection systems, insufficient investment in waste processing technologies [15].

The transition to a circular economy can be significantly facilitated by the incorporation of digital technologies, which would allow for the optimization of resource management. Digital platforms can be developed to facilitate the control and traceability of materials in the supply, production and consumption chains, ensure the implementation of extended producer responsibility, contribute to the dissemination of information on sustainability for consumers.

The synergy between digital innovation and circular economy practices has the potential to increase economic efficiency in tandem with ensuring the principles of the

circular economy. However, we must note that the integration of advanced digital tools is still at an early stage and considerable investments are needed to create big data infrastructure and ensure appropriate education [16].

In the above, we have identified a set of complex and interconnected the main directions for the development of the circular economy in the Republic of Moldova:

3.1 Policies and Regulatory Framework

The regulatory framework of the Republic of Moldova has evolved to align with European Union standards; however, there are still some shortcomings in terms of established indicators and quantified objectives. Regulations have been developed that provide for recycling, resource recovery and waste reduction, but there are no clear requirements for the implementation of these goals. However, as the Republic of Moldova joins the EU, there is an opportunity to develop its policy framework and instruments by adopting a comprehensive national circular economy strategy, which establishes clear performance indicators, tax incentives for businesses and sanctions for non-compliance. EU integration and the post-accession stage include technical assistance instruments, capacity building and financial support, which would facilitate transparent monitoring of progress and help attract foreign investment in green technologies.

It should also be highlighted that regulatory disparities, including those regarding practices with major trading partners (primarily the EU), can create impediments to trade and restrict market access. At the same time, by adopting best practices and obtaining certifications for circular economy performance, domestic products can become more competitive in new market segments characteristic of the green economy.

European integration can encourage the development of regional economic infrastructure, such as waste management facilities or the creation of recycling partnerships, which would ensure economies of scale and reduce operational costs.

Therefore, we propose the creation of a central institution to coordinate the implementation of circular economy projects, which would constitute a robust platform for sustainable development and would allow for efficient monitoring of progress, stimulate innovation, make it possible to capitalize on the expertise of both domestic and international partners, and ensure institutional accountability.

3.2 Investments

As previously discussed, one of the significant challenges facing the Republic of Moldova in the transition to a circular economy is the lack of specific financial instruments that would allow pilot projects to be scaled up. Also, limited domestic financial resources and reduced access to international financing constitute an impediment to research and development in the field of circular technologies and waste management systems, as well as the takeover of new green business models.

At the same time, the Government of the Republic of Moldova can access international financing through green bonds, EU funds, EBRD, etc. There is a trend, at least regionally, for investors interested in sustainable projects, and the Republic of Moldova could benefit from attracting investments for the development of the circular economy. Moreover, public-private partnerships (PPPs) can mobilize resources for the modernization of waste collection systems and recycling facilities. By establishing funds dedicated to the circular economy, the government can subsidize and provide favorable financing conditions to support enterprises in the transition to sustainable production processes.

3.3 Technological Development

Technological progress is another challenge but also an opportunity to move towards a sustainable development trajectory. Current waste management, energy recovery and material processing systems lack the modern infrastructure needed to fully exploit the benefits of the circular economy.

At the same time, digitalization is a necessary ingredient to facilitate the restructuring of business processes due to the ability to monitor and optimize the flows of resources used, and the use of sensors and digital tools for production systems, modern recycling facilities, waste collection are essential to increase operational efficiency and traceability [17].

The use of digital technology within the circular economy offers excellent opportunities, as the Internet of Things (IoT), big data analysis and blockchain can revolutionize traditional industries in the Republic of Moldova. By digitizing the value chain, enterprises can optimize resource use and reduce waste generation at each stage, thus ensuring Extended Producer Responsibility. At the same time, government support can be achieved by supporting innovation centers and through tax incentives for the adoption of new technologies, manufacturing new products in accordance with the principles of the circular economy.

3.4 Industrial Transformation

From the data examined, we note that traditional sectors of the economy of the Republic of Moldova such as: agriculture, food industry, textile and construction are characterized by a production with a relatively high level of waste and current expenses, investments for environmental protection at a relatively modest level to ensure sustainable production. The transformation of these sectors by including circular production models requires not only the re-equipment of production facilities, but also a cultural change of managers. It is also necessary to train the workforce according new technologies, eco-efficient processes and sustainable product design.

Adopting eco-design principles and integrating waste minimization processes can lead to new business models that value industrial by-products. In agriculture, circular practices, such as the use of organic waste to generate bioenergy or compost, can improve soil fertility and reduce chemical fertilizer inputs.

Food processing companies can innovate by transforming food waste into value-added ingredients [18]. Cross-sector collaborations, incubated through industrial clusters, could stimulate innovation in closed-loop supply chains. This reorientation not only minimizes environmental impact but also drives economic resilience.

3.5 Cultural Transformation

The transition from linear models to a circular economy requires a multidimensional change in consumer behavior, corporate strategies and societal norms.

The awareness of the general public about the benefits of circularity and its long-term socio-economic advantages is still at an early stage. Cultural inertia and relatively modest knowledge about the environmental impact constitute an impediment to the adoption of new circular models. Therefore, it is necessary to strengthen environmental education and the principles of the circular economy, at all levels - from schools and universities to vocational training programs. Educational programs and media campaigns focused on waste reduction, waste collection and sorting, energy efficiency are still needed.

NGOs, local innovation centers and community initiatives can drive cultural transformation and stimulate local support for sustainability. It should be highlighted that the focus of consumers, mass media and civil society on environmental issues will put pressure on the business community to adopt circular practices, thus strengthening the transition to a green economy.

4. Conclusions

In conclusion, we can conclude that the economy of the Republic of Moldova is determined by significant challenges in terms of social adaptation, EU integration, regulatory alignment, institutional coordination, technological and industrial transformation, access to finance. The state of the circular economy in the Republic of Moldova is at an early stage with cautious progress, marked by the fact that the general legal framework is broadly formed, but there are no well-established action plans and allocated resources, which does not contribute to the expansion of circular practices in traditional economic areas such as agriculture, food industry, textiles or construction. At the same time, challenge is also an opportunity that, if properly capitalized, could profoundly reconfigure the economy of the Republic of Moldova.

We have to underline that EU integration and international cooperation will be essential into the transition to the circular economy. By aligning policies with EU standards, ensuring stable and diversified sources of financing, modernizing industrial practices and developing a culture of sustainability among citizens and the businessmen, adopting technological innovations, the Republic of Moldova will be able to protect its environment, increase its economic resilience, stimulate competitiveness, and ultimately the quality of life of its population and ensure a sustainable and prosperous future.

Further research should focus on quantifying the economic impact and identifying relevant indicators for circularity specific to different economic sectors to support the sustainable development objectives of the Republic of Moldova.

Acknowledgments: The research was carried out in the framework of the research subprogram 020408 "Research on ensuring sustainable development and increasing the competitiveness of the Republic of Moldova in the European context".

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Belostecinic, G.; Guțu, C. Premises and opportunities of the Republic of Moldova for sustainable development in European context. *The Romanian Journal of Economics, Institute of National Economy* 2008, 26 (1(35)), pp. 5-32.
2. Dodu-Gugea, L.; Siscan, Z.; Condratchi, L.; Fortuna, O. Modern world trend of sustainable economy and formation of the circular ecosystem in the Republic of Moldova. *Economica* 2021, 02 (116), pp. 63-77.
3. National Bureau of Statistics of Moldova. Available online: www.statistica.gov.md (accessed on 06.05.2025).
4. Ministerul Dezvoltării Economice și Digitalizării. Available online: <https://mded.gov.md/domains/business-environment/green-economy/> (accessed on 08.05.2025).
5. Timofei, O. Resource use efficiency in the Republic of Moldova: opportunities and challenges in the context of European initiatives. *Akademios* 2024, 4(75), pp. 119-129.
6. Luo, Y. Analysis of Economic Development of Moldova. *Advances in Economics, Management and Political Sciences*. In: *Proceedings of the 3rd International Conference on Financial Technology and Business Analysis, 2024*, 137, pp.10-14. <https://doi.org/10.54254/2754-1169/2024.18628>.
7. Ganea, V.; Birca, I. European circular economy - a real model for the sustainable development of the economy of the Republic of Moldova. *European Journal of Accounting, Finance & Business* 2020, 8(3), 7 p.

8. Diordiev, A. Perspectives of circular economy development in the Republic of Moldova. In: *Simpozion Științific Internațional al Tinerilor Cercetători*, Chișinău, ASEM, 8-9 aprilie 2022, 2, pp. 126-130.
9. Gheorghiuța, M. Contribuția angajamentului social și de mediu la sustenabilitatea întreprinderilor din industria ușoară și implementarea economiei circulare. In: *Simpozion internațional "Creativitate, Tehnologie, Marketing"*, 31 martie 2023, Chișinău, Republica Moldova, pp 17-23.
10. Litvin, A.; Dobrovolschi, L. Dezvoltarea durabilă – o nouă paradigmă a științei economice. In: *Inovația: factor al dezvoltării social-economice*, 17 decembrie 2021, Cahul, Universitatea de Stat „Bogdan Petriceicu Hașdeu” din Cahul, 2022, pp. 7-11.
11. Crucerescu, C.; Crețu, T. Politică industrială europeană - punct de reper pentru dezvoltarea durabilă a industriei Republicii Moldova. In: *Competitiveness and sustainable development: in the context of European integration*, 4-5 noiembrie 2021, Chișinău. pp. 23-28.
12. Gheorghiuța, M.; Oberșt, A. Advancing sustainable development through environmental commitment of apparel producers. *Journal of Social Sciences* 2021, 4(1), pp. 47-57.
13. Țurcan, Iu.; Țurcan, R.; Stratila, A. Impactul calității și siguranței alimentelor asupra exportului produselor agroalimentare a Republicii Moldova în contextul integrării Europene. In: *Perspectives and achievements within European Integration of Moldova*, 1-2 octombrie 2020, Chișinău, 2021, 1, pp. 90-98.
14. Cucuș, S.; Țurcan, R. The role of the construction industry in economic growth and sustainable development. *Journal of Social Sciences* 2025, 8(1), pp. 25-38.
15. Crucerescu, C. Changes in Moldovan entrepreneurship to achieve sustainable development. In: *Youth Entrepreneurship in Eastern Partnership Countries: Analysis of Problems and Solutions*: monograph, 2020, pp. 633–635.
16. Țurcan, R.; Pojar, D. Impact of industry 4.0 technologies on skill requirements and workforce availability in key sectors. In: *Competitiveness and sustainable development*, 7-8 noiembrie 2024, Chișinău, „Tehnica-UTM”, 2024, pp. 203-212.
17. Țurcan, Iu.; Țurcan, R.; Stratila, A. Digitalization and its role in the development of circular economy business models. In: *Competitiveness and sustainable development*, 2-3 noiembrie 2023, Chișinău. „Tehnica-UTM”, pp. 103-109.
18. Diaconu, C. Assessment of sustainability progress indicators in the wine industry. *Journal of Social Sciences* 2025, 7(4), pp. 30–41.

Citation: Ciloci, R.; Turcan, Iu. The economy of the Republic of Moldova from the perspective of sustainable development. *Journal of Social Sciences*, 8 (3), pp. 49-59. [https://doi.org/10.52326/jss.utm.2025.8\(3\).04](https://doi.org/10.52326/jss.utm.2025.8(3).04).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).05](https://doi.org/10.52326/jss.utm.2025.8(3).05)
CZU 338.48:663.2:634.8



EXPLORING THE ECONOMIC AND ENVIRONMENTAL IMPACT OF WINE TOURISM IN EMERGING AND DEVELOPED ECONOMIES

Alexandru Alexeev, ORCID: 0009-0009-4802-9025,
Rina Turcan*, ORCID: 0000-0002-6001-2025,
Ina Gumeniuc, ORCID: 0000-0001-9626-4147

Technical University of Moldova, 168, Ștefan cel Mare Blvd., Chisinau, Republic of Moldova

* Corresponding author: Rina Turcan, rina.turcan@emin.utm.md

Received: 06. 27. 2025

Accepted: 08. 23. 2025

Abstract. Over recent decades, wine tourism underwent accelerated development, evolving into a distinct segment of the tourism industry. As consumer preferences shifted towards authentic, sustainable, and culturally enriched experiences, wine tourism proved well-positioned for growth. Located at the crossroads of agriculture, the wine industry, heritage, and regional development, it reinforced its role as a strategic tool for enhancing the competitiveness of wine regions, particularly in transitioning economies. This study applied a mixed-methods approach combining quantitative and qualitative techniques, including comparative analysis, content examination of theoretical models, documentary review, and linear regression. This framework enabled the exploration of correlations between wine tourism performance and macroeconomic indicators. The findings indicated that success in wine tourism was less dependent on GDP per capita and more strongly influenced by factors such as wine heritage, vineyard density, infrastructure quality, branding strategies, and communication effectiveness. Moldova illustrated this dynamic by ranking fifth globally in wine tourism, despite modest macroeconomic performance. The research contributed to consolidating wine tourism as a vector for inclusive and sustainable regional development. It also emphasized the potential of emerging economies to attain international visibility by leveraging cultural assets, innovating tourism offerings, and aligning with global sustainability trends.

Keywords: *vine tourism, sustainable development, regional economic growth, viticulture, tourism infrastructure, Wine Lovers Index.*

Rezumat. În ultimele decenii, turismul vitivinicol a cunoscut o dezvoltare accelerată, devenind un segment distinct al industriei turismului. Pe măsură ce preferințele consumatorilor s-au orientat către experiențe autentice, durabile și îmbogățite din punct de vedere cultural, turismul vitivinicol s-a dovedit bine poziționat pentru creștere. Situat la intersecția dintre agricultură, industria vinului, patrimoniu și dezvoltare regională, acesta și-a consolidat rolul de instrument strategic pentru creșterea competitivității regiunilor viticole, în special în economiile în tranziție. Acest studiu a aplicat o abordare mixtă a metodelor care

combină tehnici cantitative și calitative, inclusiv analiza comparativă, examinarea conținutului modelelor teoretice, revizuirea documentelor și regresia liniară. Acest cadru a permis explorarea corelațiilor dintre performanța turismului vitivinicol și indicatorii macroeconomici. Constatările au indicat că succesul în turismul vitivinicol depinde mai puțin de PIB-ul pe cap de locuitor și este mai puternic influențat de factori precum patrimoniul vitivinicol, densitatea podgoriilor, calitatea infrastructurii, strategiile de branding și eficiența comunicării. Moldova a ilustrat această dinamică prin clasarea pe locul cinci la nivel mondial în ceea ce privește turismul vitivinicol, în ciuda performanțelor macroeconomice modeste. Cercetarea a contribuit la consolidarea turismului vitivinicol ca vector al dezvoltării regionale incluzive și durabile. De asemenea, a subliniat potențialul economiilor emergente de a obține vizibilitate internațională prin valorificarea activelor culturale, inovarea ofertelor turistice și alinierea la tendințele globale de durabilitate.

Cuvinte-cheie: *turism vitivinicol, dezvoltare durabilă, creștere economică regională, viticultură, infrastructură turistică, Indicele Wine Lovers*

1. Introduction

Wine tourism has emerged in recent decades as a dynamic and multifaceted area of the global tourism industry, with close links and intersections with agriculture, wine, gastronomy and regional economic development. Although rural tourism is not a separate niche activity, it has become a strategic vector for sustainable development, providing economic, social and environmental benefits in both developed and emerging economies [1]. As global interest in the sector continues to grow and the global interest in authentic and experiential travel continues to grow, wine producing regions have seized the opportunity to capitalize on their natural, cultural and viticultural assets [2].

Although wine tourism is expanding significantly and consolidating as an area with relevant economic and social potential, it remains under-investigated in terms of its integrated economic and environmental impacts. While many studies highlight its capacity to generate income, boost local entrepreneurship and foster cultural exchange, approaches that examine the interdependencies between economic performance and sustainability outcomes are still limited [3]. At the same time, the lack of comparative studies between economies at different stages of development substantially reduces the access of policy makers and stakeholders to relevant information to inform coherent policies and transfer best practices that can be adapted to different economic and territorial contexts.

In this context, in-depth research on the economic and environmental impact of wine tourism is of increasing strategic importance, particularly in terms of underpinning sustainable regional development policies, especially for developing economies [4]. Such an approach not only makes it possible to identify and make rational use of wine-growing and tourism resources, but also to design balanced development models capable of ensuring compatibility between economic progress, environmental protection and social cohesion.

Moreover, in the context of intensifying global competition to attract tourists and the growing emphasis on authentic and personalized experiences, in-depth knowledge of the determinants of performance in wine tourism provides solid premises for the formulation of effective public policies and coherent territorial branding strategies. From a scientific point of view, research on this issue contributes to strengthening the theoretical basis of sustainable tourism and to the development of integrated assessment tools relevant for monitoring and optimizing the performance of wine destinations [3].

The development of wine tourism should not be seen solely in terms of its immediate economic benefits, but rather as a strategic component of a sustainable regional development model with multiple cultural, social and environmental implications. This type of tourism has the potential to become an essential link in the revitalization of rural areas, offering a sustainable alternative to traditional economic models that are often vulnerable to global change [5]. By harnessing synergies between tourism activities and the wine sector, regions can build more resilient economic ecosystems that support local entrepreneurship, encourage the preservation and transmission of traditions and contribute to the shaping of an authentic and attractive territorial identity. Furthermore, this integrated approach creates opportunities for the implementation of environmentally friendly practices in agriculture and tourism, thus ensuring the long-term preservation of natural resources and wine landscapes, often of heritage value. Wine tourism thus becomes more than a recreational or economic activity - it becomes a vector for sustainable development, capable of generating positive impacts not only in financial terms, but also in social cohesion and the quality of life of local communities. For developing regions, this potential is all the more valuable as it can support a balanced transition towards an economy based on local resources, environmental responsibility and social inclusion.

2. Materials and Methods

For this research, a mixed quantitative-qualitative methodology was adopted, based on a coherent set of scientific methods - empirical, comparative and documentary analysis - oriented towards the complex investigation of wine tourism in the context of sustainable economic development. The research aimed to outline and highlight the potential of wine tourism to function as a strategic tool for regional development by analyzing its economic, social and environmental impact in diverse international contexts, with a special focus on transition and emerging economies.

The scientific work was primarily based on secondary analysis of data provided by highly credible scientific sources: academic articles published in internationally indexed journals, research reports produced by prestigious international organizations, as well as official statistics relevant to the topic. In order to ensure a rigorous and balanced comparative perspective, case studies were selected from five countries - Spain, Georgia, South Africa, Serbia and the Republic of Moldova - which show significant developments in the wine sector but also different levels of economic development, thus providing fertile ground for cross-national analysis.

In order to assess the performance of wine tourism in relation to macroeconomic indicators, a comparative method was used which involved analyzing the positioning of selected countries in the Wine Lovers Index 2024. The choice of this tool was based on its composite and multidimensional nature, as it integrates key variables such as: wine production per capita, domestic consumption, volume of exports, share of wine-growing areas, frequency of wine tours per area, average price of a bottle of wine and associated tourism infrastructure. By correlating these variables with the level of GDP per capita, the aim was to identify a possible direct relationship between the performance of wine tourism and the level of overall economic development.

In order to deepen the sustainable dimension of wine tourism, a content analysis was applied on the theoretical models identified in the specialized literature. This analysis made it possible to outline the main directions in which wine tourism contributes simultaneously

to the conservation of natural resources and to the generation of negative impacts such as landscape degradation or excessive pressure on local resources.

To test the relationship between the position in the Wine Lovers Index 2024 and the level of GDP per capita, a simple linear regression statistical analysis was applied. The results, presented graphically, showed the absence of a significant correlation between the two variables, confirming the hypothesis that cultural, historical and strategic factors exert a stronger influence on the development of wine tourism than the level of economic prosperity as a whole.

3. Results and discussions

The empirical analysis of wine tourism across various nations where it serves as a vital contributor to economic progress underscores its indispensable role in regional development. As observed by Vázquez Vicente, G., Martín Barroso, V., and Blanco Jiménez, F., wine tourism functions as a mechanism through which capital inflows are stimulated, attracting visitors and thereby augmenting the revenue streams of wine-producing regions [6]. Their examination of nine Spanish wine routes over the period 2008–2018 provides substantial evidence that the expansion of wine tourism exerts a favourable influence on economic development, aligning with the broader principles of capital allocation and resource optimization within competitive markets [6]. Wine tourism, by augmenting the visibility of regional wine production, serves as an essential instrument in stimulating ancillary industries such as hospitality, gastronomy, and artisanal enterprises. This interconnected economic activity not only enhances local commerce but also contributes to a broader framework of wealth generation, thereby advancing regional economic development [7]. Beyond its role in cultural preservation, the wine tourism sector functions as a critical engine of economic progress, facilitating capital circulation and employment creation. Georgia, endowed with distinctive viticultural resources and a rich historical tradition, possesses the capacity to harness wine tourism as a sustainable revenue stream. Through the effective utilization of these comparative advantages, the sector can contribute to increased labour demand in rural areas, leading to improved living standards and heightened economic productivity. Moreover, the capacity of wine tourism to adapt to evolving economic conditions, including global crises and technological innovations, further reinforces its viability as a resilient and competitive sector. By maintaining a dynamic and responsive structure, wine tourism can integrate into the broader mechanisms of international trade and investment, ensuring its sustained relevance within the global economic system [8].

Wine tourism is a valuable tool for the active promotion and sustainable conservation of cultural heritage, while contributing to strengthening territorial identity and regional cohesion. An eloquent example of this is the Douro region in Portugal, where the culture of port wine is a fundamental pillar of tourism development, generating multiple economic, social and emotional benefits for the communities involved in wine-growing and related tourism activities [9].

Wine tourism occupies a central role in the development of sustainable tourism by integrating ecological, sociocultural, and economic dimensions into a cohesive model. In areas like Vojvodina, wine routes serve not only as a distinctive tourism product that reflects local heritage but also as a crucial driver of regional economic growth, fostering investment, employment, and cultural preservation. By fostering collaboration among local communities,

visitors, and public institutions, wine tourism not only enhances cultural engagement but also contributes to the comprehensive development of the destination [10].

Although there is no firm model that accurately indicates the number of jobs that can be created due to the development of the tourism sector, several studies show that tourism has been able to contribute substantially to job creation in different countries. A notable example is wine tourism in South Africa, which supported almost 300000 direct and indirect jobs in 2015, highlighting the economic potential of wine tourism, where the expansion of viticulture and related services stimulates labor demand in several sectors, enhancing employment and regional economic vitality. The geographical analysis conducted by Ferreira and Hunter further substantiates the role of wine tourism as a mechanism for economic expansion, particularly in rural regions, where it facilitates both capital accumulation and social progress [11]. Attracting new visitors to wine tourism simultaneously boosts the activity of multiple local businesses, such as accommodation establishments, restaurants and craft shops, thus promoting overall economic development.

The researchers Q. Li, X. Wang and M. Arif have advanced a conceptual model that delineates the effects of tourism development upon the sustainability of the natural environment [12]. Their framework, founded upon systematic reasoning, discerns with precision the dual nature of tourism's influence. On the one hand, it engenders adverse externalities, manifest in the depletion of finite resources, the contamination of air and water, and the erosion of biodiversity. On the other, it yields beneficial consequences, fostering conservation initiatives, incentivizing sustainable practices, and affording economic sustenance to local communities. Thus, their model elucidates the intricate interplay between economic activity and environmental preservation, a subject of paramount significance in the political economy of nations.

Figure 1 presents a comprehensive model that illustrates the interdependent relationship between tourism development and environmental sustainability, highlighting both its negative and beneficial effects. On the one hand, depleting natural resources, degrading landscapes and diminishing biodiversity, tourism expansion imposes environmental burdens as an absolute necessity. If neglected, these disruptions bring about broader systemic challenges such as climate disruption, soil depletion and water scarcity, thus jeopardizing the long-term stability of the natural environment. On the contrary, this model reveals the latent potential of tourism, delineating the prospects that may be realized when its expansion is directed by the tenets of sustainability. Under such prudent guidance, tourism ceases to be a mere consumer of natural resources and instead assumes the role of an instrument for environmental preservation and economic reinforcement. By channeling capital towards conservation endeavours, instituting sustainable modes of operation, and employing scientific inquiry to inform ecological governance, tourism may be transformed into a force of environmental rejuvenation. Indeed, the alignment of tourism with sustainable development is not only conceivable but practicable through a variety of mechanisms.

The establishment of protected areas, the rehabilitation of biodiversity, and the systematic promotion of ecotourism stand as tangible measures by which this alignment may be achieved. In this manner, the industry may cease to be a source of depletion and, instead, become an integral component of a broader economic and ecological equilibrium. The conceptual framework emphasizes the imperative of a holistic approach to governance, synthesizing policy interventions, cooperative stakeholder engagement and empirical research to reconcile tourism's economic contributions with its environmental branches.

It argues for a structural transformation towards regenerative tourism models in which environmental conservation and the pursuit of economic progress are not antagonistic goals, but rather mutually reinforcing pillars of sustainable and equitable development.

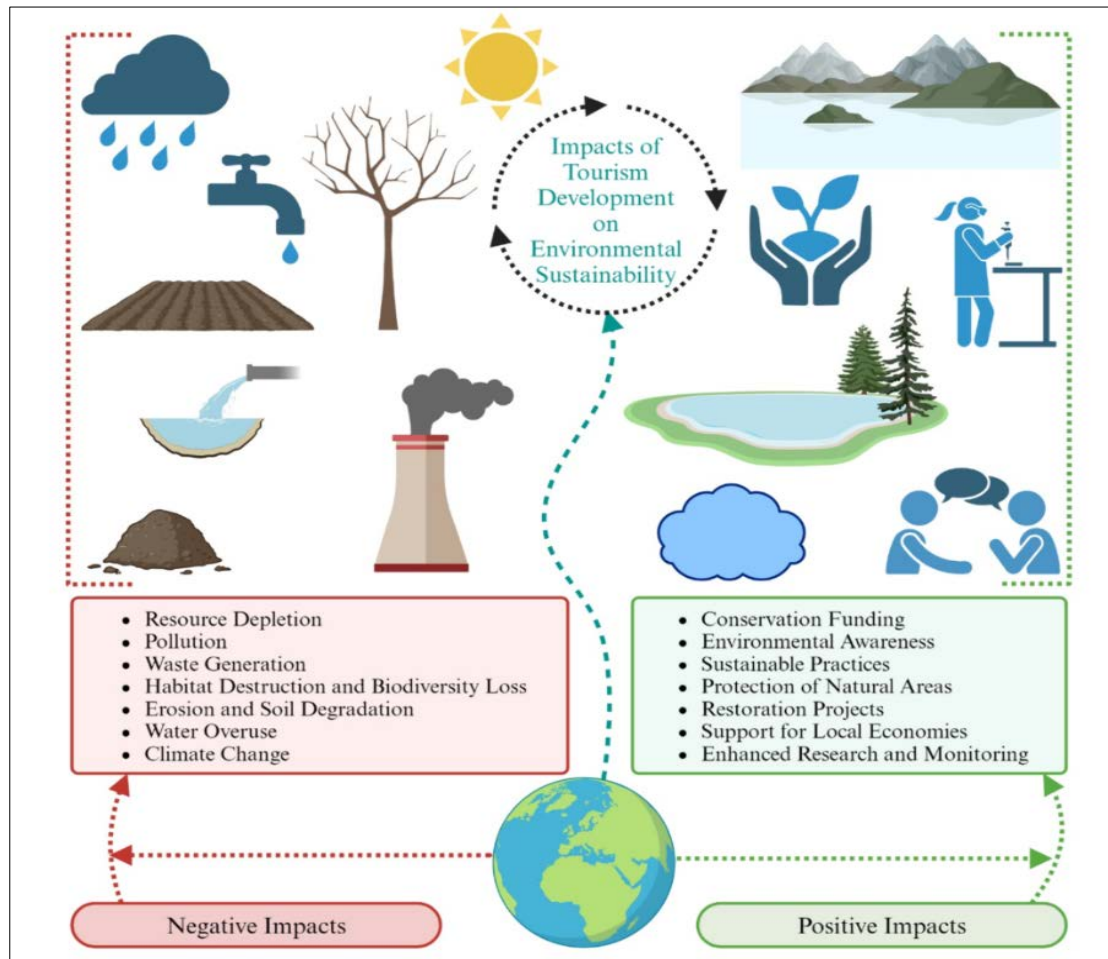


Figure 1. A conceptual model shows the impacts of tourism development [12].

Vine and wine tourism represents a distinct branch of commerce, arising naturally from individuals' inherent desire to engage deeply with the traditions and practices surrounding wine production. It involves journeys to regions notable for viticulture, embracing experiences such as visiting vineyards and wineries, participating in local wine festivals, and attending exhibitions dedicated to the art and craft of winemaking [13]. The primary inducement driving tourists towards such pursuits lies in the gratification derived from tasting and discerning wines produced in distinct localities. This preference stems not merely from sensory pleasure, but also from curiosity to explore variations in soil, climate, production methods, and the broader cultural customs unique to each region. Economically, vine and wine tourism generates considerable advantages: it enhances demand for local goods, encourages the prosperity of rural communities, and directly supports small-scale winegrowers. Thus, guided by the natural propensity of consumers to seek novel and authentic experiences, this form of tourism effectively channels individual interests toward collective regional prosperity.

Wine tourism is situated at the crossroads of the tourism, viticulture and wine industry, offering visitors a rich, multi-sensory experience that goes far beyond traditional sightseeing. At the same time, wine tourism is often seen tangentially with rural tourism, visiting vineyards

often involves and stimulates the development of rural tourism [14]. This branch of tourism offers the opportunity to taste and appreciate different varieties of wine, explore complex aromas and tastes through guided tastings and gain insights into the winemaking process. In addition to tasting wine, this form of tourism allows tourists to immerse themselves in the local culture, history and traditions of the wine-producing regions. Visitors have the opportunity to communicate directly with winemakers, participate in vineyard tours, and enjoy regional gastronomy, creating a holistic experience that combines education, leisure and cultural enrichment [15,16]. As a result, wine tourism fosters a deeper appreciation of viticulture while supporting local economies and sustainable rural development.

Wine tourism encompasses several key dimensions that contribute to its attractiveness and economic importance. These aspects define the unique character of wine tourism and its role in regional development and are systematized in Figure 2.

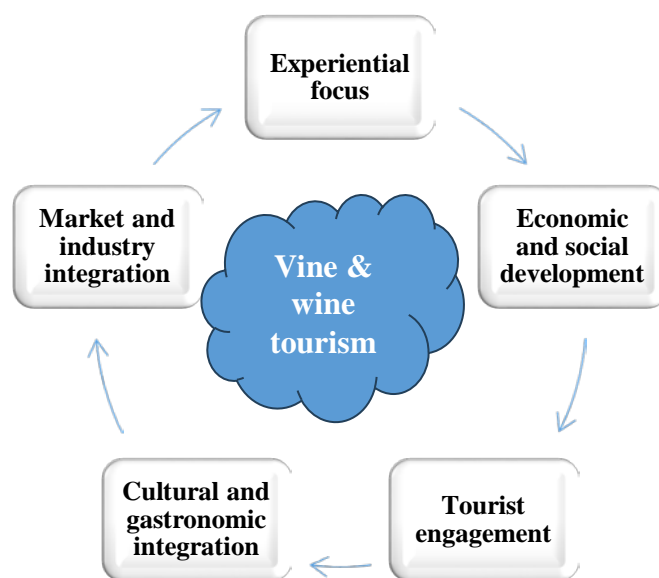


Figure 2. Specific aspects of vine and wine tourism and its role in regional development.

Source: Systematized by the author based on [15-19].

The main specific aspects of wine and wine tourism are the following:

- **Experiential Focus** – Wine tourism fundamentally arises from the innate human desire for pleasure derived from sensory and intellectual engagement. Visitors are drawn into a rich sensory encounter, involving taste, scent, and visual perception, through wine tastings, vineyard explorations, and culturally enriching activities. This blend of sensory experience and traditional local practices significantly enhances the intrinsic pleasure and educational value of the tourist's journey [16,17].
- **Economic and Social Development** – Beyond mere leisure, wine tourism significantly contributes to the wealth and improvement of society by stimulating regional economies. It enhances competitiveness among wine-producing regions, fosters vineyard growth, encourages refinement in wine quality, and generates employment opportunities, thereby benefiting both rural and urban areas alike [15-17].
- **Tourist Engagement** – A distinctive characteristic of wine tourism is the mutually beneficial relationship formed between the visitor, the wine producer, and the natural environment. Personalized hospitality, exceptional service, and compelling narratives provided by winemakers substantially increase visitor satisfaction, ensuring continued patronage and enduring interest in the region [15,18].

- Cultural and Gastronomic Integration – Wine tourism is deeply interwoven with the broader cultural traditions and gastronomic heritage of the locality. Participation in regional cuisine, traditional festivities, and historical vineyard tours enhances visitors' authentic experiences, promoting a deeper and more meaningful connection with the destination [16,17].
- Market and Industry Integration – Wine tourism effectively links the wine and tourism sectors, creating reciprocal benefits and facilitating mutual economic expansion. It ensures consistent visitor traffic, thus elevating winery income through direct sales, promotional events, and branding opportunities. Strategic alliances, such as those between wineries and travel enterprises, are particularly effective in amplifying these benefits [18,19].

Collectively, these elements demonstrate wine tourism's role as a distinctive and dynamic segment of commerce. By providing enriching experiences that engage travelers culturally and sensorially, it simultaneously promotes sustainable economic prosperity in wine-producing regions.

According to the investigations conducted by M.R.G. Revilla and O.M. Moure, wine tourism distinctly enhances both economic prosperity and social advancement. It accomplishes this by fostering employment, augmenting local incomes, and encouraging beneficial collaboration among enterprises within rural communities [15]. Beyond these economic advantages, wine tourism notably enriches visitors through profound sensory experiences and meaningful cultural engagements, thereby increasing the attractiveness and appeal of regions such as Malaga and encouraging sustainable economic diversification [15]. Moreover, wine tourism effectively serves as an instrument for achieving sustainable rural development, stimulating economic activity, safeguarding cultural traditions, and promoting responsible environmental practices. By generating employment and supplementary income, particularly within rural localities, it directly bolsters the prosperity of these communities. Furthermore, wine tourism reinforces regional cultural identities, harmonizing historical viticultural methods with contemporary sustainability measures, thus delivering benefits that extend from local communities to broader global tourism markets.

Although wine tourism at first glance has a long history, being linked to a traditional branch with rich experience, at first glance it seems to be quite recent, young and innovative [20]. It is obvious that the development of wine tourism is inextricably linked to the growth of vines and the presence of a well-developed wine industry. At the same time, of particular interest is what determines the interest of tourists and how they choose wine tourism destinations.

In the following table, a comparative analysis of various countries is presented, highlighting key indicators related to wine production, consumption, export volumes, vineyard coverage, wine tasting tour availability, and wine affordability. These data are based on the Wine Lovers Index 2024, which integrates these factors into an overall score, offering insights into the role and significance of each country in the global wine tourism industry.

The Wine Lovers Index 2024 ranks countries that have wine industry in the structure of their economy in rating, taking into account multiple indicators such as: wine production per person, wine consumption per person, export volume, share of wine vineyards in total land area, average price of a bottle of wine, wine tourism infrastructure and accessibility. This world ranking provides valuable information for people who have a wine-drinking culture and consciously choose wine tourism destinations.

Leading positions in this ranking hold such countries as Portugal, Italy and France stand out as the main wine destinations. Portugal has the highest score of 8.96 due to the volume of wine produced at 71.5 L/person, a high level of domestic consumption (52.3 L/person) and a well-developed wine tourism infrastructure providing 61.2 wine tasting tours per 10000 km². Italy and France follow closely behind, benefiting from their historical prominence in wine production and extensive viticultural landscapes. Although the top positions are held by world leaders, these being the developed countries of Europe that historically manage to maintain their strong image and position on the world wine markets, the rating demonstrates the importance of the more mature countries specialized in wine production for which this industry is a traditional one in intense development [21].

Table 1

Wine Lovers Index leading indicators in 2024 for the top 10 rating positions

No	Country	Rating	Wine production per Person, L	Wine consumptions per Person, L	Wine export volume, 1000 hL	Vineyard size as % of Surface Area	Average price of a Wine bottle, EUR	Wine tasting tours per 10 ⁹ m ²	Overall score/10
1.	Portugal	1	71.5	52.3	3.195	1.98	4.67	61.2	8.96
2.	Italy	2	65.2	37.1	21.366	2.38	6.00	40.8	8.68
3.	France	3	70.5	35.8	12.667	1.44	7.00	13.5	7.92
4.	Spain	3	58.6	20.3	20.815	1.87	5.00	13.4	7.92
5.	Moldova	5	71.5	12.5	1.041	3.44	4.65	21.3	7.36
6.	Chile	6	56.2	8.8	6.791	0.23	4.87	11.9	6.25
7.	Hungary	7	25.4	17.1	1.266	0.65	4.57	8.6	6.25
8.	Georgia	8	49.6	26.4	895	0.70	6.06	6.1	6.18
9.	New Zealand	9	69.1	16.6	3.371	0.16	8.73	41.4	5.97
10.	Australia	10	36.2	20.3	6.209	0.02	12.04	19.7	5.42
11.	Greece	10	13.2	18.0	284	0.71	8.00	57.3	5.42
12.	South Africa	10	15.4	7.4	3.492	0.10	4.01	6.1	5.42

Source: elaborated by authors based on data [21]

A favourable position in this ranking is occupied by the Republic of Moldova, which ranks fifth with a score of 7.36. This high position demonstrates the wine tourism sector's growing and developing reputation, supported by a substantial volume of wine production, a favourable price-quality ratio and world leadership in terms of the rate of extensive vineyard coverage. Thus, in terms of wine produced per capita, Moldova has a level similar to Portugal (71.5 L/person), demonstrating the country's strong wine-growing tradition. Despite this high level of production, domestic wine consumption remains comparatively lower, at 12.5 L/person, indicating that a significant proportion of Moldovan wine is destined for export rather than local markets.

The volume of wine exports from the Republic of Moldova, amounting to 1041000 hectolitres per year, appears to be quite modest in comparison with major exporters such as Italy (21366000 hL/year) and Spain (20815000 hL/year). However, when these figures are analysed relative to the country's surface area or population size, they reveal a high intensity of export-related indicators, highlighting Moldova's dependence on international markets.

A particularly distinctive indicator for Moldova within the Wine Lovers Index 2024 is the percentage of land dedicated to viticulture, which stands at 3.44%, the highest among all

countries included in this ranking. This metric once again underscores Moldova's historical tradition of viticulture and the crucial role of the wine industry in the national economy, providing a solid foundation for the expansion of wine exports and the development of vine and wine tourism.

As statistical data show, wine tourism in Moldova achieves about 21.3 wine tasting tours per 10000 km², with this indicator Moldova holds a strong position in the intense and active promotion of wine and wine tourism. Although the level of this indicator is lower than in Portugal (61.2 tours/10000 km) or Greece (57.3 tours/10000 km), it signifies a developing sector with growth potential. Regarding the accessibility of Moldovan wine, depending on the average price (approx. 4.65 EUR/bottle), it increases the attractiveness of the Republic of Moldova for international visitors, especially for that category of visitors who are looking for competitive production in terms of price/quality ratio.

It is worth noting that in the Wine Lovers Index 2024 ranking among developed European countries, the Republic of Moldova holds the fifth position, which highlights the strategic importance of the wine industry and wine tourism for the national economy and an active development dynamic of this sector. To further strengthen its position, Moldova still has solid reserves for the development and expansion of the wine tourism infrastructure, with an emphasis on increasing the number of organized wine tours and intensifying promotional efforts to attract international visitors. By properly capitalizing on its wine heritage and accessibility, Moldova has great potential to become a top centre for wine tourism in Eastern Europe.

The following figure presents the relationship between a country's ranking in the Wine Lovers Index 2024 and its GDP per capita (USD), illustrating the degree of correlation between wine tourism performance and overall economic development.

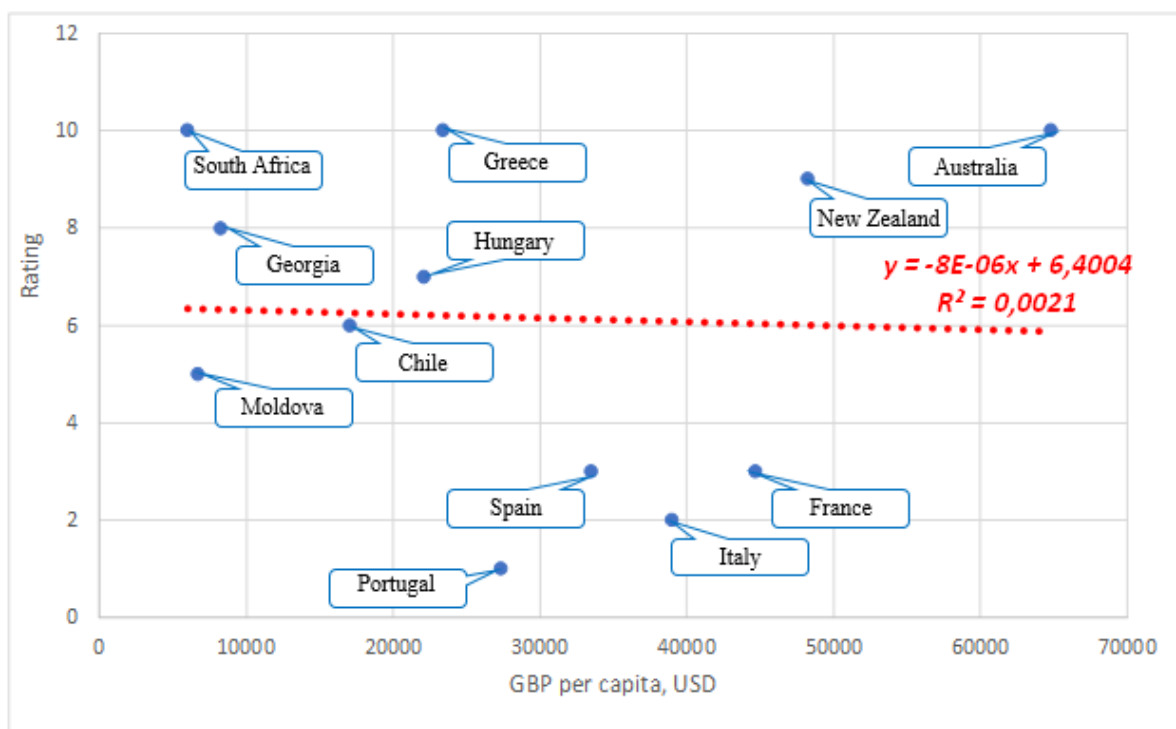


Figure 3. Dependence between rating in Wine Lovers Index leading indicators in 2024 for the top 10 rating positions and GDP per capita in these countries.

Source: Elaborated by the authors based on data from the [21,22]

The dependence between the Wine Lovers Index leading indicator ratings in 2024 for the top 10 rating positions and the GDP per capita in these countries reflects a very interesting situation. At first sight it can be assumed that as the economic level of development increases, i.e. as the GDP per capita increases, the country's rating in the Wine Lovers Index also increases.

In the current ranking of the countries most appreciated by wine lovers, Portugal occupies the first place. This pre-eminence is not achieved by the size of its GDP per capita, because its per capita income is \$27331, but rather by the excellence and reputation of its wine-related enterprise. Italy and France, with ancient traditions in the field of viticulture and the wine industry, follow in close succession, each holding a high level of GDP per capita of \$39003 and \$44690, respectively. Spain, in fourth place, with a per capita income of \$33509, further confirms the maxim according to which countries that have historically enjoyed mastery in the arts of viticulture and also continue to attract the favor of tourists in this field. However, it is worth noting the case of Moldova, which, although it is fifth in this ranking, differs considerably in terms of GDP per capita from other countries in this ranking. Its per capita income, being only \$6729, places it among other well-developed countries in Europe. However, through a judicious application of its natural advantages such as an abundance of vineyards, a vigorous trade in wine exports and a pronounced emphasis on the development of the wine sector and wine tourism, has determined Moldova as a competitor worthy of note. Moldova's ranking clearly demonstrates that having a significantly lower GDP per capita in relation to developed European countries, you can occupy the top positions, having favourable positions in terms of wine production per person, wine consumption per person, export volume, share of wine vineyards in total land area, average price of a bottle of wine, wine tourism infrastructure and accessibility.

The ranking continues with countries such as Chile, Hungary and Georgia, which, while not having very high incomes, have a long tradition of growing grapes and have cautiously adopted policies that encourage wine tourism. Hungary, with a per capita income of \$22114, is in an intermediate position between the rich states of Europe and those still rising economies. Meanwhile, Georgia, with a per capita income of just \$8283, draws its strength not from material opulence but from the age and distinction of its winemaking heritage, which continues to lure visitors from near and far. In stark contrast, we find that nations like New Zealand and Australia - despite enjoying the highest levels of wealth among the countries considered here, with per capita incomes of \$48280 and \$64820 respectively - rank lower on the index. This observation reveals a sobering truth: that mere economic prosperity, however enviable, is insufficient in itself to ensure pre-eminence in the realm of wine tourism. Analysis of the regression coefficient yields an R^2 value of just 0.0021 - a result so insignificant that it practically indicates a complete lack of connection between GDP per capita and Wine Lovers Index rating. From this, it must be deduced that other factors, of a more specific and perhaps cultural nature, are of greater consequence: the density and extent of vineyards, the depth of historical and cultural attachment to winemaking, the prevailing patterns of wine consumption, and the effectiveness of national policies designed to promote and support such tourism. Of these examples, the case of Moldova is the most illustrative. Although deficient in broad economic means, it has managed, by virtue of a concentrated and deliberate emphasis on viticulture and wine tourism, to raise its stature on the international stage. Thus, we see that, in the quest for national distinction in certain arts or industries, it is not always the richest, but rather the most purposeful and industrious, who achieve success.

At the same time, in the development of all types of tourism, in order for the country to be attractive for tourists, it must have well-developed accommodation facilities [23]. In an indirect way there is a connection between the level of development of the country and the development of accommodation facilities for tourists, including those tourists practicing wine tourism.

From an economic perspective, it is clear that countries wishing to advance their position in the field of wine tourism would do well to direct their efforts towards cultivating vineyards, producing quality wines, promoting wine tourism services, and ensuring a healthy economic and political climate at the country level. Prudently expanding vineyards, deliberately building a renowned identity for their wines, and providing infrastructure that fosters the enjoyment and exploration of wine regions are all far more effective measures than relying solely on general economic prosperity. Thus, the prosperity of a particular industry depends less on the affluence of the nation as a whole and more on the judicious allocation of resources and the cultivation of those institutions and customs that support it.

5. Conclusions

The empirical analysis presented in the article outlines, with solid and rigorous arguments, the considerable potential of wine tourism to become a catalyst for sustainable regional economic development. The case studies from countries such as Spain, Georgia, South Africa or Serbia, together with the comparative analysis provided by the Wine Lovers Index 2024, convincingly demonstrate that this type of tourism generates multiple beneficial effects: attracting capital, creating jobs, stimulating entrepreneurial initiatives and enhancing collaboration between related sectors - hospitality, gastronomy, crafts and cultural heritage. In this context, wine tourism is going beyond its traditional status, asserting itself as a complex and synergetic tool for economic, social and environmental development.

The strategic value of this sector is amplified by its deeply experiential dimension, which responds to the contemporary tourist's needs for authenticity, cultural diversity and direct interaction with the local specificity. Wine tasting, exploring wine traditions and participating in rural life offer not only sensory satisfaction, but also a sense of identity between the visitor and the host community. Thus, wine tourism is a vector for preserving local values, strengthening rural economies and revitalizing areas with latent economic potential, becoming a priority direction in smart regional development strategies.

The results of the analysis of the Wine Lovers Index 2024 in relation to GDP per capita show that wine tourism is a fairly independent economic sector, with its own specific factors that determine its attractiveness and success. While high-income, highly developed countries have the financial capacity to support the industry, it is the long-term investment in viticulture, wine traditions and tourism infrastructure that ultimately determine a country's position in the wine tourism market. Countries such as the Republic of Moldova and Georgia are eloquent examples of how emerging economies, through the intelligent valorisation of their wine heritage and traditional agro-economic resources, can build sustainable competitive advantages, effectively positioning themselves on the international market and transforming wine tourism into a strategic direction for economic growth and global affirmation.

Essentially, wine tourism is emerging as a real lever for economic and social development, contributing not only to the dynamization of wine-producing regions, but also to the strengthening of territorial cohesion, the revitalization of rural areas and the

foundation of a sustainability-oriented economy. Its multidimensional nature, situated at the intersection between agriculture, industry, tourism and culture, gives it a particular potential for generating intersectoral synergies. The success of this type of tourism depends directly on the convergence and complementarity of the efforts of public authorities, local producers and academia in an intelligent and strategically oriented partnership.

At the same time, international experience shows that wine tourism is not the exclusive preserve of developed countries, but is emerging as a valuable and feasible opportunity for economies in transition with deep-rooted wine traditions, such as Moldova or Georgia. In these contexts, a strategic approach and an intelligent use of the wine heritage can transform a comparative advantage into a sustainable competitive advantage with a direct impact on the international positioning of these countries.

Based on the results of the present research, future directions of scientific investigation will aim to deepen the behaviour of wine tourism consumers through a detailed analysis of their motivations, preferences and loyalty to the destinations visited. In parallel, particular emphasis will be placed on exploring how wine tourism can become a catalyst for the development of the circular economy in rural areas by promoting sustainable practices, reducing waste and stimulating local innovation. These research directions are intended to strengthen the theoretical and practical foundations needed to transform wine tourism into a sustainable development vector with economic, social and environmental benefits.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Ariyani, N.; Fauzi, A. Pathways toward the Transformation of Sustainable Rural Tourism Management in Central Java, Indonesia. *Sustainability* 2023, 15(3), 2592.
2. Vukojević, D.; Tomić, N.; Marković, N.; Mašić, B.; Banjanin, T.; Bodiřoga, R.; Đorđević, T.; Marjanović, M. Exploring Wineries and Wine Tourism Potential in the Republic of Srpska, an Emerging Wine Region of Bosnia and Herzegovina. *Sustainability* 2022, 14(5), 2485.
3. Petelca, O.; Pătrăuceanu, C.; Beșliu, I.; Garbuz, V. Influence of the wine sector on tourism development. *The Annals of the University of Oradea. Economic Sciences* 2022, 31(1), pp. 89-98.
4. Milićević, S.; Đorđević, N.; Kraguljac, V. Wine tourism and sustainable rural development. In: Proceedings of the The Eighth International Scientific Conference „Tourism and green investments”, The Faculty of Hotel Management and Tourism in Vrnjačka, Banja, from May 31st to June 1st, 2024, pp. 419-428.
5. Lamoureux, C.; Barbier, N.; Bouzdine-Chameeva, T. Managing Wine Tourism and Biodiversity: The Art of Ambidexterity for Sustainability. *Sustainability* 2022, 14, 15447
6. Vázquez Vicente, G.; Martín Barroso, V.; Blanco Jiménez, F.J. Sustainable Tourism, Economic Growth and Employment—The Case of the Wine Routes of Spain. *Sustainability* 2021, 13, 7164.
7. Marco-Lajara, B.; Zaragoza-Sáez, P.; Martínez-Falcó, J.; Sánchez García, E. Wine tourism in Spain: The economic impact derived from visits to wineries and museums on wine routes. *Investigaciones Turísticas* 2023, 25, pp. 168-195.
8. Koguashvili, P.K.P.; Ososhvili, M.O.M. The Role of Wine in Tourism Development in Kakheti Region. *Economics* 2022, 105(09-10), pp.118-130.
9. Quintela, J.A.; Albuquerque, H.; Freitas, I. Port Wine and Wine Tourism: The Touristic Dimension of Douro's Landscape. *Sustainability* 2023, 15, 11718.
10. Trišić, I.; Štetić, S.; Privitera, D.; Nedelcu, A. Wine Routes in Vojvodina Province, Northern Serbia: A Tool for Sustainable Tourism Development. *Sustainability* 2020, 12(1), 82.
11. Ferreira, S.L.A.; Hunter, C.A. Wine Tourism Development in South Africa: A Geographical Analysis. *Tourism Geographies* 2017, 19, pp. 676–698.
12. Li, Q.; Wang, X.; Arif, M. Assessing the Conjunction of Environmental Sustainability and Tourism Development along Chinese Waterways. *Ecological Indicators* 2024, 166, pp. 1–10.
13. Jaykumar, V.; Fukey, L.N. Issues and Opportunities of Niche Tourism Markets- Understanding South India Wine Tourism. *Developing Country Studies* 2014, 4, pp. 51–59.

14. Turcan Iu. Indispensabilitatea turismului rural și a turismului vitivinicol pentru Republica Moldova. In Principii de dezvoltare a oenologiei moderne și organizarea pieței vitivinicole, Sturza, R. (ed.), Tehnica-Info, Chisinau, RM, 2020, pp. 251-267
15. Revilla, M.R.G.; Moure, O.M. Wine as a Tourist Resource: New Manifestations and Consequences of a Quality Product from the Perspective of Sustainability. Case Analysis of the Province of Málaga. Sustainability 2021, 13(23), 13003.
16. Crespi-Vallbona, M.; Mascarilla-Miró, Ò. Wine Lovers: Their Interests in Tourist Experiences. International Journal of Culture, Tourism and Hospitality Research 2020, 14(2), pp. 239–258.
17. Madeira, A.; Correia, A.; Filipe, J. Wine Tourism: Constructs of the Experience. Tourism, Hospitality & Event Management 2019, pp. 93-108.
18. Jago, L.K.; Issaverdis, J.P.; Graham, D. The wine tourist: What's in a name? In: Proceedings of the 2000 CAUTHE National Research Conference in Victoria, Australia, 2000 pp. 64–71.
19. Petelca, O.; Pătrăuceanu, C.-C.; Beșliu, I.; Garbuz, V. Influence of the wine sector on tourism development. The Annals of the University of Oradea. Economic Sciences 2022, 31(1), pp. 89-98.
20. Crespi-Vallbona, M.; Mascarilla-Miró, O. Wine Lovers: Their Interests in Tourist Experiences. International Journal of Culture, Tourism and Hospitality Research 2020, 14, pp. 239–258.
21. Wine Lovers Index 2024 - Bounce. Available online: <https://bounce.com/blog/wine-lovers-index-2024> (accessed on 2 March 2025).
22. World Bank Open Data. Available online: <https://data.worldbank.org> (accessed on 10 February 2025).
23. Țurcan, I.; Roșca, O. Dezvoltarea structurilor de primire turistică colective cu funcțiuni de cazare în Republica Moldova și impactul lor asupra dezvoltării turismului. In: Particularitățile dezvoltării economiei mondiale în condițiile globalizării, 15 aprilie 2016, Chișinău, Republica Moldova, 2016, pp. 511-520.

Citation: Alexeev, A.; Turcan, R.; Gumeniuc, I. Exploring the economic and environmental impact of wine tourism in emerging and developed economies. Journal of Social Sciences, 8 (3), pp. 61-73. [https://doi.org/10.52326/jss.utm.2025.8\(3\).05](https://doi.org/10.52326/jss.utm.2025.8(3).05).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).06](https://doi.org/10.52326/jss.utm.2025.8(3).06)
CZU 72.025.3:008:342+711.4(497.2-25)



ARCHITECTURE, CULTURAL VALUES AND POLITICS: THE CASE FOR SOFIA

Lino Bianco *, ORCID: 0000-0001-8779-2351

University of Malta, MSD 2080 Msida, Malta

* Corresponding author: *Lino Bianco, lino.bianco@um.edu.mt*

Received: 07. 15. 2025

Accepted: 08. 29. 2025

Abstract. Recalling a doctoral study undertaken at the University of Architecture, Civil Engineering and Geodesy, Sofia, this article focuses on architecture, cultural values and politics in contemporary Sofia. It addresses urban landscapes and cultural heritage legislation in Bulgaria with specific emphasis on immovable and intangible culture. It concludes by arguing for mapping the city's monuments of cultural value, addressing its urban challenges, and positioning this capital amongst Europe's leading capital cities.

Keywords: *Sofia, urban planning, cultural heritage, cultural heritage value, monuments, intangible culture, spirit of place, phenomenology.*

Rezumat. Reamintind studiul de doctorat la Universitatea de Arhitectură, Inginerie Civilă și Geodezie din Sofia, acest articol se concentrează pe arhitectură, valori culturale și politică în Sofia contemporană. Acesta abordează peisajele urbane și legislația privind patrimoniul cultural în Bulgaria, cu accent special pe cultura imobiliară și intangibilă. Articolul se încheie cu un argument pentru cartografierea monumentelor de valoare culturală ale orașului, abordând problemele urbane și poziționând această capitală printre principalele capitale ale Europei.

Cuvinte cheie: Sofia, urbanism, patrimoniu cultural, valoare de patrimoniu cultural, monumente materiale, monumente imateriale, spirit de loc, fenomenologie.

1. Introduction

During the Communist regime, Sofia's urban core was destroyed to make way for the modern city centre which included the Central Universal Store (TSUM), the Sheraton Hotel and the Communist Party Headquarters. Post Second World War developments tore apart the soul of the place, rendering it sterile and replacing humanity with technology. This can be illustrated through urban planning enhancements of major infrastructural works and public buildings. Historical photos of Lions' Bridge (Figure 1), Eagles' Bridge (Figure 2) and the National Theatre (Figures 3 and 4) demonstrate how Sofia developed over approximately a century. The argument put forth is not, and is not intended to be read as, a plea for a nostalgic or a romantic approach to planning. It is a call for a phenomenological approach to urban planning in Sofia whereby, in Norberg-Schulz's words, "human identity presupposes the identity of place" [1, p. 22].

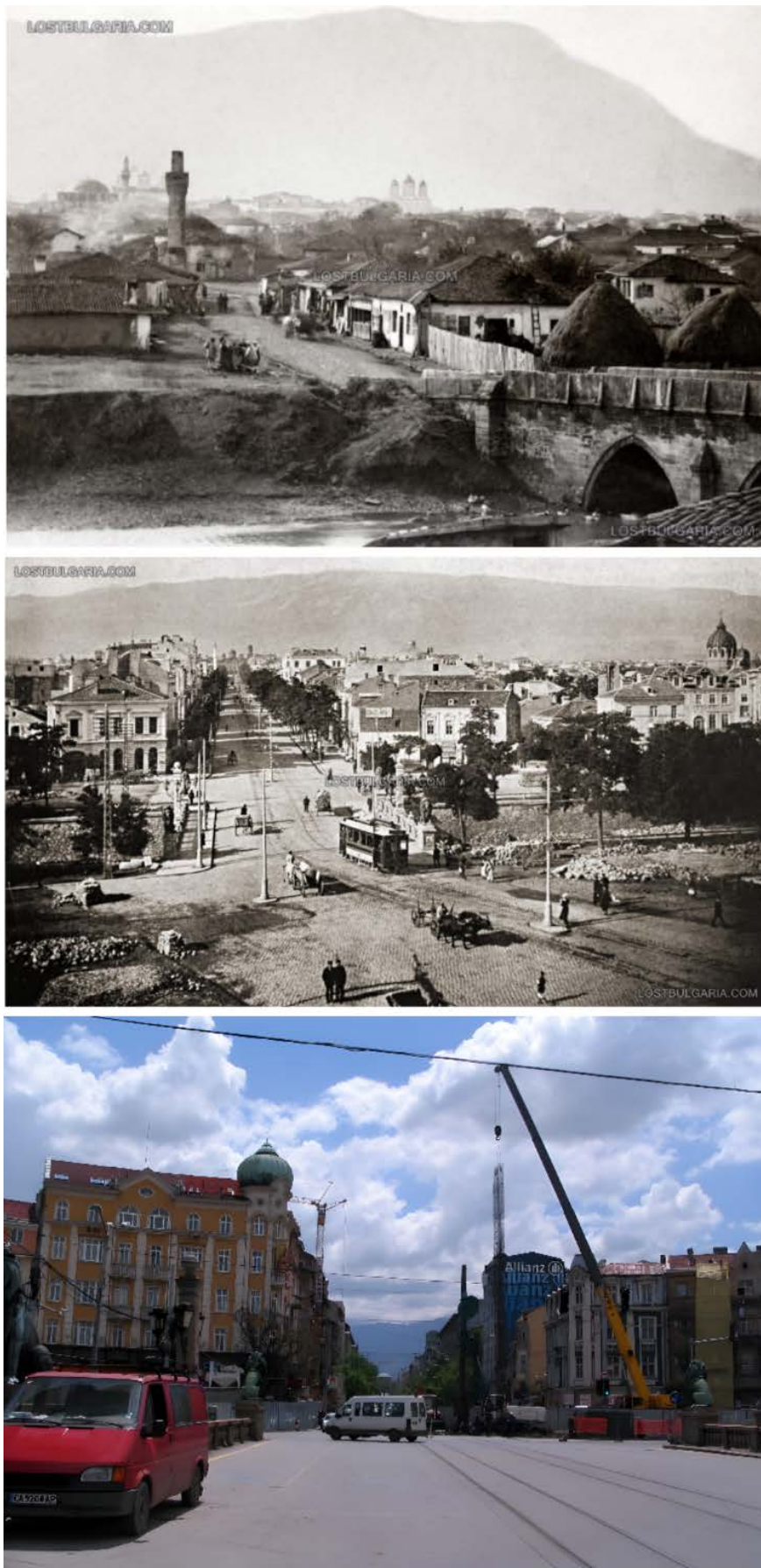


Figure 1. Lions' Bridge: (top) former bridge in 1879 [5], (middle) the paving of the bridge in the first decade of the twentieth century [6] and (bottom) the bridge at present (online version is in colour).

In tackling architecture, cultural values and politics in contemporary Sofia, this article addresses urban landscapes and local cultural heritage legislation, focusing on immovable and intangible culture. It concludes by arguing for (i) the mapping of the city's culturally valuable monuments, (ii) rising to meet its urban challenges, and (iii) positioning Sofia amongst Europe's leading capital cities. This article is a follow up to a recent publication on the phenomenology of urban planning in Sofia [2] whose content formed part of an unpublished doctoral thesis [3, pp. 181–196; 4, pp. 75–83].



Figure 2. Eagles' Bridge: (left) in the 1910s [7] and (right) in the 1980s [8] (online version is in colour).



Figure 3. National Theatre: (left) between 1910–1920 [9] and (right) at present (online version is in colour).



Figure 4. The setting of the National Theatre: (left) between 1910–1920 [10] and (right) as at present (online version is in colour).

2. Urban landscapes

There are a number of landscapes within a city. Urban planners talk of townscapes, cityscapes, roofscapes, cultural landscapes, and so on. These are all tangible phenomena which are important characteristics of a given place. They all help to orient and identify oneself within a space. This is an important dimension to the environmental nature of a place. Another significant aspect is generated by intangible cultural assets – costumes, folk dances, games and sports – which are nowadays protected by law in Bulgaria. Prior to the process of globalisation and synchronisation with Western capitalist culture – primarily mass-media driven – less information and peer pressure to conform to stylistic fashions were present. Photos taken during the interwar period (1919–1939) illustrate a typical family from Sofia village (Figure 5, left) and another from the city centre (Figure 5, right). These families can be easily distinguished by their respective dress code. The former is recognisably closer to costumes associated with rural settings, while the latter wore outfits that bore similarities to those worn in the towns and cities of the Balkans. The urban dress code is only remotely associated with that of the vernacular village areas. Figure 6 (left) illustrates a young woman from the city in a sitting room at the turn of the twentieth century. This type of interior is more in line with the new influences from the Continent. The most significant interior, and one which is congruent with those of other royal courts in Europe, is the throne room of the Royal Palace, dating from the same period (Figure 6, right). This throne room – a symbol of power and governance – communicates the values the new political establishment wanted to convey. The significance of folklore and public culture since Sofia was made the capital of Bulgaria was not limited solely to themes such as national costumes; it extended to traditional dance and sporting activities.



Figure 5. A Bulgarian family: (left) from Sofia village, 1920s [11] and (right) from Sofia city, 1920s [12] (online version is in colour).

With the establishment of the Kingdom of Bulgaria in 1908, an immediate need was felt to initiate civil engineering works and erect public buildings to support the administrative and social infrastructure of the capital. Priority was given to establishing national monuments, not only to facilitate identification and orientation within the city but also to convey the values of the new political establishment. Two such building works – both of which are existentially tangible but phenomenologically intangible – are Alexander Nevski Cathedral (Figure 7) and the monument to the Tsar Liberator (Figures 8 and 9). The former edifice was ranked in 2009 as the top urban sight in the city by primary school children [15: 24].



Figure 6. (Left) A young woman in an early twentieth-century interior [13] and (right) the Throne Room, Royal Palace, Sofia, early twentieth century [14] (online version is in colour).

Both buildings are physical landmarks which symbolically convey the traditions and values the Bulgarian nation had long yearned for, namely the country's liberation from half a millennium of despotic foreign oppression under the Turkish yoke and suppression of the culture and spirit of Bulgarians. Both successive governments and the public, local and foreign, respected these monuments and what they stand for. They were not imposed on society but reflected the collective memory and identity of all Bulgarians. National monuments erected by the state during the socialist period also serve as landmarks which the locals and foreigners associate with Sofia. Two such examples are the National Palace of Culture (Figure 10, left) and the Monument for the Soviet Army (Figure 10, right). In 1993, Sofia City Council resolved to destroy the latter, but it was saved from destruction – a fate which had previously fallen on other national monuments from the same period – mainly due to opposition mounted by the Bulgarian Socialist Party, although the monument was partially removed in December 2023. The mausoleum of Georgi Dimitrov (Figure 11, left) was demolished in 1999 (Figure 11, right), while the statue of Lenin (Figure 12, left) was replaced by a statue of Sofia, the symbol of the city (Figure 12, right). The removal of these monuments – in particular the destruction of the mausoleum, which took place a decade after the fall of communism (although it was presented through the media as a collective impulsive decision) – reads more like a political agenda of members of government at the time.



Figure 7. (Left) Aerial view of Alexander Nevski Cathedral in 1926 [16] and (right) Alexander Nevski Cathedral at present (online version is in colour).



Figure 8. Monument to the Tsar Liberator: (left) at its inauguration on August 30, 1907 [17] and (right) as it stands today (online version is in colour).

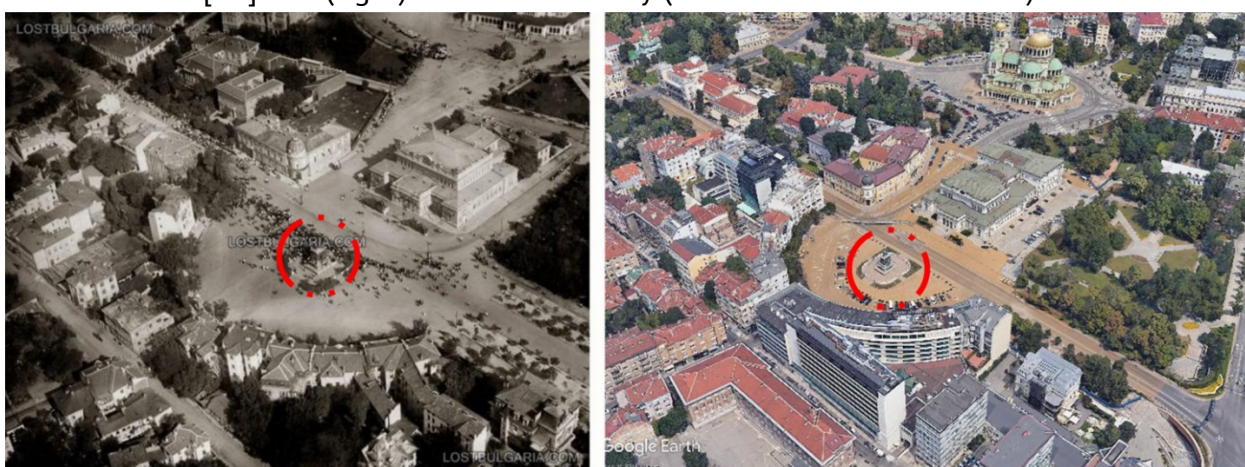


Figure 9. Aerial view of the Monument to the Tsar Liberator (circled in red) which is located in front of the National Assembly: (left) as in 1926 [18] and (right) as at present (© Google Earth) (online version is in colour).



Figure 10. (Left) The National Palace of Culture and (right) the Monument for the Soviet Army as in May 2021 (online version is in colour).



Figure 11. Georgi Dimitrov Mausoleum: (left) in the 1980s [19] and (right) during its destruction in 1999 [20] (online version is in colour).



Figure 12. (Left) The statue of Lenin [21] and (right) the statue of Sofia as it stands today (online version is in colour).

3. Cultural heritage legislation

The criteria regulating contemporary and future spatial planning policies for Sofia, as in other settlements, is regulated by the country's political priorities. The relationship between planning and politics reflects the agenda of the government. The same applies to the city's heritage. The significance of monuments of culture runs through the political agenda.

One development which affected spatial planning in Sofia was the introduction of the Cultural Heritage Act in 2009 [22]. This legislation, which "introduced a new integrative concept for cultural heritage and sets up a new national system for protection, management and sustainable use" [23], replaced the Cultural Monuments and Museums Act [24] and reflected the priorities of environmental protection. What is significant in this act is the introduction of the notion of "cultural values", a concept included in international charters and conventions relating to protection and sustainability of cultural heritage.

In the context of Bulgaria, it suggests an interesting conceptual leap in dealing with culture. The Bulgarian government started to take into consideration both tangible phenomena (buildings and monuments) and intangible phenomena such as oral traditions, folklore, popular games and sport. The cultural heritage values stated in the Cultural Heritage Act, categorised in terms of tangible and intangible phenomena, are tabulated in Table 1. As

can be inferred from this list, the Cultural Heritage Act identified eighteen cultural heritage values. With respect to immovable cultural heritage values, each is in turn classified in terms of its cultural and social significance into one of the following four categories: global significance, national, local and ensemble value. The criteria for inclusion in each of these categories are given in Table 2. Some of the significant tangible and intangible cultural heritage values were discussed in [2] whereby conclusions were drawn about their role and meaning in the context of the city of Sofia, both with respect to its image and its history.

4. Immovable monuments of culture

The list of immovable monuments of culture as acknowledged by the Cultural Heritage Act currently and in use by the Old Sofia Municipal Enterprise – an enterprise founded in 1998 “to investigate, collect, preserve and manage any movable and immovable cultural heritage in Sofia Municipality” [25] – includes monuments of culture within the territory of Sofia Municipality and in the historical centre (the historical centre of Sofia – ancient Serdika and the medieval Sredets – was declared an archaeological reservation in 1976 [26]). The categorisation of these monuments, in terms of their significance and the number of monuments in each classification, is given in Table 3. The criterion used by Old Sofia Municipal Enterprise for defining the historical centre of the city was used to complete the tabulation. The list of monuments of culture of national value in Sofia city is included in [27]. From this list it is evident that the concentration of cultural assets is in the city centre. Knowing accurately the area occupied by these sites and their buffer zones one can compute

1. the density of monuments of cultural heritage in Sofia,
2. the effective area occupied by said monuments, and
3. their buffer zones as a percentage of the total superficial area of the city.

Only the medieval-dating Boyana Church, located on the outskirts of Sofia, is listed by UNESCO as a site of world heritage significance [28].

Table 1

Cultural heritage values listed in the Bulgaria's Cultural Heritage Act of 2009 [22]

Tangible Phenomena	Intangible Phenomena
1. On land, underground, underwater archaeological sites and reserves	1. Oral traditions and language
2. Historical sites and complexes	2. Literary and fiction heritage
3. Architectural sites and complexes	3. Customs, rituals, ceremonies, feasts and beliefs
4. Ethnographic sites and complexes	4. Music, songs and dances
5. Park art and landscape architecture	5. Folk medicine
6. Natural heritage*	6. Cultural ethnologic traditions
7. Industrial heritage	7. Folk games and sports
8. Works of fine and applied arts	
9. Folk crafts	
10. Documentary heritage	
11. Audio-visual heritage	

* including anthropological remains discovered during field research, and remains of paleozoology and cultivated plants.

Table 2

Categories of immovable cultural heritage values (based on [22])	
Category	Criteria for inclusion
Global significance	Monuments included in UNESCO World Heritage List
National value	Archaeological reserves and other cultural heritage values with exclusive importance for the culture and history of the country
Local value	Monuments connected with the culture and history of settlements, municipalities and regions
Ensemble value	Monuments that support the spatial characterisation and architectural typology of the group of cultural heritage values to which they belong

5. Intangible manifestations of culture

Important manifestations of intangible heritage (Table 1) are nowadays protected by law. The implementation of the Cultural Heritage Act was entrusted to the Ministry of Culture, the National Institute for Monuments of Culture and other agencies such as the Old Sofia Municipal Enterprise. These bodies are responsible for compiling data on such manifestations for eventual inclusion of a thematically itemised list. This requires political commitment beyond the enactment of legislation. A budget must be allocated (i) to recruit people with a range of expertise, (ii) to fund scholars from various disciplines to undertake professional studies and assessments, and (iii) to compile a database of the findings. These are the foundations required to compile a list of intangible cultural assets. The development of a cadastre for intangible cultural heritage, in parallel with the list of immovable monuments of culture, will make it possible to plot them all on a basemap of Sofia. This will facilitate greater appreciation and a more inclusive comprehension of the soul of the Bulgarian nation as it has evolved through history.

The Cultural Heritage Act should be read in the spirit of the law, namely that of preserving and conserving immovable and intangible heritage. In this context, this legislation should be allowed to cater for immovable heritage which is associated significantly with intangible cultural values, such as Alexander Nevski Cathedral and the Tsar Liberator monument.

Table 3

Monuments of culture in Sofia (based on [29])			
Level of significance	Number of monuments (Municipality) (Centre)		Remarks
International	3		Boyana Church with a reserve and guarded zone surrounding it
National	323	142	Within the municipality, 101 are archaeological sites and 222 are buildings and/or complexes; within the city centre, 19 are archaeological sites and 123 are buildings and/or complexes
Local	771	706	16 of which have been removed from the list

Continuation Table 3

For information	166	96	12 of which have been removed from the list
Group	61	61	3 of which have been removed from the list
Landscape art	39	39	
Declared monuments [#]	393	65	3 of which have been removed from list

[#] without preliminary defined category of significance.

6. Concluding remarks

To conclude this article, it is worth referring to three recommendations which will prove useful for the future position of Sofia in Europe: i) mapping the city's tangible and intangible cultural heritage, ii) addressing urban challenges and iii) positioning the city amongst Europe's leading capital cities.

1. **Mapping monuments of cultural value:** The plan for protecting and developing cultural and historical heritage within Sofia centre is reproduced in a map entitled Cultural and Historical Heritage, originally plotted at a scale of 1:5,000, which can be found in the *Masterplan of the City of Sofia and Sofia Municipality* [30]. This map records individual and groups of sites of cultural heritage at three levels of significance: national, local and "for information value". It covers ensembles and groups of ensembles of cultural heritage sites, landscape art, declared monuments without a preliminary defined category of significance, territories with development protection for the historical and archaeological reserve 'Serdica-Sredets' and Prince Boris's Garden, and protected underground public spaces of cultural and historical significance. The masterplan also includes a map of green areas within the city centre together with cultural and historical heritage [31]. This map plots landscape art and protected territory for the preservation of cultural and historical heritage for guarded and other group monuments of culture. It further includes reserves which are categorised under seven themes:
 - i. specific territorial and development protection for historical and archaeological sites;
 - ii. protected areas of historical and archaeological reserves;
 - iii. protected territory containing groups of culture heritage monuments but which are not designated as reserves;
 - iv. territories with particular settlement structures;
 - v. protected open spaces of cultural and/or historical significance;
 - vi. protected territories of spatial structures with high cultural and historical value; and
 - vii. open public spaces, "the green memory of Sofia", which comprise of parks and gardens.

These maps were rendered more useful by Old Sofia Municipal Enterprise, which organised the data thematically into separate layers, which made it far easier to analyse.

2. **Urban challenges:** In the 1990s, a number of urban planning concepts were introduced in Eastern Europe. The most notable were the Europe of Regions (a concept advanced "through public discussion and has been widely used since to give an image of the ongoing development of the united and more democratic Europe" [32, p. 97], the notion of governance (i.e., co-operation and sharing of responsibilities between all stakeholders), public-private partnerships and support for small and medium enterprises. Similarly to other members of the former Eastern Bloc, in this period urban development in Bulgaria was market driven rather than government controlled. The construction of typical socialist housing ceased and public social housing programmes were shelved. Pre-1989, centralised

urban planning regimes were discarded and replaced by a *laissez-faire* market-oriented philosophy as the city shifted from a monocentric to a polycentric structure. This led to quasi-anarchic developments which did not respect the existing environs, in particular their natural and cultural surroundings. The former is characterised by the numerous developments at the foot of the mountains surrounding Sofia Basin. Significant aspects which were not possible during the Socialist period include public and/or private participation in urban projects and the re-urbanisation of Sofia and Sofia Municipality. Sofia had already shifted to a polycentric structure prior to 1989, with the establishments of residential complexes at Lyulin and Mladost. These two districts are in effect satellite towns supporting a population of about 120,000 and 200,000 inhabitants, respectively; they have their own secondary centres with parks, schools, clinics and other social and cultural infrastructure.

3. **Positioning of Sofia amongst Europe's leading capital cities:** The *Masterplan of the City of Sofia and Sofia Municipality* acknowledges that "despite Sofia's considerable potential for becoming an urban centre of European importance, it faces a strong competition for that role from neighbouring large cities" [30, p. 25]. The role of cities in the European, and indeed global, urban network is enhanced by the presence of multinational corporations. The presence of such companies' headquarters has a significant impact on the cities in which they are located. However, attracting such corporations places a number of demands on cities, including the ability to guarantee political stability, efficient central and local administration, an attractive tax system, a good range of (cross)cultural activities, high-quality real estate, schools for foreign nationals, and good healthcare facilities [30]. Following EU accession, the significance of capitals in former Warsaw Pact countries expanded from a national to a European dimension. Besides a good general investment climate, Prague, Budapest and Warsaw have fared well in regional and international competition for foreign investment through the introduction of a range of incentives, from financial assistance programmes to zero-interest loans and tax incentives.

Local and European professionals talk of Sofia as the emerging capital of the Balkans. However, other capital cities in the region are challenging Sofia for this title. Notwithstanding the relatively positive forecasts for the city provided by research in Western Europe, Sofia lags behind in terms of both general development of the city and, more specifically, attracting foreign investment [30]. Indeed Sofia, and Bulgaria in general, has the resources, human and otherwise, and the expertise to transcend its current conditions and mature into a leading prosperous country in southeast Europe. Its vision should not be limited to a capital city in line with other EU capitals but to be a unique, flourishing city, the capital of the Bulgarian nation and a cradle of European civilisation. The crucible for the national spirit is rooted in the times of ancient antiquity, when this region formed the hub of world empires which extended to Asia.

Acknowledgements. This article is based on the PhD thesis of the author, undertaken and successfully completed under the academic supervision of the late Prof. Dr Arch. Vesselina Rousseva Troeva at the Faculty of Architecture, University of Architecture, Civil Engineering and Geodesy, Sofia [33]. Thanks are also due to the University of Malta, which financed the doctoral studies, and Peyo Kolev (proprietor of Lost Bulgaria, <http://www.lostbulgaria.com/>) for permission to images included in Figures 1 to 9, 11 and 12. Final thanks go to architect Joeaby Vassallo for his help extracting the image from Google Earth, reproduced here as Figure 9 (right).

Conflicts of Interest: The author declares no conflict of interest.

References

1. Norberg-Schulz, C. *Genius Loci: Towards a phenomenology of architecture*. Academy Editions, London, UK, 1980, pp. 6-23.
2. Bianco, L. Towards a phenomenology of urban planning for the city of Sofia. *Terra Sebus. Acta Musei Sabesiensis*, 2024, 16, pp. 465-481.
3. Bianco, L. *Architecture and politics: Contemporary and future planning policies for Sofia*. Sofia: University of Architecture, Civil Engineering and Geodesy, Sofia, 2011, PhD thesis.
4. Bianco, L. *Architecture and politics: Contemporary and future planning policies for Sofia: Abstract*. Sofia: University of Architecture, Civil Engineering and Geodesy, 2011. Available online: http://uacg.bg/filebank/att_1527.pdf (accessed on 28.03.2025).
5. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=2891> (accessed on 28.03.2025).
6. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=79> (accessed on 28.03.2025).
7. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=245> (accessed on 28.03.2025).
8. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=2901> (accessed on 28.03.2025).
9. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=75> (accessed on 28.03.2025).
10. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=232> (accessed on 28.03.2025).
11. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=3290> (accessed on 28.03.2025).
12. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=545> (accessed on 28.03.2025).
13. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=1689> (accessed on 28.03.2025).
14. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=947> (accessed on 28.03.2025).
15. Troeva, V. (ed.). *Journey to the City*. ERA Publishing, Sofia, Bulgaria, 2010, pp. 19-31.
16. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=2591> (accessed on 28.03.2025).
17. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=1210> (accessed on 28.03.2025).
18. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=2007> (accessed on 28.03.2025).
19. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=287> (accessed on 28.03.2025).
20. Kolev, P. Lost Bulgaria. Available online: <https://www.lostbulgaria.com/?p=1022> (accessed on 28.03.2025).
21. Kolev, P. *Lost Bulgaria*. Available online: <https://www.lostbulgaria.com/?p=1927> (accessed on 28.03.2025).
22. Cultural Heritage Act 2009. National Assembly, Republic of Bulgaria (2009). Available online: https://mc.government.bg/files/3696_CulturalHeritageAct-Bulgaria.pdf (accessed on 28.03.2025).
23. Tomovs, B., Andreeva, D. Bulgaria 3.1. Available online: https://www.culturalpolicies.net/country_profile/bulgaria-3-1/ (accessed on 28.03.2025).
24. Cultural Monuments and Museums Act 1969. National Assembly, The People's Republic of Bulgaria (1969).
25. Sofia Municipality. Sofia Museum. In: *Official web portal of Sofia*. Available online: [https://www.sofia.bg/web/sofia-municipality/sofia-museum#:~:text=The%20'Stara%20Sofia'%20\(Old,cultural%20heritage%20in%20Sofia%20Municipality](https://www.sofia.bg/web/sofia-municipality/sofia-museum#:~:text=The%20'Stara%20Sofia'%20(Old,cultural%20heritage%20in%20Sofia%20Municipality) (accessed on 28.03.2025).
26. Council of Ministers. Resolution No. 36 of the Council of Ministers declaring the areas of the ancient core and the medieval centre of Sofia as an archaeological reserve. *State Gazzette* [of The People's Republic of Bulgaria], 1 June 1976, 47 [in Bulgarian].
27. List of monuments of culture in the category 'national importance' on the territory of Sofia city (In Bulgarian). Available online: http://mc.government.bg/images/NPK/SOFIA_GRAD.pdf (accessed on 28.03.2025).
28. UNESCO. World Heritage List: Boyana Church. Available online: <https://whc.unesco.org/en/list/42> (accessed: 28.03.2025).
29. Stoilova, L. The Cultural Heritage and Lists of Monuments of Culture in Sofia. Unpublished List, Old Sofia Municipal Enterprise with Historical Museum of Sofia, Sofia, Bulgaria, 2009.
30. SofProject. *Masterplan of the City of Sofia and Sofia Municipality*. Architecture and Town Planning Directorate, Sofia, Bulgaria, 2004.
31. SofProject. *Masterplan of Sofia Municipality: Synthesis report*. Sofia Municipality: Architecture and Town Planning Directorate, 2009, map: Green systems and cultural and historical heritage. Available online: <https://sofiaplan.bg/wp-content/uploads/2020/04/page-21.pdf> (accessed on 28.03.2025).
32. Vartiainen, P.; Kokkonen, M. Europe of Regions – A Nordic View. In: *Competitive European Peripheries: Advances in spatial science*; Eskelinen, H., Snickars, F. (Eds.). Springer Berlin Heidelberg, Berlin, Germany, 1995, pp. 97-114. https://doi.org/10.1007/978-3-642-79955-6_6

33. Bianco, L. Vesselina Troeva and planning education at the University of Architecture, Civil Engineering and Geodesy in Sofia. *Annual of the University of Architecture, Civil Engineering and Geodesy Sofia*, 2022, 55(4), pp. 543-555.

Citation: Bianco, L. Architecture, cultural values and politics: the case for Sofia. *Journal of Social Sciences*, 8 (3), pp. 74-86. [https://doi.org/10.52326/jss.utm.2025.8\(3\).06](https://doi.org/10.52326/jss.utm.2025.8(3).06).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright:© 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).07](https://doi.org/10.52326/jss.utm.2025.8(3).07)
CZU 391:687.1.016(498+478)



POPULAR WEAR A SOURCE OF CREATION IN THE DEVELOPMENT OF MODERN CLOTHING FORMS

Svetlana Cangas*, ORCID: 0000-0001-8495-583X,
Elena Florea-Burduja, ORCID: 0000-0001-8318-1756,
Aliona Raru, ORCID: 0000-0002-7488-3083

Technical University of Moldova, 168 Stefan cel Mare Blvd, Chisinau, 2004, Republic of Moldova

* Corresponding author: Svetlana Cangas, svetlana.cangas@dttp.utm.md

Received: 07. 11. 2025

Accepted: 08. 27. 2025

Abstract. The creative process or product design is impulsive, unpredictable and influenced by a series of factors. Factors that due to the influence of society are shaped by: the action of the characters who constituted the artistic message for generations formed by the folk costume; the capacity for acceptance by social strata of novelties in design, politics, technology, etc.; the capacity for coagulation of an artistic character guided and promoted by society with the imposition of product design demand at the current time. The popular shirt with rolled sleeves as a source is analyzed by: shape with original characteristics, embroidery, cutting method, assembly, outline of the details. The popular product remains that link that contributes to the formation of new ideas in industrial design, textile design, typographic design, etc. For the study or used three basic types of rolled sleeve shirt and ten modeled shirts which were simulated using CLO 3D software. The article will present the constructive parameters of the rolled sleeve shape, a model of a shirt, blouse with a rolled sleeve adapted to the requirements of contemporary clothing, as well as possibility of assembling the rolled sleeve with pave.

Keywords: *popular shirt, detail, source, creation, design, embroidery, sleeve.*

Rezumat. Procesul creativ sau designul de produs este impulsiv, imprezvizibil și influențat de o serie de factori. Datorită influenței societății, acești factori, sunt modelați de: acțiunea personajelor estetice care au constituit mesajul artistic de generații, format prin costumul popular și costumul boieresc; capacitatea straturilor sociale de a accepta noutăți în design, în politică, în tehnologie, etc.; capacitatea de coagulare a unui caracter artistic ghidată și promovată de societate, concomitent cu impunerea cererii designului de produs în momentul actual. Produsul popular, rămâne să fie acea verigă ce contribuie la formarea ideilor noi în designul industrial, designul textil, designul tipografic, etc. Cămașa populară cu mâneca răsucită în calitate de sursă este analizată prin: formă, broderie, mod de croi, asamblare, contur al detaliilor. Pentru studiu sau utilizat trei tipuri de bază a cămășii autentice cu mâneca răsucită și zece cămăși modelate, care au fost simulate utilizând software-ul CLO 3D. În articol se vor prezenta parametrii constructivi ai formei mânecilor răsucite, un model de bluză

cu mânecă răsucită adaptate cerințelor îmbrăcămintei contemporane, cât și metode de asamblare a mânecii răsucite cu pava.

Cuvinte cheie: *cămașă populară, reper, sursă, creație, design, broderie, mânecă.*

1. Introducere

Creatorii de îmbrăcămintă în calitate de surse de inspirație utilizează diverse subiecte, deseori încadrate în problemele de Upcycling, Zero Waste Design care sporesc reciclarea, reducerea de deșeuri, etc. Croiala, forma produselor de port popular românesc sunt surse, dar și exemple, care respectă fidel prioritățile de durabilitate și deșeuri minime printr-un aspect estetic de învidiat. În același tip planșele de croire, asamblare a produselor de port popular la prima vedere simple, deseori sunt greu de descurcat, cât și un model se poate broda, coase 4-9 luni [1-3]. Simularea digitală a îmbrăcămintei utilizând softurile 3D a lărgit posibilitățile de analiza a metodelor de croire, poziționare pe corp a produsului, organizarea proporțiilor și decorului prin diverse texturi respectând cerințele de reducere a deșeurilor și timp de realizare. Un produs cu caracteristici estetice pronunțate este cămașa cu mâneca răsucită, deseori supradimensionată, drapată în spirală pe mână, numită ie [3,4]. Prin "ie" se înțelege o piesă tradițională de îmbrăcămintă purtată de femei, caracterizată prin croială din repere dreptunghiulare, din pânză albă (bumbac, in, cânepă) și împodobită cu broderii realizate manual [5,6]. Supradimensionarea mânecii în produsul de îmbrăcămintă este conservată în portul popular mai multor etnii, întâlnite în portul boieresc din perioada medievală, când caftanul se purta îmbrăcat pe mânecă sau în calitate de pelerină cu mânecile destul de lungi legate la spate, dar răsucirea spiralată a mânecii dintr-o bucată de formă triunghiulară, caracteristică ieii luate în studiu nu mai întâlnim [1,7,8]. Impresionante prin caracteristici deosebite de model, formă, structură și contrast al proporțiilor sunt: ia cu mâneca răsfrântă din regiunea folclorică Rupea, Transilvania, ia cu mâneca extra-lungă, ia cu mâneca extra-largă, ia cu mâneca răsucită. Considerată endemică, pierdută în timp ia cu mâneca răsucită prin forma și draparea mânecii se racordează reușit formei și drapării orizontale a pantalonilor pentru bărbați, numiți ȋțari întâlniți în portul popular al Republicii Moldova [9,10]. Model de pantaloni dezvoltat pe baza formelor arhaice, remarcate în portul de pe metopele monumentului de la Adamclisi, monument care după una din afirmații avea prea multe ornamente de origine tracă [11]. Pantalonii înfășoară foarte strâmt piciorul realizându-se din pânză de cânepă, bumbac, lână și cu ajutorul mulțimii creților se permite îndoirea ușoară a acestuia în special pentru zona genunchilor. Acest tip de pantalon se mai numește ȋțar cu 100 de crețuri și este de bază în portul zonelor moldovenești. Lungimea cracului de pantalon depășea de 1,5 ori lungimea piciorului [5]. Deși cămașa cu mâneca răsucită datează începând cu sec. al XV-lea [5], pantalonii datează din perioada metopelor monumentului antic de la Adamclisi ridicat între anii 106-109 pentru a celebra victoria armatei conduse de împăratul Traian [11], aceste două piese vestimentare destinate diferitor sexe, decalate în timp se remarcă prin caracter estetic, proporții și metode de obținere a formei comune, ceea ce ne face să credem că ar putea avea aceleași rădăcini și forma compleului vestimentar popular pentru bărbați -femei din perioada tracică caracterizate prin dimensiuni ale mânecii și cracului de pantalon extra-lungi [12,13].

S-a observat că modul de asamblare prin răsucire al reperului îl întâlnim la pantalonii pentru bărbați numiți cioareci din zona Bran, prezentați într-un studiu recent al formei produsului popular [14]. Cartografierea zonală în care se prezintă răspândirea pieselor costumului popular depistează că cămașa cu mâneca răsucită s-a purtat în zonele de curbură

a munților Carpați [5]. Originala croială a mânicii o întâlnim în Țara Bârsei, Făgărașul, Covasna, Bran, Muscel, Vrancea [6]. Este un model de cămașă din sec. al XV-lea, XVI-lea, care s-a menținut până în sec. al XIX-lea în teritoriul zonei etnice Vrancea, întâlnindu-se și cusută de femei, în familiile bogate, de oieri, negustori, și nu în ultimul rând influențată de moda Curților Regale din sec. al XVI-XVII-lea din vestul Europei, dar și a celei de la Curțile Domnitorilor Moldovei și Țării Românești [5,15]. Cămașa se cosea din pânză țesută în casă cu urzeala din bumbac și beteala din in. Componenta pânzei deseori varia și putea fi din cânepă și bumbac, dar și numai bumbac [15,16]. Se broda cu fir metalic intercalat în firul de culoare negru și roșu. Dar găsim descrieri în care se menționează că gama cromatică este de roșu predominant, galben subordonat, accente argintiu, aurii, albastru sau alt model cu cromatica de brun verzui predominant, galben bordo subordonat, dar și brun închis, accent de mov un al patrulea model. Motivele broderiei în cazul ieii cu mâneca răsucită sunt geometrice și florale stilizate [16]. Firul auriu/metalic, un accent obligatoriu cu care se broda o ie, se aducea din Viena din magazinele dedicate uniformelor militare [15]. La începutul celui de al doilea război mondial sa întrerupt exportul firului metalic și acesta a fost înlocuit cu mătase, cămășile pierzând din aspectul „stilului bătrânesc” regăsit în costumele în teritoriul României de până în 1925 sau perioada interbelică din sec. al XX-lea [17].

la cu mâneca răsucită a contribuit la dezvoltarea râurilor diagonali cusuți pe mâneca cămășii populare pentru femei, purtată în zonele etnice ale Republicii Moldova. În aceste cămăși frecvent întâlniți sunt râurile diagonali brodați cu răsucirea spre stânga analogic asamblării mânecii răsucite, cât și spre dreapta spre pieptul cămășii [7,8]. Mâneca răsucită este adesea un element distinctiv al anumitor regiuni și comunități, oferind indicii despre originea geografică și tradițiile specifice. Modul de răsucire, ornamentația și tehnica folosită pot varia în funcție de zonă, iar aceste detalii contribuie la identitatea culturală a purtătorului [18]. De asemenea în multe culturi, detaliile vestimentare precum mânecile răsucite puteau indica statutul social al purtătorului sau ocazia pentru care era purtat costumul (de sărbătoare, de muncă, pentru ceremonii) [5,7,19].

În moda internațională cămașa populară este frecvent reinterpretată în haute couture ca simbol al rafinementului artizanal, în moda sustenabilă ca model de valoare culturală și tradiție. Yves Saint Laurent, Jean Paul Gaultier, Dior, Carolina Herrera, etc. au folosit reinterpretarea cămășii de tip ie prin broderii bogate, croiuri fluide, materiale moderne, stiluri avangarde și simbolismul ancestral. Scopul studiului este valorificarea caracteristicilor cămășii cu mâneca răsucită în forme vestimentare actuale. Obiectivele lucrării au vizat analiza cămășii cu mâneca răsucită și elaborarea modelelor noi.

2. Materiale utilizate și metode aplicate

Lungimea reperului mânicii răsucite nu identifică lungimea corpului de produs, aceasta se drapează pe mână aleatoriu, oferind un anumit număr de spirale în dependență de lungimea tubulară a mânecii deja asamblate. Numărul cel mai frecvent întâlnit este de 4-7, maxim 8 răsuciri [4]. Cămășile populare oferă o gamă largă de mărimi pentru purtător. Cu aceeași cămașa se mergea la hora, se măritau, era îmbrăcată de femei însărcinate până în luna a noua [20]. Corpul de produs se confecționa tradițional din 3 fâșii, lățimea cărora era impusă de lățimea țesăturii de casă și varia în dependență de războiul de țesut, zonă etnografică, tipul de produs cum ar fi: pantaloni, fustă, cămașă. Analiza planșelor de croire a produselor de port popular a permis să identificăm lățimi ale pânzei: 36 cm, 40 cm, 42 cm, 44 cm, 45 cm, 46 cm, 48 cm, 50 cm, 52 cm, 59 cm, 80 cm, 85 cm. Cea mai frecvent utilizată

lățime a pânzei țesute în casă pentru confecționarea cămășilor și pantalonilor este de 40 cm [9,16,21].

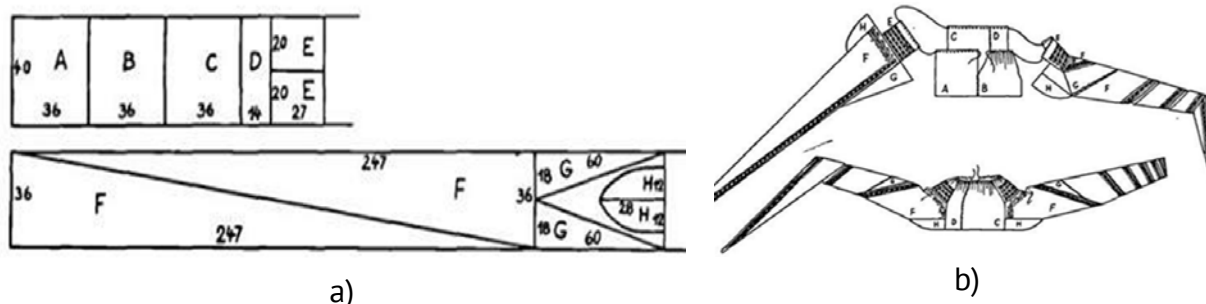


Figura 1. Ie cu mâneca răsucită -Muzeul Bruthenkal Sibiu (Modelul A), **A** și **B** „ciupagele” din față, **C**-spatele foia întreagă, **D**-spatele jumătate foaie, **E**-altiță, **F**-mâneacă, **G**-clinul mânecii, **H**-„năditura” la spate, mânecă, piesă foarte veche; a) Repere ale cămășii; b) Schema de asamblare a ieii cu mâneca răsucită.

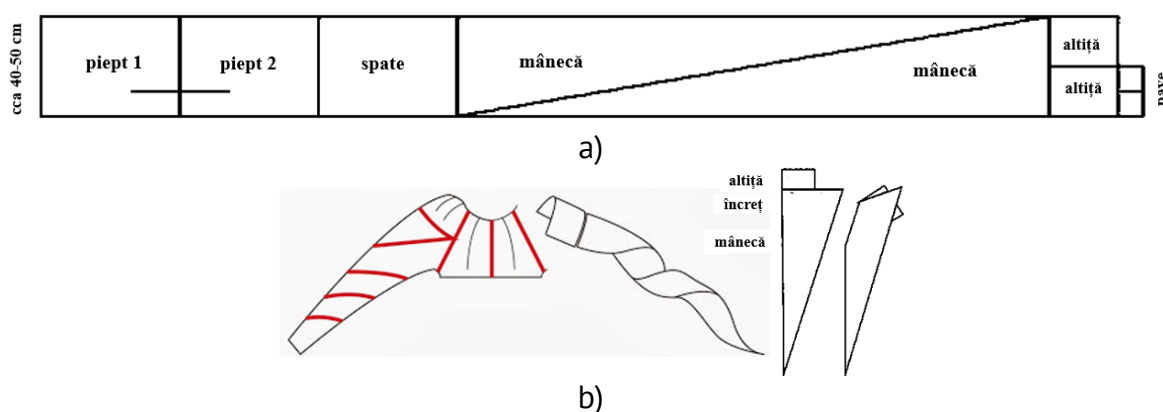


Figura 2. Ie de Vrancea cu mâneca răsucită și pava pătrată, ie din fondul Muzeului Țăranului Român (Modelul B); a) Repere ale cămășii; b) Schema de asamblare a cămășii

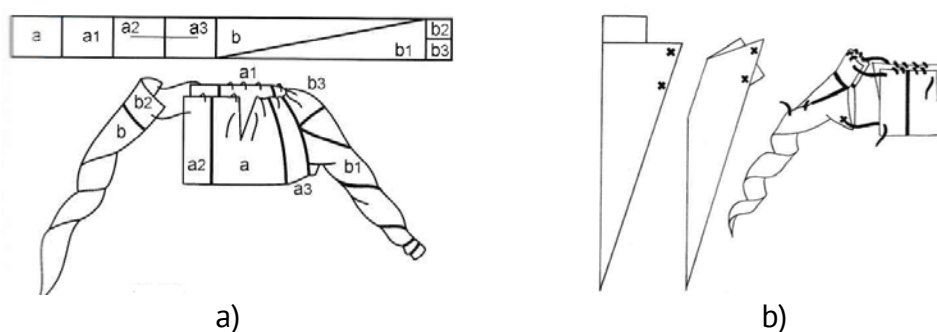


Figura 3. Ie cu mâneca răsucită (Modelul C), **a** și **a1** pieptul și spatele stanului, **a2,a3**-clinii laterali ai stanului **b2, b3**-altiță, **b, b1**-mâneacă; a) Schema de croire și asamblare a ieii; b) Formarea reperului pavă din unghiul liber al triunghiului mânecii [5].

Pentru analiza formei și modului de asamblare al reperelor sau utilizat trei modele de cămașă cu mâneca răsucită (Figurile 1-3). Acestea se deosebesc prin croială, asamblare, dimensiuni și raporturi proporționale ale reperelor cămășii. În Figura 1 se propune o cămașă croită din pânza de lățimea 36 cm, cu lungimea triunghiului mânecii de 247 cm. În Figura 2 se propune o cămașă croită din lățimea pânzei de 40-50 cm. În Figura 3 cămașă se croiește din lățimea de 40 cm.

3. Rezultate

Planșele de croire și asamblare a portului popular oferite de sursele bibliografice cât și meșterii populari foarte frecvent sunt puțin informative, dar și destul de diverse, deseori contradictorii. Principiul modular de croire ale detaliilor, dependent de lățimea pânzei țesute în casă, utilizat în croirea produselor costumului popular ne-a condus către identificarea coeficienților de proporționalitate care ne vor permite să stabilim dimensiunile detaliilor cămășii. Utilizarea softului 3D ne va permite identificarea mărimii produsului. Modelele din Figurile 1-3 convențional se vor numi A, B, C. Coeficientul de proporționalitate (CP) se propune să se determine prin raportul dintre lungimea reperelor către lățimea pânzei țesute în casă pentru modelul A unde sunt indicate dimensiunile reperelor și același raport al reperelor măsurate în cm din schemele modelelor B și C, considerate a fi la scară. Dimensiunile obținute ale reperelor cămășilor din Figurile 1-3, cât și coeficienții utilizați sunt prezentate în Tabelul 1.

Tabelul 1

Dimensiuni ale reperelor cămășii de tip ie cu mâneca răsucită

Lățimea pânzei, cm	Lungimea reperului, cm									
	Față	Spate	Clinul lateral	Mâncă	Pava clin mâncă	Pava	Alțița	Lățimea clinului mâneții	Tăietura pavă	Lățimea alțiței
Modelul A (Figura 1)										
CP	1,11	1,11	-	6,86	1,66	0,77	0,75	0,50	-	L. stan/2
36*	40	40	-	247	60	28	27	18	-	40/2=20
Modelul B (Figura 2)										
CP	1,35	1,35	-	5,70	-	0,25	0,50	-	0,25	0,65
46*	62,10	62,10	-	262,2	-	11,5	23	-	11,5	29,9
Modelul C (Figura 3)										
CP	1,25	1,25	1,25	5,25	-	-	0,50	-	-	0,625
40*	50	50	50	210	-	-	20	-	-	25
45	56,25	56,25	56,25	236,25	-	-	22,50	-	-	28,125
50	62,50	62,50	62,50	262,50	-	-	25	-	-	31,25
55	68,75	68,75	68,75	288,75	-	-	27,50	-	-	34,375
60	75	75	75	315	-	-	30	-	-	37,50

Pentru Modelul C, Figura 3 se prezintă dimensiunile reperelor pentru materialele de lățimea 45 cm, 50 cm, 55 cm, 60 cm, calcul realizat pentru a păstra proporțiile formei, precum și utiliza materiale de diverse lățimi. Dar analiza rezultatelor sugerează că lățimea pânzei de 55-60 cm nu este relevantă pentru coeficienții calculați și lungimea reperelor este necesar de adaptat către dimensiunile antropometrice ale corpului sau a mari gama de mărimi a produselor. Analiza dimensiunilor reperelor evocă că pentru lățimea pânzei de 55 cm va fi necesar de ales un manechin de înălțimea mult mai mare, mai rar întâlnit în rândul populației.

3.1. Analiza formei și metodelor de asamblare a modelelor de ie cu mâneca răsucită

Analiza mai multor surse cât și modele de cămăși populare a identificat diverse metode de asamblare a reperului pavă. În cămașa cu mâneca răsucită tradițional linia de broderie se

amplasează pe cateta mare a triunghiului detaliului mânecii cămășii sau pe firul de urzeală care la rândul său impune rotirea mânecii și amplasarea altiței (Figurile 1-3). În acest studiu

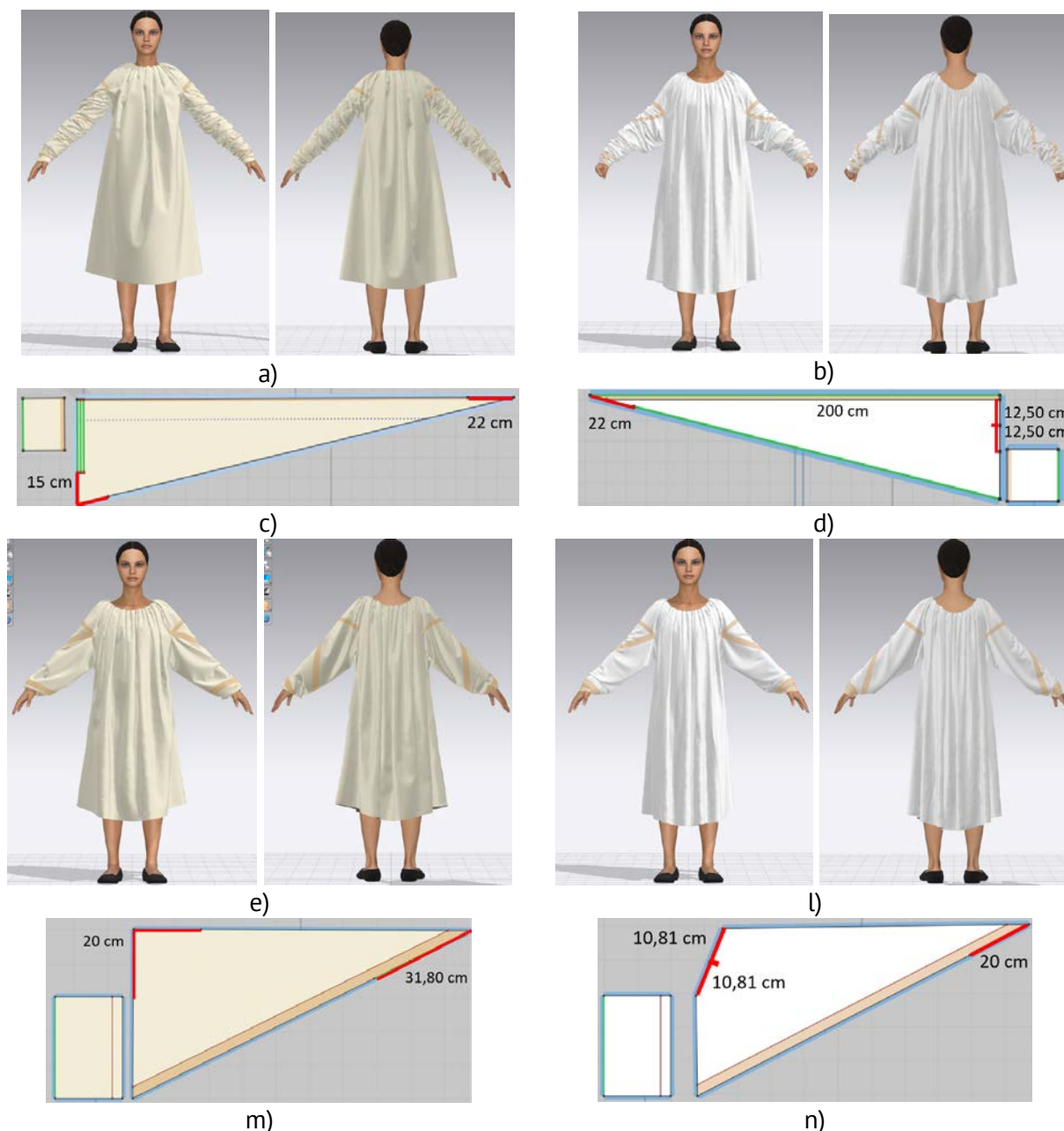


Figura 4. Simularea digitală a cămășii cu mâneca răsucită vedere față, spate: a) modelul C-M1, mărimea 170-88-96; b) modelul C-M2, mărimea 164-80-92; e) modelul stilizat M3a, mărimea 164-80-92; l) modelul stilizat M3b, mărimea 164-80-92. Dimensiuni și asamblare ale reperelor: mânecă, pavă și altiță -c), d), m), n). (Elaborat de autori)

sunt prezentate modele de ie unde altița este poziționată către linia catetei mânecii (Figurile 4j, 5c, 5j). Brățara mânecii variază ca poziție fiind pe linia catetei triunghiului mânecii și ipotenuza. În final au fost analizate opt modele de ie utilizând softul CLO 3d [22]. În Figura 4a se prezintă cămașa cusută din pânza de lățimea 40 cm, Figura 4b cămașa cusută din pânza de lățimea 50 cm, în Figura 4e, 4l se prezintă aceeași cămașă din pânza de lățimea 50 cm, dar cu altița și brățara pe linia ipotenuzei și pava proiectată diferit caz în care pentru modelul M3b mâneca este mai puțin largă, dar mai lungă și se răsucește în trei spine.

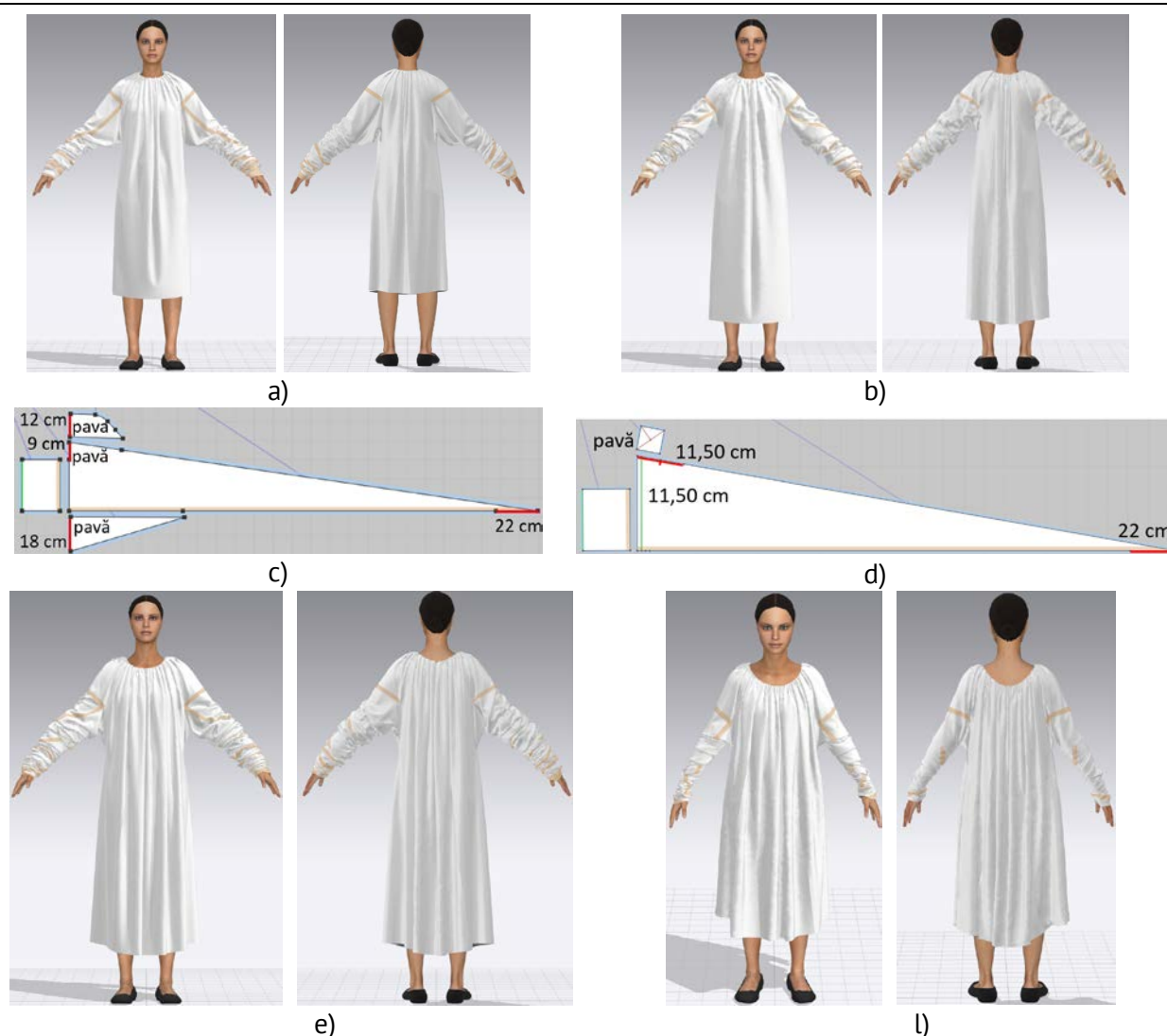


Figura 5. Simularea digitală a cămășii cu mâneca răsucită vedere față, spate: a) modelul A-M4, mărimea 176-80-96; b) modelul B-M5, mărimea 176-80-96; e) modelul C-M6, mărimea 194-88-104; l) modelul M7, mâneca răsucită spre dreapta, mărimea 164-80-92. Dimensiuni și asamblare ale reperelor: mânecă, pavă și altiță – c), d). (Elaborat de autori)

În Figura 5a se prezintă cămașa cusută din pânza de lățimea 36 cm, modelul A-M4 (croit după modelul A din Figura 1) cu lungimea catetei reperului de mânecă de 247 cm. Brățara mânecii se formează pe cateta mare, perimetrul brățării este de 22 cm. Mâneca cămășii se completează cu două repere de pavă croite separat. Colțul reperului mânecii completează pava spatelui. În Figura 5b se prezintă modelul de cămașa B-M5 (croit după modelul B, Figura 2) cusut din pânza de lățimea 46 cm, cu lungimea catetei reperului de mânecă de 262,20 cm. Mâneca este cu pavă pătrată croită separat. În Figura 5e se prezintă cămașa C-M6 (croită după modelul C, Figura 3) cusută din pânza de lățimea 55 cm cu lungimea catetei reperului de mânecă de 288,75 cm. Dimensiunile reperelor sunt preluate din Tabelul 1, pentru pânza de lățimea 55 cm. În Figura 5l se prezintă cămașa cusută din pânza de lățimea 55 cm, analogică modelului C-M2 (Figura 4b), dar cu mâneca răsucită în direcție inversă, spre dreapta. Pentru mâneca răsucită se prezintă cinci metode de amplasare a reperului pavă. Pava în cămașa cu mâneca răsucită se poate forma din corpul reperului de mânecă (Figura 4), poate fi croită separat (Figura 5 d) sau compune din mai multe repere, cum ar fi: două croite separat și al treilea croit integral cu corpul reperului de mânecă (Figura 5 c).

În Figurile 4, 5 sunt indicate valorile dimensionale ale laturilor pavei și marcate reperele sau zona pavei. Modul de amplasare, forma și numărul de repere pavă impune asamblarea și forma mânecii. În Figura 4m, 4n autorii prezintă un alt mod de amplasare a pavei care impune asamblarea altiței către colțul ascuțit al reperului triunghi al mânecii.

3.2. Analiza parametrilor constructivi ai cămășilor cu mâneca răsucită

În Tabelul 2 se prezintă parametrii constructivi, parametrii de formă produs și numărul de spire în jurul mâinii oferite de modelele de cămașă analizate în acest studiu.

Tabelul 2

Parametrii constructivi ai mânecii răsucite croite din materiale de diferite lățimi

Modelul de ie, mărimea, figura	Lățimea pânzei, cm	Înălțimea și lățimea altiței (x1), cm	Dimensiunile reperului triunghi al mânecii, lungime/ lățime/ ipotenuză (L-x1-xi), cm	Parametrii forma-produs, Lungimea mânecii cusute, fără altiță, cm	Caracteristică dimensională -lungimea mâinii (Lm), cm	Numărul de răsuciri/spire în jurul mâinii
Modelul C - croit după cămașa din Figura 3						
le C-M1 de mărimea 170-88-96, Figura 4a	40	20×25	210×40×215,87	153,95	57,11	7
le C-M2 de mărimea 164-80-92, Figura 4b	50	25×25	200×50×206,16	140,20	54,94	7
le C-M6 de mărimea 194-88-104, Figura 5e	55	27,50×34,40	288×55×293,20	207,92	64,98	8
Modelul B - croit după cămașa din Figura 2						
le B-M5 de mărimea 176-80-96, Figura 5b	46	23×29,90	262,20×46×266,20	177,13	58,93	8
Modelul A - croit după cămașa din Figura 1						
le A-M4 de mărimea 176-80-96, Figura 5a	36	20×27	247×36×249,61	151,03	58,93	7
Cămașa stilizată-repere și asamblare adaptate						
le M3a de mărimea 164-80-92, Figura 4e	50	20×30	110×50×111,80	52,28	54,94	3
le M3b de mărimea 164-80-92, Figura 4l	50	20×30	110×50×111,80	70,16	54,94	4
le M7 de mărimea 164-80-92, Figura 5l	50	25×30	120×50×130	90,31	54,94	3

Reperul de forma triunghi al mânecii se poate numi atemporal și universal din punct de vedere al dimensiunii formeii. Dimensiunile reperului nu reflectă caracteristicile antropometrice ale mâinii. În tabelul 2 se prezintă lungimea mânecii de formă tubulară, asamblată din reperul triunghiular al mânecii de dimensiuni concrete care pentru mărimea produsului indicată formează un anumit număr de spire.

4. Discuții

În zilele noastre tendințele de economie verde, perfecționarea și dezvoltarea mecanismelor prin aplicarea sistemelor de funcționare a sistemelor vii în diverse domenii cum ar fi: arhitectură, cibernetică, automobile, vestimentație, etc. tot mai mult ne conduc

către analiza modului de utilizare a resurselor naturale de strămoșii noștri care întrebuițau tot ce se poate reproduce practic pe durata unei vieți umane. Cultura practicilor vestimentare, în special ale costumului popular, a provocat interesul mai multor cercetători, dat fiind faptul că acesta este componenta fundamentală a artei populare care ilustrează principiul unității în diversitate, păstrând particularitățile etnice și trăsăturile de cultură și civilizație [23]. Costumul popular este o sursă de ne etalat care astăzi sugerează idei prin modul de utilizare a coloranților naturali, modului de țesere a pânzei de casă și desigur formă, croială, decor care întrunesc cerințele designului durabil. Societatea Republicii Moldova a început să recunoască cămășile cusute manual prin participarea la șezători sau purtate la evenimente precum cununii, nunți, cumetrii, festivaluri, sărbători folclorice, etc. [24,25].



Figura 6. Produse de tip bluză cu mâneca răsucită; a) cu altiță- mâneca modelului M3b, M3a; b) fără altiță - mâneca modelului M3a adaptată la corpul de produs contemporan; c) vedere în ansamblu al bluzei cu mâneca cu altiță al modelului M3a. (Elaborat de autori)

În costumul popular autentic mâneca este lungă și acoperă mâna în întregime pentru a proteja de cald, frig, etc. De aceea mâneca răsucită se potrivește cât pentru sezonul cald atât pentru sezonul rece la confecționarea produsului din materiale corespunzătoare. Pentru diversificarea aspectului estetic prin adaptarea caracteristicilor constructivi într-un produs de îmbrăcăminte de diferit tip cum ar fi bluză, jachetă, palton, rochie se propune utilizarea mâneicii răsucite a costumului popular. În Figura 6 sunt prezentate produse de tip bluze realizate în baza tiparului oferit de softul CLO 3D adaptat către reperele mâneicii răsucite a modelului ie stilizate M3a și M3b.

5. Concluzii

În acest articol s-au analizat: istoria și dezvoltarea, localizarea geografică, componența fibroasă a pânzei, diversitatea lățimii pânzei țesute în casă, forma și croiala a 11 modele cu mâneca răsucită simulate digital în CLO 3D, mărimi ale modelelor asamblate după planșele de croire oferite de sursele etnografice, coeficienți de proporționalitate obținuți pe bază planșelor de croire utilizați la confecționarea cămășilor de tip "ie" cu mâneca răsucită. În urma studiului se poate afirma:

- Cămașa cu mâneca răsucită are o istorie bogată, localizată într-un teritoriu destul de restrâns în zonele de curbură a muncilor Carpați. Este o cămașă considerată mai mult domnească datorită caracteristicilor estetice, cât și consumului de materiale la prima vedere. Dar aspectul estetic de răsucire în spirală a broderiei a demonstrat contrariul fiind preluat de meșterițe și anume în amplasarea râurilor diagonali foarte frecvent întâlnit în cămășile populare din Republica Moldova. Astăzi cămașa se regăsește în expozițiile muzeelor etnografice, în colecțiile individuale și în calitate de produs de port popular restabilit. Datorită aspectului estetic și caracterului de răspândire în glumă este numită cămașa „ambasadoarelor”. Deși de o răspândire destul de modestă, încă se mai regăsesc trei metode de croire a mânecii acestei cămăși care prin simulare digitală în CLO 3D dovedește calități estetice deosebite, eleganță și confort în purtare.
- Cămașa se confecționează din pânză țesută în casă cu compoziția în și bumbac, cânepă și bumbac sau numai bumbac, țesături destul de robuste. Lățimea textilelor țesute în casă putea fi foarte diferită. Lățimea optimă pentru confecționarea cămășii cu mâneca răsucită ar fi: 36 cm -50 cm. Reperul triunghi al mânicii cămășii cât și modul spiralat de asamblare nu denotă lungimea tubulară a mânicii gata, cât și numărul de spire posibil de format. Caracteristicile de formă și dimensiuni obținute la croirea cămășii cu mâneca răsucită din materiale de diferite lățimi au fost prezentați în tabelul 2. Dimensiunile reperelor cămășilor cu mâneca răsucită pentru trei modele A, B, C sunt prezentate în Tabelul 1.
- Cămașa cu mâneca răsucită oferă o gamă destul de largă de mărimi și talii datorită mânecii extralungi răsucite, reperului pavă și piepților produsului cu volum generos care se putea purta de femei pe durata întregii vieți, în diferite stări pe care le putea avea. În Tabelul 2, dar și figurile de simulare digitală a cămășii se prezintă mărimile produsului prin trei caracteristici dimensionale: Înălțimea corpului- Îc, Perimetrul bustului III-Pb III, Perimetrul șoldurilor incluzând proeminența abdominală-Pș.
- Au fost prezentate mai multe posibilități de asamblare, croire a reperului pavă în zona sub axilară a brațului mâinii cât și două metode de asamblare a altiței-una tradițională cu amplasarea altiței în colțul cu unghiul drept al reperului mânicii, alta în colțul cu unghiul ascuțit al reperului mânicii, modelul M3b, M3a.
- Diversitatea sortimentală, complexitatea estetică, compozițională a produselor contemporane impune căutarea metodelor de dezvoltare a formei îmbrăcăminte. În Figura 6 se prezintă modelele stilizate M3a și M3b diversitatea căror s-a atins prin valorificarea caracteristicilor cămășii cu mâneca răsucită în forme vestimentare actuale. Forma produsului bluză s-a obținut prin adaptarea răscoielii mânecii în construcția inițială de model.
- Analiza rezultatelor sugerează că lățimea pânzei de 55 cm-60 cm nu este relevantă pentru coeficienții calculați și lungimea reperelor este necesar de adaptat către dimensiunile antropometrice ale corpului cum ar fi lungimea piepților/corsajului. Pentru lățimea pânzei de 55 cm s-a ales manechinul de mărimea 194-88-104, mai rar întâlnit în rândul populației (Figura 5e, modelul C-M6). Mâneca se obține destul de largă și poate exagerat de lungă deși nu se exclude și un astfel de model.
- Brățara mânecii se recomandă să fie formată pe linia catetei mari al reperului triunghiului sau pe firul drept care va menține dimensiunea brățării mai stabilă, plus pe firul drept mai frecvent se amplasează broderia pe fire numărate cusută manual, deși nu se exclude

și o altă amplasare dacă se prelucrează cu bieul brodat, croit separat, care va avea același rol de protecție și decor, etc.

- Cămașa cu mâneca răsucită este un model destul de complex cât realizat fizic, dar și simulat digital. Simularea digitală a tipurilor de îmbrăcăminte contribuie la formarea bazelor de date sau formarea produselor baza în scop de utilizare ulterioară. Au fost modelate în format digital unsprezece cămăși cu mâneca răsucită (Figurile 4-6) și revitalizate trei modele bază C-M1, B-M5, A-M4.

Acknowledgments: This analysis was carried out within the sub-program 020408, Research on Ensuring Sustainable Development and Increasing Competitiveness of the Republic of Moldova in a European Context.

Conflicts of Interest: The authors declare no conflict of interest.

Referințe

1. Vrancea Altfel. De ce era unică ia străveche de Vrancea. November 6, 2019. Available online: <https://vranceaaltfel.ro/2019/11/06/de-ce-era-unica-ia-straveche-de-vrancea/> (accessed on 07/07/2025).
2. Ia rădăcini spre infinit. Expoziție de cămăși tradiționale cusute ieri și azi. 21 iunie-20 iulie, 2024. Facultatea Urbanism și Arhitectură, UTM, Chizinau. Available online: https://maiestria.com/radacini_spre_infinit/ (accessed on 07/07/2025).
3. Corduneanu, I.; Badiu, A.M. A-14 mâneci răsucite. Content Course. Available online: <https://semnecusute.com/courses/courses/a14-camasi-cu-maneca-rasucita/> (accessed on 07/07/2025).
4. Corduneanu, I. Ioana și cămașa de Bran cu mâneca răsucită în Muzeul National al Țăranului Român. Available online: <https://www.youtube.com/watch?v=39zgsvGAolw> (accessed on 07/07/2025).
5. Buzilă, V. *Retorica vestimentară: cămașa cu altiță: (valorificând colecțiile Muzeului National de Etnografie și istorie Naturală și contextul realităților culturale)*. Ministerul Culturii al Republicii Moldova, Muzeul Național de Etnografie și Istorie Naturală, Chișinău, RM, 2022. 311 p.
6. Buzilă, V. *Creatori, purtători și admiratori ai costumului tradițional în secolul al XXI-lea*. Muzeul Național de Etnografie și Istorie Naturală. Epigraf, Chișinău, RM, 2022, 264p.
7. Formagiu, H-M. *Portul popular din România*. Alcor Edimpex, București, România, 2021, 253 p.
8. Negrilă, A. Etnotique. Portul popular din zona Muscel-camașa cu mâneca răsucită. 2019. Available online: <https://etnotique.ro/portul-popular-din-zona-muscel-camasa-cu-maneca-rasucita/> (accessed on 08/07/2025).
9. Buzilă, V. *Costumul popular din Republica Moldova*. Ghid practic. Chișinău, RM, 2011, 170 p.
10. Cangaș, S. *Elemente de compunere estetică a îmbrăcăminteii cu diverse destinații*. Indicații metodice pentru lucrările de laborator nr.5-8/Universitatea Tehnică a Moldovei. Facultatea de Design. Tehnica-UTM, Chișinău, RM, 2024. 52p.
11. Popescu-Prelipceanu, A. E. *Misterul Monumentului Antic de la Adamclisi*. Brumărel, București, România, 2018. pp. 18-19. 105 p.
12. Șofranksy, Z. Frumosul în arta tradițională. *Revista de Etnologie și Culturologie* 2016, 20, pp. 8-17.
13. Șofranksy, Z. Privire generală asupra germenilor artei tradiționale românești în spațiul pruto-nistean (din cele mai vechi timpuri până la finele evului mediu). *Revisita de etnologie* 1995, 1, pp. 21-30.
14. Cangaș, S.; Florea-Burduja, E. Analiza metodelor de croire a îmbrăcăminteii portului popular românesc. In: *Materialele Conferinței Științifice Internaționale "Tradiții. Tehnologii. Simboluri"*, May 25-26, 2023, Chisinau, RM, 2023, pp. 116-124.
15. Ilea, S. Camașa cu mâneca răsucită, ia de două sute de ani, Available online: <https://www.digi24.ro/magazin/timp-liber/cultura/camasa-cu-maneca-rasucita-ia-de-doua-sute-de-ani-484446> (accessed on 08/07/2025).
16. Muzeul etnografic al Transilvaniei - Cluj-Napoca. Bunuri culturale mobile clasate în Patrimoniul Cultural Național. Ie cu mâneca răsucită nr.de inventar 4591, 4559, 4534. Available online: <https://clasate.cimec.ro/Detaliu.asp?tit=camasa-femeiasca-fara-poale--le-camasa-cu-maneca-rasucita&k=5592A9079F0E472FAE813767CE4C29EB> (accessed on 08/05/2025).
17. Dumitrescu, N. Motive populare din România, Vrancea. Colectia lui Nelu Dumitrescu. Available online : <https://motivepopulare.cimec.ro/colectia-nelu-dumitrescu/> (accessed on 08/05/2025).

18. Kalashnikova, N. Vystavki narodnogo kostyuma v Rossiyskom etnograficheskom muzeye (Sankt-Peterburg). *Revista de Etnologie și Culturologie* 2024, 36, pp. 64-70.
19. Spânu, C. Arta decorativă din RSS Moldovenească: anii 1944-1991. Epigraf, Chișinău, RM, 2018. 560 p.
20. Atanasoaie, N. Cum se coase o ie. Care sunt etapele de cusut și cât durează. Mai 03, 2025. Available online : <https://ocaua.ro/blog/ie-nationala/cum-se-coase-ie-care-sunt-etapele-cusut-cat-dureaza> (accessed on 07/07/2025).
21. Petrescu, P. Costumul popular Romînesc din Transilvania și Banat. Didactică și Pedagogică, București, România, 1959. 144 p.
22. CLO 3D Fashion Design Software. Available online: <https://www.clo3d.com/en/> (accessed on 09/04/2025).
23. Bujorean, T. Coordonatele dezvoltării costumului popular din Basarabia și RSS Moldovenească: repere istoriografice și surse de documentare. In: *Materialele conferinței științifice internaționale "Patrimoniul cultural de ieri – implicații în dezvoltarea societății de mâine"*, Iași-Chișinău, 2024, 7, pp. 559-573.
24. Ețcu, E. Motive vegetale florale în costumul traditional românesc. In: *Materialele conferinței științifice internaționale „Tradiții. Tehnologii. Simboluri.”*, 25-26 mai 2023, pp. 149-153.
25. Enachi, O. Reactualizarea cămășii cu altiță de către membrii comunității „Șezătoarea Basarabia”. In: *Materialele conferinței științifice internaționale „Tradiții. Tehnologii. Simboluri.”*, 25-26 mai 2023, pp. 276-280.

Citation: Cangaș, S.; Florea-Burduja, E.; Raru A. Popular wear a source of creation in the development of modern clothing forms. *Journal of Social Sciences*, 8 (3), pp. 87-98. [https://doi.org/10.52326/jss.utm.2025.8\(3\).07](https://doi.org/10.52326/jss.utm.2025.8(3).07).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright:© 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

Following publication (pp. 99-109), it was identified that this article made use of generative artificial intelligence in the preparation of the manuscript. In accordance with the journal's editorial policies, the article has been removed from the journal. This page serves to notify readers of the article's exclusion and the reason for this decision.

[https://doi.org/10.52326/jss.utm.2025.8\(3\).09](https://doi.org/10.52326/jss.utm.2025.8(3).09)
CZU 37.013.42:005.336.2



THE PROFESSIONAL ADAPTATION OF NOVICE TEACHERS DURING THE TRANSITION FROM UNIVERSITY TO THE SCHOOL ENVIRONMENT

Mariana Goras *, ORCID: 0009-0001-2450-7936

„Ion Creangă” State Pedagogical University, 1 Ion Creangă Str., Chisinau, Republic of Moldova

* Corresponding author: Mariana Goras, mariana.goras@yahoo.com

Received: 08. 05. 2025

Accepted: 09. 02. 2025

Abstract. The study was conducted based on recent research in the field that emphasizes the importance of the transition phenomenon in the teaching career. The study addressed the issue of adaptation of novice teachers, and findings were noted regarding the transition of young specialists in the process of adapting to the conditions of the educational system. Transition represents a series of changes that novices perceive, moving from the student level where they have assimilated knowledge to the teacher level where they translate the theoretical part into practice, apply knowledge and skills in student groups. The study hypothesized that determining the level of professional adaptation to changes of novices during the transition period in the school environment and covering their needs can optimize the professional adaptation process. The purpose of the research was to determine the level of adaptation to changes of novice teachers during the transition period in the school environment. 97 young specialists participated in the study. It was found that the needs expressed by beginners in the process of professional adaptation in the school environment are multiple and require the provision of solutions to optimize the professional adaptation process. The conclusions of the study highlighted results regarding the analysis of the level of professional adaptation at the beginning of the teaching career and recommendations regarding the implementation of measures to prevent maladaptation, optimize the professional adaptation process and facilitate the transition phenomenon of beginners in the school environment.

Keywords: *professional adaptation, transition, beginner teachers, debutants, professional development.*

Rezumat. Studiul a fost realizat reieșind din cercetările recente din domeniu care accentuează importanța fenomenului de tranziție în cariera didactică. Prin studiu s-a abordat problematica adaptării cadrelor didactice debutante, s-au remarcat constatări referitoare la tranziția tinerilor specialiști în procesul de adaptare la condițiile sistemului educațional. Tranziția reprezintă un șir de schimbări pe care le percep debutanții, trecând de la nivelul de student unde au asimilat cunoștințe la nivelul de profesor unde transpun partea teoretică în practică, aplică cunoștințele și competențele în colectivele de elevi. Studiul a emis ipoteza că, determinarea nivelului de adaptare profesională la schimbări al debutanților în perioada de

tranziție în mediul școlar și acoperirea nevoilor acestora, pot optimiza procesul de adaptare profesională. Scopul cercetării a constat în determinarea nivelului de adaptare la schimbări al cadrelor didactice debutante în perioada de tranziție în mediul școlar. În realizarea studiului au participat 97 de tineri specialiști. S-a constatat că nevoile manifestate de debutanți în procesul de adaptare profesională în mediul școlar sunt multiple și necesită oferirea unor soluții pentru optimizarea procesului de adaptare profesională. Concluziile studiului au evidențiat rezultate privind analiza nivelului de adaptare profesională la începutul carierei didactice și recomandări privind întreprinderea măsurilor de prevenire a inadapării, de optimizare a procesului de adaptare profesională și de facilitare a fenomenului de tranziție al debutanților în mediul școlar.

Cuvinte-cheie: *adaptare profesională, tranziție, cadre didactice debutante, debutanți, dezvoltare profesională.*

1. Introducere

În ultimii ani, preocupările privind modernizarea sistemului educațional au cunoscut o creștere semnificativă, reflectând nevoia stringentă de a adapta educația la realitățile și cerințele unei societăți aflate într-o continuă schimbare. Tendințele actuale vizează alinierea structurilor educaționale la standardele internaționale și la bunele practici implementate cu succes în țări cu sisteme educaționale avansate, precum Finlanda [1, 2], Estonia [3, 4] și România [5]. Astfel de modele oferă exemple relevante de eficiență, flexibilitate și orientare spre nevoile atât a cadrelor didactice, cât și ale elevilor și ale societății. Prin adaptarea constantă la provocările economice, sociale, tehnologice și ecologice ale lumii contemporane, aceste sisteme educaționale devin factori determinanți necesari în formarea tinerei generații pentru dezvoltarea sustenabilă într-un context global în continuă schimbare. Este vital ca sistemul educațional să evolueze într-un ritm susținut, astfel încât să poată oferi răspunsuri pertinente și soluții durabile la problemele contemporane. Procesul de dezvoltare a educației trebuie să pună accent pe calitate, echitate și incluziune, fundamentându-se pe valorile și principiile europene. Reieșind din ideile expuse, se înțelege că problematica generală a educației devine mai pronunțată în ceea ce privește nevoia de atragere și de menținere a tinerilor specialiști în sistemul educațional, amplificarea necesităților de adaptare profesională a cadrelor didactice debutante în mediul școlar, de afirmare și integrare socioprofesională în sistemul educațional. În condițiile existente, realizăm că în sistemul educațional se necesită, la nivel național, o ascensiune a dezvoltării sistemului de valori pedagogice, o creștere a cerințelor psihopedagogice pentru justificarea experienței pedagogice de succes și se accentuează condițiile necesare pentru promovarea bunelor practici în educația tinerei generații de elevi.

În context, pentru realizarea dezideratului pe linia evoluției sistemului educațional, sunt necesare acțiuni strategice care să întărească pilonii pe dimensiunile educației ce țin de: asigurarea modernizării continue a procesului educațional, ridicarea nivelului calității în educație, formarea profesională continuă a cadrelor didactice în domeniile necesare, etc., care în ansamblu, toate au la bază tentative de o schimbare continuă și transformare cu efecte evidente asupra cadrelor didactice.

În contextul provocărilor actuale din sistemul educațional, devine evident că adaptarea profesională a cadrelor didactice debutante presupune optimizarea continuă a acestui proces, în acord cu cerințele și schimbările permanente din mediul școlar și din societate. Aceste transformări, generate de noi idei, concepții și reforme, impun o abordare

flexibilă și coerentă. Astfel, viziunea strategică a abordării este centrată pe necesitatea menținerii unui echilibru între toți indicatorii și factorii care influențează adaptarea profesională, sprijinind totodată dezvoltarea continuă a tinerilor profesori în vederea consolidării progresului lor în activitatea pedagogică. Cu certitudine că, documentele strategice de politici publice puse în aplicare recent, precum Strategia de dezvoltare *Educația 2030* și Programul de implementare a acesteia pentru anii 2023-2025 [6], aprobate prin Hotărârea Guvernului nr. 114 din 7 martie 2023 și **Strategia națională de dezvoltare *Moldova Europeană 2030*** [7], **aprobată prin Legea 315 din 17 noiembrie 2022** prevăd acțiuni consolidate, de nivel intersectorial, sectorial și național care sunt orientate să sprijine profesional tinerii specialiști pe tot parcursul carierei, să contribuie la dezvoltarea continuă a cadrelor didactice și manageriale, pentru asigurarea sistemului educațional cu personal calificat, competent și motivat.

Urmare a ideilor expuse, toate provocările și tendințele moderne abordate în contextul dezvoltării sistemului educațional, intensifică indicatorii adaptării în diverse aspecte:

1) În aspect pedagogic, cadrele didactice debutante tot mai mult se confruntă cu necesitatea de adaptare profesională, în mod special, se accentuează indicatorul la debutul carierei pedagogice, odată cu tranziția din mediul universitar în mediul școlar, cu axarea pe abordările pedagogice fundamentale, implicarea zilnică a tinerilor specialiști în activități didactice și educaționale în contextul exercitării profesiei de pedagog.

2) În aspect social, un indicator perceput de către debutanți în perioada adaptării, care reflectă legătura și condiționarea reciprocă între mediul social și mediul intern prin prisma proceselor de socializare care se desfășoară în interiorul organismului uman pentru a face față adaptării profesionale. În acest aspect, adaptarea profesională a cadrelor didactice debutante ne orientează spre a înțelege, dacă reușește tânărul specialist cu studii superioare să răspundă unui grup de cerințe și condiții psihopedagogice existente în mediul școlar, în rândul cărora pot fi menționate: comportamentul și responsabilitatea profesională, formarea atitudinilor pedagogice de predare-învățare-evaluare, acumularea noilor abilități și deprinderi necesare integrării socioprofesionale, manifestarea culturii organizaționale etc.

3) În aspect psihologic, se urmărește un alt indicator al adaptării, axat pe schimbarea comportamentului individului la condițiile create în noul mediu și argumentat în lucrările cercetătorilor interesați de dimensiunile psihologice, prin manifestările individuale de comportament în situațiile noi oferite de către mediul în care activează, precum și reacția individului în relația dintre propriul organism și mediu.

Suplimentar la cele expuse, este de menționat că în procesul de adaptare profesională a tinerilor specialiști în mediul școlar, paralel cu influența indicatorilor adaptării asupra personalității, mediul școlar oferă oportunitatea debutanților să dobândească competențe profesionale practice în timp rezonabil. În context, impactul adaptării profesionale este valoros asupra dezvoltării profesionale a cadrului didactic pentru consolidarea potențialului uman pedagogic, dar și asupra așteptărilor individuale privind dezvoltarea carierei pedagogice. În consecință, adaptarea profesională a debutanților contribuie la asigurarea integrării profesionale în mediul educațional, motivându-i pentru creșterea, dezvoltarea profesională și menținerea în activitatea educațională, formându-le încrederea și devotamentul față de cultura organizațională a sistemului de învățământ.

Așadar, în esența documentelor de politici educaționale, scopul strategic **constă în oferirea de oportunități pentru toți oamenii de a-și dezvolta deprinderile, cunoștințele, abilitățile și competențele necesare pentru a-și valorifica mai bine potențialul atât în plan**

profesional, cât și în plan personal. Prin urmare, în sistemul educațional din Republica Moldova, în plan teoretic, accentul este plasat pe abordarea educațională prospectivă în contextul susținerii cadrelor didactice pe tot parcursul carierei pedagogice. Totodată, la modul practic, se pune accent pe implementarea programelor de mentorat optând pentru trecerea de la achiziționarea cunoștințelor teoretice la formarea și dezvoltarea competențelor profesionale și personale pentru motivare privind profesia aleasă, pentru acumularea reușită a experienței pedagogice și avansarea în carieră, dar și pentru prevenirea insuccesului cu referire la integrarea profesională în mediul educațional.

Actualmente, organizarea programelor de mentorat sunt orientate spre pregătirea mentorilor naționali și instituționali care să poată demonstra potențialul în desfășurarea stagiilor de formare profesională prin consolidarea și modernizarea proceselor de formare continuă a cadrelor didactice și manageriale, prin valorificarea competențelor profesionale a acestora pentru o mai bună integrare profesională în mediul educațional. În același timp, în ceea ce privește formarea cadrelor didactice debutante pentru dezvoltarea abilităților, capacităților și competențelor profesionale în vederea facilitării procesului de adaptare profesională, există rezerve, deoarece lipsesc astfel de programe și cursuri ce vizează direct satisfacerea nevoilor cu care se confruntă debutanții aflați în procesul de tranziție din mediul universitar în mediul școlar și care să contribuie la optimizarea procesului de adaptare profesională a cadrelor didactice debutante în mediul școlar.

În esența orientărilor teoretice și din perspectiva practicii managementului resurselor umane, în Republica Moldova mai mulți cercetători și-au adus aportul în abordarea conceptului de adaptare profesională din diverse aspecte, avansând cercetări cu caracter inovator și relevant.

Sunt de menționat studiile realizate de autorii L. Grishanov și V. Țurcan care s-au axat pe probleme sociale de adaptare a studenților din primii ani, anul 1990 [8]. Cercetătorii N. Bucun, S. Mustăță, V. Guțu și Gh. Rudic au confirmat în baza rezultatele cercetărilor efectuate că problema adaptării a fost studiată mai detaliat în biologie și medicină doar în situații limită și mai puțin în pedagogie, în procesul instructiv-educativ, anul 1997 [9]. Un interes deosebit a manifestat M. Pleșca cercetând mecanismele psihologice de bază ce influențează adaptarea studenților în activitatea de învățare, anul 2002 [10]. Autoarea E. Țarnă a fost preocupată de cercetarea problemelor și impactul lor asupra procesului de adaptare în rândul studenților din mediul universitar, anul 2013 [11]. În cadrul cercetărilor sale, S. Rusnac și V. Verdeș au identificat particularitățile adaptării social-psihologice în perioada crizei vârstei adulte, anul 2015 [12]. Autoarea E. Puzur a stabilit în baza rezultatelor cercetării, interacțiunea dintre particularitățile de personalitate ale studenților anului I din instituțiile de învățământ superior și procesul de adaptare psihosocială al acestora, anul 2016 [13]. Un șir de abordări teoretice au fost examinate de către O. Paladi care au stat la baza determinării orientărilor valorice și adaptării psihosociale la vârsta adolescenței, anul 2021 [14].

În România problematica adaptării în mediul educațional la diverse niveluri a devenit o preocupare a mai multor cercetători, cu accent pe dezvoltarea impactului cu amprentă pozitivă în calitatea vieții tinerilor pe parcursul întregii vieți și în termen lung. O contribuție semnificativă în domeniul adaptării tinerilor în mediul academic au adus cercetătorii: M. Zlate și E. Avram s-au axat în cercetare pe corelația dintre perspective profesionale în raport cu gradul de adaptare în mediul academic, anul 2004 [15], M. Zlate și V. Negovan au continuat cercetările asupra problemelor fundamentale ale psihologiei și științelor educative; au propus strategiile de adaptare în mediul universitar, anul 2006 [16], V. Negovan și M. Dincă au

cercetat procesul de adaptare al studenților în mediul universitar din perspectiva valorilor în viziunea studenților, anul 2010 [17].

Potrivit autorilor menționați, adaptarea profesională reprezintă procesul prin care indivizii își ajustează obiceiurile și trăsăturile pentru a face față schimbărilor din mediul în care activează, socializează, creează etc., fiind influențați permanent de interacțiunea dintre factori interni și externi. Factorii interni țin de particularitățile fiecărei personalități, în timp ce factorii externi sunt condiții obiective, independente de voința individului. Ambele grupuri de factori acționează ca provocări asupra debutanților pentru care aceștia trebuie să reacționeze prompt la schimbările din mediul școlar în favoarea adaptării profesionale la schimbări, astfel, ca tranziția din mediul universitar în mediul școlar să devină reușită în depășirea provocărilor, iar cariera didactică să fie percepută ca pe o opțiune profesională valoroasă și atrăgătoare.

Abordarea fenomenului de tranziție în carieră devine o problematică tot mai evidențiată în cercetările recente prin caracterul provocator asupra persoanelor angajate în muncă, manifestat printr-un complex de schimbări de natură multiplă care se răsfrânge asupra personalității la etapa de trecere dintr-un mediu în alt mediu și la etapa de adaptare profesională.

O analiză a esenței definiției pentru termenul *tranziție* „trecerea lentă sau bruscă de la o stare, de la o situație, de la o idee la alta”, oferită în Dicționarul explicativ al limbii române [18, p.2047] și transpunerea explicației în esența procesului de tranziție a cadrelor didactice din mediul universitar în mediul școlar, evidențiază că, la începutul carierei pedagogice debutanții se confruntă cu o serie de provocări existente în sistemul educațional: creșterea necesității de adaptare profesională, diversificarea ofertei de sprijin pentru integrarea profesională, scăderea rezilienței din cauza stresului ocupațional, precum și punerea accentului pe cerințele privind îmbunătățirea condițiilor de muncă, a motivației, a ghidării în carieră și a valorificării competențelor profesionale.

În accepțiunea autoarei Negovan, tranziția în carieră este definită ca o schimbare în asumptiile personalității referitoare la sine și la mediu, nu trebuie înțelese ca simple schimbări, fără a se lua în considerare consecințele reale sau percepute ale acestor schimbări [19, p.79]. În sensul aceleiași opinii, se subînțelege că și situația privind insuficiența cadrelor didactice în sistemul de învățământ sau în contextul părăsirii instituțiilor de învățământ în primii ani de activitate denotă faptul că tranziția din mediul universitar în mediul școlar presupune schimbări esențiale pentru cadrele didactice debutante, în mod special în primul an de activitate în cadrul carierei pedagogice. În perioada de tranziție profesională, cadrele didactice debutante se confruntă cu o serie de provocări, printre care sunt: construirea relațiilor cu colegii din mediul școlar, interacțiunea și adaptarea la diverse categorii de elevi, integrarea în cultura organizațională a noii instituții, respectarea tradițiilor locale, pregătirea zilnică a lecțiilor, gestionarea autonomă a activităților elevilor în timpul orelor, alinierea la cerințele și așteptările instituției, etc.

În contextul argumentelor descrise anterior se încadrează într-un cadru teoretic în care pot fi analizate diverse tipuri de tranziții și caracteristicile acestora. Este cazul să facem referire la una dintre lucrările autorului Schlossberg, N. [20, p. 2-18], care afirmă că „adaptarea academică se realizează când studentul reușește să integreze tranziția în noul mediu academic”. Din analiza cercetării autorului citat, este clar că adaptarea profesională este influențată de caracteristici de ordin tridimensional, întrucât autorul menționează „adaptarea este influențată de trei seturi de factori: (1) caracteristicile tranziției în sine; (2)

caracteristicile mediului pre și post-tranziție; (3) caracteristicile personale ale individului”. Cu certitudine, tranziția în carieră a debutanților începând cu etapa de activitate pedagogică în mediul școlar reprezintă realitatea complexă de schimbări care însoțesc capacitatea cadrelor didactice debutante de a face față schimbărilor cu care se confruntă, dezvoltată prin adaptarea profesională. Revenind la afirmația autoarei Negovan cu referință la schimbările în perioada tranziției „nu trebuie înțelese ca simple schimbări, fără a se lua în considerare consecințele reale sau percepute ale acestor schimbări”, cu siguranță poate fi menționat că specialiștii din domeniile de resort pot aduce cele mai convingătoare argumente privind un șir de repercusiuni reale percepute la nivelul organismului uman, urmare a interacțiunii cu schimbările produse de tranziția dintr-un mediu în alt mediu, în cazul cercetării noastre, vorbim de schimbări de tranziție în mediul școlar, apărute odată cu debutul carierei de către tinerii specialiști.

În contextul transformărilor continue ce influențează atât dimensiunea individuală, cât și cea instituțională a procesului educațional, sprijinul oferit cadrelor didactice debutante prin cultivarea competențelor sociale se conturează ca o resursă educațională esențială. Aceste competențe contribuie semnificativ la facilitarea tranziției către noul mediu școlar, permițând depășirea obstacolelor specifice debutului în carieră și conducând la obținerea unei stări de satisfacție profesională, reflectată prin validarea și aprecierea conduitei pedagogice. Integrarea debutantului într-o rețea instituțională caracterizată prin relații sociale și comunicare eficientă este un indicator al unei adaptări profesionale reușite. Astfel, procesul de adaptare profesională a debutanților în sistemul educațional devine unul funcțional și constructiv, cu efecte pozitive asupra parcursului profesional al cadrului didactic.

Un element remarcat în cadrul analizei problematice legate de adaptarea cadrelor didactice debutante, se referă la atenția deosebită oferită cercetărilor recente care evidențiază tot mai accentuat importanța fenomenului de tranziție în cariera didactică. Acest proces, marcat de multiple provocări pentru cadrele didactice aflate la debutul profesional, presupune un ansamblu de transformări de natură diversă, care influențează profund dezvoltarea personală și profesională în perioada de trecere de la un context educațional la altul, precum ar fi la etapa de tranziție din mediul universitar în mediul școlar. Așadar, la etapa incipientă și în perioada de înaintare a debutantului în cariera didactică, precum și la etapa de stagiu în perioada de mentorat, absolvenții facultăților cu profil pedagogic se află într-o tranziție reală în sistemul educațional. Tranziția presupune schimbările pe care le percepe debutantul, odată cu trecerea de la nivelul de student la care a asimilat cunoștințe teoretice la nivelul de profesor la care transpune partea teoretică în practică și, în același timp implementează cunoștințele și competențele în colectivele de elevi.

În ordinea ideilor expuse, scopul cercetării constă în constatarea nivelului de adaptare la schimbări al cadrelor didactice debutante în perioada de tranziție în mediul școlar, în vederea determinării soluțiilor necesare pentru optimizarea procesului de adaptare profesională a cadrelor didactice debutante în mediul școlar.

2. Materiale și Metode

Analiza cercetărilor de specialitate ne subliniază necesitatea de asigurare a coerenței între partea teoretică și practica educațională, în vederea formulării unor direcții de acțiune care să contribuie la eficientizarea procesului de adaptare profesională. În acest sens, evaluarea nivelului de adaptare a cadrelor didactice debutante reprezintă un demers esențial pentru identificarea dificultăților cu care acestea se confruntă în etapa inițială a carierei

didactice, precum și pentru evidențierea nevoilor de formare profesională specifice etapei de tranziție din mediul universitar în mediul școlar. Conștientizarea aspectelor menționate permite elaborarea unor strategii de sprijin, menite să faciliteze procesul de tranziție și să consolideze activitatea profesională.

Cu certitudine, metodele de evaluare a nivelului de adaptare profesională a cadrelor didactice debutante sunt variate și pot fi clasificate în mai multe categorii, de la cele cantitative la cele calitative.

În acest sens, o abordare calitativă combină mai multe metode pentru a obține o imagine de ansamblu reală. Prin urmare, în contextul analizei aplicabilității și a funcțiilor metodelor de evaluare a nivelului de adaptare profesională, devine esențială identificarea și clasificarea celor mai relevante abordări.

Din perspectiva demersului metodologic și în concordanță cu cele expuse anterior, au fost valorificate următoarele metode:

1) *metoda analitică*, utilizată pentru examinarea surselor bibliografice și evidențierea reperelor teoretice și metodologice orientate spre facilitarea adaptării profesionale a cadrelor didactice debutante la cerințele procesului educațional modernizat, la realitățile actuale, precum și la specificul mediului școlar în care învață o generație de elevi cu perspective contemporane și, uneori, cu rezerve față de anumite aspecte esențiale;

2) *metoda de analiză SWOT* cunoscută în domeniile pedagogiei și ușor aplicabilă în rândul cadrelor didactice, pentru identificarea profilului cadrului didactic debutant în interacțiune cu două categorii de factori care, de asemenea, influențează adaptarea profesională în mediul școlar: factorii interni (puncte tari și puncte slabe) și factorii externi (oportunități și amenințări).

3) *metoda cantitativă*, aplicată pentru conturarea unei imagini realiste asupra nivelului de adaptare profesională a cadrelor didactice aflate la etapa de tranziție în mediul școlar, la început de carieră. Instrumentul de cercetare aplicat pentru obținerea unor rezultate cantitative este Chestionarul pe care l-am adaptat după Chelcea A. din lucrarea „Psihoteste.” [21].

Cercetarea a fost realizată pe un lot experimental compus din 97 de cadre didactice debutante, angajate în instituțiile de învățământ primar, gimnazial și liceal din Republica Moldova. Participanții la completarea chestionarului se încadrau în perioada debutului în cariera pedagogică, în unul din primii trei ani de activitate profesională, imediat după absolvirea facultății *Științe ale Educației* și predau diverse discipline conform curriculumului național școlar. Instrumentul utilizat este Chestionarul adaptat - *Evaluarea nivelului de adaptare profesională la schimbări a cadrelor didactice debutante*.

Acest chestionar face parte din studiul privind comportamentul cadrelor didactice debutante din învățământul general la noile schimbări în cadrul activității profesionale în instituția de învățământ în care își exercită funcția didactică în unul din primii trei ani de activitate (îndată după absolvirea facultății).

Chestionarul include întrebări deschise care solicită debutanților să-și exprime opiniile și reflecțiile personale cu privire la situațiile trăite și manifestarea comportamentului acestora în etapa de tranziție din mediul universitar în mediul școlar și în perioada de adaptare profesională în noul mediu. Conținutul Chestionarului este prezentat în Tabelul 1.

Tabelul 1

Evaluarea nivelului de adaptare profesională la schimbări a cadrelor didactice debutante

Nr. d/r	Conținutul întrebărilor	5- foarte des	4- des	3 - uneori	2 - rar	1- foarte rar/deloc
1	Am încercat aceasta și mai demult.					
2	Nu se va putea aplica în activitatea mea.					
3	Nu am timpul necesar.					
4	Nu am mai făcut aceasta înainte.					
5	Nu este practic pentru mine.					
6	Este prea târziu pentru mine.					
7	Este o schimbare prea radicală.					
8	A mai încercat cineva?					
9	M-am descurcat foarte bine și fără aceasta.					
10	Beneficiile obținute nu vor acoperi cheltuielile de aplicare.					
11	Sunt nemotivat/ă pentru acceptarea schimbării.					
12	Dacă se acceptă să aplicăm aceasta în grup, ne va fi mai ușor, decât individual.					
13	Voi întâmpina dificultăți în aplicare, dacă nu voi avea un mentor care să mă ghideze.					
14	Îmi va fi mai ușor să mă adaptez schimbării, dacă prin activități de mentorat mi se vor propune instrumente specifice concrete pentru aplicare în activitate.					
15	Schimbarea în perioada de adaptare profesională mă va suprasolicita.					

Sursa: elaborat de autor în baza Chestionarului adaptat după Chelcea A. din lucrarea „Psihoteste. Cunoașterea de sine și a celorlalți” [21].

Pentru completarea Chestionarului, conform instrucțiunilor, debutanții au selectat câte un răspuns de la fiecare întrebare, atribuindu-l pe orizontală, în corespundere cu o cifră din scala „5-1”. La final, din cifrele selectate la fiecare întrebare, conform scalei „5-1”, a fost calculată, pe verticală, suma totală obținută.

3. Rezultate și Discuții

Din scopul trasat pentru etapa de constatare rezidă analiza rezultatelor sintetizate din răspunsurile respondenților la Chestionarul aplicat care se încadrează în dimensiunea evaluării și constatării nivelului de adaptare profesională la schimbări a cadrelor didactice debutante în mediul școlar, redată în continuare.

Un indicator analizat a constat în selectarea datelor obținute privind anul de activitate al celor 97 debutanți, în vederea determinării profilului cadrelor didactice debutante și menținerea în sistem, reflectând sinteza rezultatelor în Figura 1.

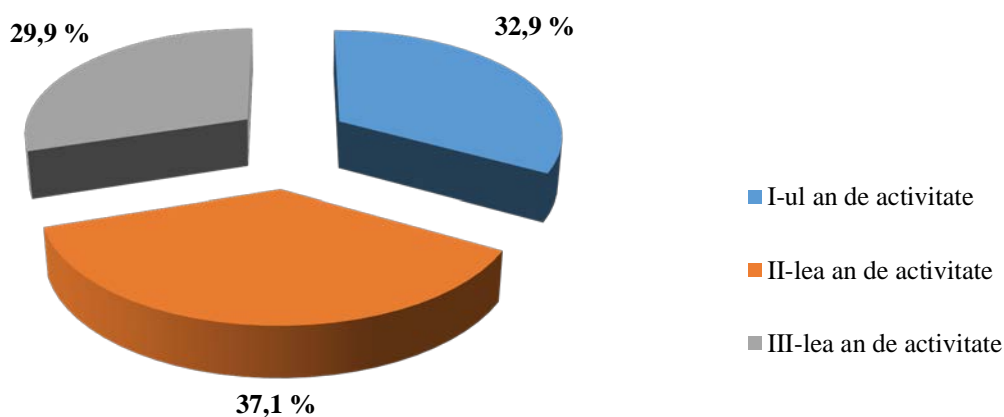


Figura 1. Anul de activitate al cadrelor didactice debutante.

Urmare a analizei rezultatelor obținute din chestionarul aplicat, au fost extrase datele privind anul de activitate a celor 97 de cadre didactice debutante care activează în sistemul educațional în unul din primii trei ani de activitate, imediat după absolvirea facultății *Științe ale Educației*:

- 32,9%, constituie 32 de tineri specialiști care activează în primul an;
- 37,1%, constituie 36 de tineri specialiști care activează în al doilea an;
- 29,9%, constituie 29 de tineri specialiști care activează în al treilea an.

Analiza efectuată, evidențiază o scădere a numărului de cadre didactice debutante în al treilea an de activitate, una dintre cauze fiind deseori întâlnită, părăsirea sistemului educațional și schimbarea locului de muncă în alt domeniu de activitate. Situație similară se atestă în *Raportul anual privind diagnosticarea nevoilor actuale de cadre didactice calificate în învățământul general prin monitorizarea procesului de plasare în câmpul muncii al absolvenților programelor de studii în domeniul Științe ale Educației, 2023*, în care se precizează că „în anul bugetar 2023 și-au dat demisia până/imediat la expirarea termenului stabilit de trei ani efectiv lucrați în funcție didactică 35 de cadre didactice debutante angajate prin repartizare, dintre care: 34% au plecat din sistem în primul an de activitate didactică; 14% în al doilea an de activitate didactică, 0% debutanți au plecat în al treilea an de activitate didactică; 52% au plecat din școală imediat la expirarea termenului de 3 ani” [159]. Astfel de situație cunoscută sub numele de „exodul cadrelor didactice” are consecințe grave asupra sistemului educațional: 1) costuri financiare ridicate pentru recrutare și formare; 2) scăderea calității actului educațional, deoarece școlile se confruntă constant cu lipsa de personal calificat și experimentat; 3) presiune sporită asupra grupului profesional, care trebuie să preia sarcini suplimentare etc.

În ideea determinării profilului cadrelor didactice debutante prin analiza SWOT pot fi scoase în evidență rezultatelor obținute ce reflectă interacțiunea debutanților cu două categorii de factori care influențează adaptarea profesională în mediul școlar: factorii interni (puncte tari și puncte slabe) și factorii externi (oportunități și amenințări).

Tabelul 2

Analiza SWOT cu privire la adaptarea profesională a cadrelor didactice debutante în mediul școlar

Profilul cadrului didactic în perioada de adaptare profesională în mediul școlar

<i>PUNCTE TARI</i>	<i>PUNCTE SLABE</i>
Dragostea pentru profesia de pedagog.	Lipsa experienței pedagogice.
Vreau să lucrez în școală.	Lipsa curajului de a solicita ajutor profesional.
Manifest plăcere de a lucra cu elevii.	Lipsa obiectivelor personale pentru creșterea profesională, a autocunoașterii. Lipsa motivației financiare.
Sunt sociabil.	Capacități scăzute de autocunoaștere.
Posed răbdare suficientă în activitatea cu copiii. Sunt calm și echilibrat.	Stilul democratic de abordare, neînțeles de toți elevii. Competențe scăzute în eficientizarea demersului didactic
Posed pregătire profesională recentă.	Dificultăți întâmpinate la proiectarea didactică.
Îmi reușește să colaborez, să cooperez.	Abilități scăzute de manifestare autoritară în fața elevilor.
Am capacități de comunicare.	Abordarea superficială a unor amenințări care pot diminua procesul de adaptare în mediul școlar.
Ași putea organiza lucrul în echipă, m-ași implica de rând cu elevii.	Idei și resurse insuficiente în diversificarea lecțiilor. Stare stresată la solicitări noi, la schimbări.
<i>OPORTUNITĂȚI</i>	<i>AMENINȚĂRI</i>
Descentralizare și gestionare financiară autonomă.	Persistență birocratică a procesului de raportare (chestiuni de rutină permanentă).
Dotarea cabinetelor școlare și a laboratoarelor pentru activități practice.	Instabilitate și transformări sociale permanente.
Cunoașterea celor mai recente noutăți din domeniile educației.	Scăderea atractivității profesiei de pedagog.

Existența mentorilor pentru ghidarea în cariera didactică.	Diversificarea viziunilor teoretice ale experților educaționali și neconcordanța cu aspectele practice (experiența practică).
Utilizarea TIC și implementarea sistemului educațional informațional.	Impedimente create din partea unor manageri școlari pentru avansarea în cariera didactică (promovarea oportunităților doar în rândul cadrelor didactice cu grad didactic, manifestarea invidiei profesionale pentru tinerii care aspiră la grad didactic, susținerea insuficientă a debutanților în formarea profesională, economisirea bugetului și lipsa oportunităților de dezvoltare profesională, etc.).
Posibilități de formare și dezvoltare profesională.	Posibilități reduse de avansare în domeniu.
Atragerea proiectelor educaționale.	Număr de elevi în descreștere, în mod special, în mediul rural.
Tendențe reale de extindere a specializărilor și ocupare a unor posturi noi.	Competiție școlară scăzută între instituțiile de învățământ.
Ofertă diversificată de organizare a odihnei active.	Interes scăzut de participare al părinților în viața școlară (lipsă de timp, migrația peste hotare la muncă, etc.). Interes scăzut a elevilor față de învățatură. Nivel scăzut de salarizare.

Sursa: elaborat de autor în baza informațiilor prelucrate din analiza SWOT.

Urmare a analizei răspunsurilor obținute pot fi identificate nevoile de adaptare profesională, de formare și dezvoltare a personalității cadrului didactic debutant în aspect profesional, astfel, având claritate privind punctul de pornire fiind necesar și important în elaborarea unui plan individual de dezvoltare profesională, care ar fi parte componentă a unui program de mentorat în contextul optimizării procesului de adaptare profesională a cadrelor didactice debutante în mediul școlar.

În ideea valorificării studiului privind comportamentul cadrelor didactice debutante din învățământul general la noile schimbări, a fost efectuată analiza opiniilor și a reflecțiilor personale ale debutanților menționate la completarea chestionarului propus. Analiza a permis scoaterea în evidență a unor răspunsuri referitoare la trăirile manifestate odată cu tranziția din mediul universitar în mediul școlar care se încadrează în șirul de caracteristici profesionale manifestate prin comportament în mediul școlar, în contextul adaptării profesionale la schimbări.

În continuare, este prezentată analiza rezultatelor obținute din răspunsurile respondenților în urma aplicării Chestionarului *Evaluarea nivelului de adaptare profesională la schimbări a cadrelor didactice debutante*. Din sinteza efectuată, a relevat următoarele rezultate prezentate în Tabelul 3.

Tabelul 3

Rezultatele privind evaluarea nivelului de adaptare profesională la schimbări a cadrelor didactice debutante

Nivelul de adaptare profesională la schimbări	Număr/ % de cadre didactice debutante	Categoria de punctaj acumulat	Caracteristici profesionale manifestate prin comportament în mediul școlar
BINE adaptat	4,1% (4 persoane)	Între 15 și 25 puncte	Persoane a progresului schimbării, dar uneori hazardat. Acceptă o idee nouă intuitiv, riscul persistă că de multe ori renunță la o analiză riguroasă ulterioară acceptării.
PARȚIAL adaptat	29,9% (29 persoane)	Între 26 și 39 puncte	Persoane motivate pentru acceptarea schimbării. Acceptă imediat ideile și propunerile celorlalți, ceea
MEDIU adaptat	46,4% (45 persoane)	Între 40 și 53 puncte	Persoane indecise oscilante în acceptarea ideilor noi. Anumite eșecuri și experiențe anterioare au accentuat însă excesiv atitudinea, de prudență și justificată până la un punct.
FOARTE GREU adaptat	13,4% (13 persoane)	Între 54 și 67 puncte	Persoane care acceptă foarte greu introducerea noului. Doar presiunea majoră a situațiilor, evenimentelor le determină să acționeze.
INADAPTAT	6,2% (6 persoane)	Între 68 și 75 puncte	Persoane conservatoare incorigibile, a regresului în ceea ce privește schimbarea. Se manifestă absolut nemotivat pentru acceptarea schimbării, sunt orientate spre blocarea noului.

Sursa: elaborat de autor în baza informațiilor prelucrate din chestionarul aplicat și conform Grilei de analiză și interpretare a rezultatelor afiliată la chestionar.

În conformitate cu Grila de analiză și interpretare a rezultatelor la *Chestionarul privind evaluarea nivelului de adaptare profesională la schimbări a cadrelor didactice debutante*, nivelul de adaptare profesională la schimbări al respondenților este evaluat și determinat în baza unei clasificări după care cei 97 de debutanți implicați în experiment, se împart în 5 categorii, în funcție de punctajul acumulat. Prin urmare, analiza și sinteza rezultatelor obținute din răspunsurile cadrelor didactice debutante care au completat chestionarul, oferă repartizarea cadrelor didactice pe categorii, în funcție de **nivelul de adaptare profesională la schimbări al debutanților**:

Categoria I - Nivel - BINE adaptat, au acumulat între 15 și 25 puncte – 4,1% (4 persoane);

Categoria II - Nivel - PARȚIAL adaptat, au acumulat între 26 și 39 puncte – 29,9% (29 persoane);

Categoria III - Nivel - MEDIU adaptat, au acumulat între 40 și 53 puncte – 46,4% (45 persoane);

Categoria IV - Nivel - FOARTE GREU adaptat, au acumulat între 54 și 67 puncte – 13,4% (13 persoane);

Categoria V - Nivel – INADAPTAT, au acumulat între 68 și 75 puncte – 6,2% (6 persoane).

Pentru a avea o privire generală comparativă asupra rezultatelor sintetizate și atribuirea respondenților la cele 5 categorii, în funcție de **nivelul de adaptare profesională la schimbări al debutanților** constat, în continuare este prezentată distribuția comparativă a frecvențelor ce vizează nivelul de adaptare profesională la schimbări a celor 97 de cadre didactice debutante în Figura 2.

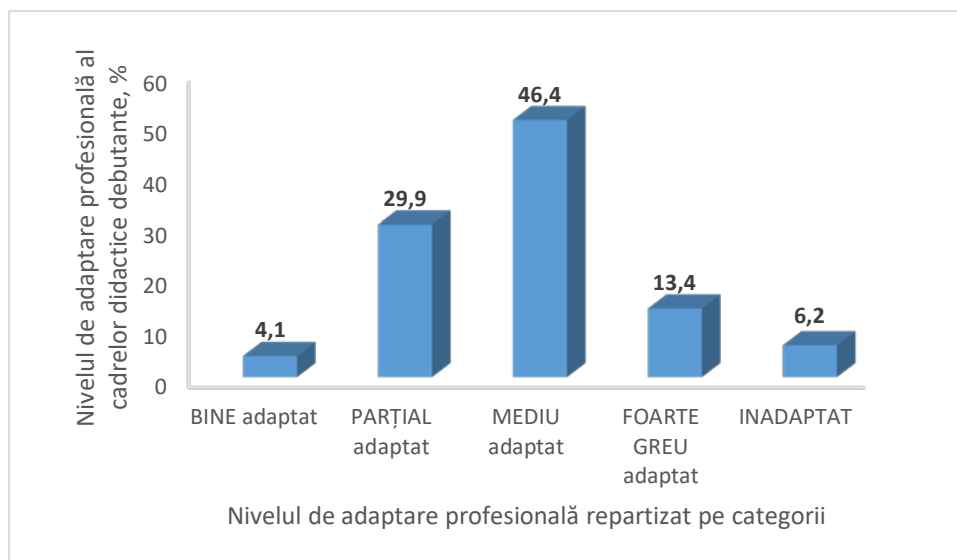


Figura 2. Distribuția comparativă a frecvențelor nivelului de adaptare profesională la schimbări a cadrelor didactice debutante, %

Sursa: elaborat de autor în baza informațiilor prelucrate din chestionarul aplicat.

Rezultatele reprezentate în Figura 2, în sensul analizei comparative, oferă claritate în clasament că, în categoria de debutanți cu *nivel bine adaptat profesional la schimbări*, s-au clasat **4,1%** (4 persoane) dintre respondenții debutanți, un număr mai mic comparativ cu celelalte categorii. Aceasta înseamnă că în primii trei ani de activitate pedagogică, îndată după absolvirea facultății *Științe ale Educației*, din numărul total de cadre didactice debutante - 97 de persoane care exercită funcția didactică în mediul școlar, pe dimensiunea acceptării schimbărilor au atins doar 4 debutanți *nivel bine adaptat profesional la schimbări*. Este un rezultat care merită o atenție sporită și permanentă în vizorul conducătorilor instituțiilor de învățământ general, precum și a mentorilor cu experiență în domeniul pedagogic pentru oferirea suportului necesar și tinderea spre creșterea capacităților de adaptare profesională a debutanților la etapa tranziției în mediul școlar.

Comparând rezultatele prezentate în aceeași figură, este vizibil că doar **29,9%** dintre debutanți (29 persoane) sunt considerați cu *nivel parțial de adaptare profesională la schimbări*. Revenind la caracteristicile profesionale manifestate prin comportament în mediul școlar, conform Grilei de analiză și interpretare a rezultatelor la Chestionarul aplicat, *această categorie de persoane sunt motivate pentru acceptarea schimbării și acceptă imediat ideile și propunerile celorlalți, ceea ce și îi motivează la dezvoltarea creativității*. Caracteristicile acestui grup de debutanți denotă faptul că este cointerestat în motivație și apreciere pentru reacția promptă la schimbare, precum și necesită urmărire din perspectiva progresului nivelului de adaptare profesională la schimbări, iar ulterior urmează să fie antrenați în calitate

de mentori în rândul debutanților pentru oferirea suportului metodologic „de la egal la egal” altor debutanți.

De asemenea, prezintă interes și grupul de debutanți (46 de persoane) ce constituie **46,4%**, cel mai mare procentaj și care sunt considerați cu *nivel mediu de adaptare profesională la schimbări*. Aceasta înseamnă că în primii trei ani de activitate pedagogică, din numărul total de cadre didactice debutante (97 de persoane), aproximativ jumătate acceptă unele schimbări. La nivel de caracteristici profesionale manifestate prin comportament în mediul școlar, *această categorie de persoane reprezintă persoane indecise, oscilante în acceptarea ideilor noi și acceptă doar unele schimbări care să nu le influențeze esențial deprinderile și abilitățile utilizate în desfășurarea procesului educațional și să nu le creeze disconfort în mediul școlar*. Pentru categoria dată de debutanți este necesară o mică terapie psihologică de recâștigare/întărire a încrederii în forțele proprii, pe care în mod real aceste persoane le posedă.

Următoarea categorie de debutanți include **13,4%** de respondenți (13 persoane) care se consideră cu *nivel foarte greu de adaptare profesională la schimbări*. Aceasta se explică prin faptul că *în acest grup persoanele se caracterizează profesional prin comportamentul manifestat în mediul școlar cu acceptarea foarte anevoioasă de introducere a noului*. Reacție îmbunătățită din partea acestor debutanți, poate fi înregistrată doar la o presiune majoră a situațiilor, evenimentelor care le determină să acționeze. Categoria dată de persoane exprimă o rezervă pronunțată în dorința de implicare activă. La modul general, din partea acestor persoane se necesită efort și flexibilitate cât privește adaptarea profesională în mediul școlar, precum și trasarea perspectivelor de înregistrare a progreselor în dezvoltarea competențelor profesionale.

Datele expuse în Figura 2 scot în evidență ultima categorie de respondenți, ce constituie **6,2%** (6 debutanți) care sunt considerați cu *nivel inadapdat profesional la schimbări*. Aceasta se explică prin faptul că *în acest grup persoanele se caracterizează profesional prin comportament conservator și incorigibil*. Persoanele din grupul menționat se aliniază nu la progres, dar la regres în ceea ce privește schimbarea. Faptul se explică prin manifestarea absolut nemotivată a debutanților pentru acceptarea schimbării și, uneori sunt orientate spre blocarea noului. Ne pune în gardă această categorie de tineri specialiști care exprimă o lipsă a dorinței de implicare în activitate deoarece sunt pasivi și nedeterminați în colaborarea și relaționarea socială în debutul carierei pedagogice.

Analiza itemilor incluși în chestionar și a răspunsurilor identificate au scos în evidență și nevoi ale debutanților, confirmate prin constatările privind nivelul de adaptare profesională la schimbări, clasificat pe categorii de debutanți.

5. Concluzii

Studiul realizat cu participarea cadrelor didactice debutante a oferit oportunitatea de a analiza nivelul de adaptare profesională al acestora la începutul carierei didactice și unele particularități ale fenomenului de tranziție prin care trec tinerii specialiști în procesul de adaptare la condițiile mediului școlar și la cerințele sistemului educațional.

Rezultatele obținute au fost analizate și sistematizate potrivit obiectivelor propuse în experimentul de constatare și confirmă existența necesităților de adaptare profesională din partea cadrelor didactice debutante, confirmate prin răspunsurile oferite. Cu certitudine, cadrele didactice debutante în perioada de tranziție în mediul școlar se confruntă cu o serie de întrebări, la care răspunsurile profesionale ar avea un impact favorabil prin mentorarea acestora în baza unui program de mentorat privind optimizarea procesului de adaptare profesională a debutanților în mediul școlar.

În contextul provocărilor actuale, marcate de dinamica accelerată a schimbărilor din sistemul educațional, se remarcă o serie de consecințe semnificative: diversificarea ofertei de sprijin pentru integrarea profesională a cadrelor didactice, scăderea rezilienței acestora din cauza stresului ocupațional, creșterea necesității de adaptare profesională și accentuarea cerințelor privind îmbunătățirea condițiilor de muncă, a motivației, a ghidării în carieră și a valorificării competențelor profesionale.

Având în vedere multitudinea și complexitatea nevoilor manifestate de cadrele didactice debutante în procesul adaptării profesionale în perioada de tranziție în mediul școlar, fiind reflectate o bună parte prin analiza SWOT, devine clar tabloul pentru necesitatea implementării unui *Program de mentorat din perspectiva optimizării procesului de adaptare profesională a cadrelor didactice debutante în mediul școlar*, or, considerăm esențială implementarea unor măsuri de prevenire a inadaptării și de acoperire a tuturor nevoilor specifice ale debutanților, astfel, procesul de adaptare profesională va fi optimizat, devenind mai rapid și mai eficient în cadrul instituțiilor de învățământ, în colectivul profesoral și în relația cu elevii din mediul școlar.

Necesitatea întreprinderii măsurilor de prevenire a inadaptării, de optimizare a procesului de adaptare profesională și de facilitare a fenomenului de tranziție a debutanților în mediul școlar, precum și toate constatările privind nivelul de adaptare profesională la schimbări identificat pe categorii de tineri specialiști, în viziunea noastră, justifică raționalitatea implementării în rândul cadrelor didactice debutante a unui *Program de mentorat din perspectiva optimizării procesului de adaptare profesională a cadrelor didactice debutante în mediul școlar*. Cu siguranță, formarea cadrelor didactice debutante în baza unui astfel de program, va facilita adaptarea profesională și dezvoltarea profesională în perioada exercitării profesiei de pedagog, în mod special, în perioada tranziției după absolvirea facultății și integrarea în mediul școlar.

Pe final, din sinteza ideilor prezentate, se poate afirma că impactul educațional este profund influențat de calitatea relațiilor interpersonale dintre elev și cadru didactic, dintre conducătorul instituției și debutant, dintre mentor și cadrul didactic aflat la început de carieră pedagogică, precum și de caracteristicile contextului educațional în parteneriatul format. Aceste dimensiuni relaționale și contextuale se reflectă în mod esențial asupra tuturor aspectelor procesului educațional, inclusiv asupra adaptării profesionale, integrării socioprofesionale și dezvoltării profesionale continue. Tranziția reușită din mediul universitar în mediul școlar va marca o carieră pedagogică solidă și resurse umane cu identitate profesională dezvoltată, când fiecare provocare va fi depășită, iar fiecare obstacol va lăsa amprentă de succes, iar pentru dezvoltarea profesională și eficientizarea contextului formativ în toate aspectele educației, șansele devin mai mari, odată cu optimizarea procesului de adaptare profesională în mediul școlar.

Conflicte de interese: Autorul nu declară conflicte de interese.

Referințe

1. Finland's 'education miracle' and the lessons we can learn. Disponibil online: <https://www.weforum.org/stories/2017/07/finlands-education-miracle-and-the-lessons-we-can-learn/> (accesat pe 20.03. 2025).
2. Finland's educational success: A global model to follow. Disponibil online: <https://www.globalsociety.earth/post/finland-s-educational-success-a-global-model-to-follow?> (accesat pe 20.03. 2025).
3. Learning for sustainability. Disponibil online: <https://op.europa.eu/webpub/eac/education-and-training-monitor/en/country-reports/estonia.html?> (accesat pe 20.03. 2025).

4. School education. Disponibil online: <https://op.europa.eu/webpub/eac/education-and-training-monitor/en/country-reports/estonia.html?#3-school-education> (accesat pe 20.03. 2025).
5. Evoluția și direcțiile integrării în educația europeană. Disponibil online: https://ibn.idsi.md/sites/default/files/imag_file/38-46_14.pdf (accesat pe 20.03. 2025).
6. Strategia de dezvoltare *Educația 2030* și în Programul de implementare a acesteia pentru anii 2023-2025, aprobate prin Hotărârea Guvernului nr. 114 din 7 martie 2023, publicată în Monitorul Oficial al Republicii Moldova nr.134-137 din 20.04.2023, art. 289.
7. Strategia națională de dezvoltare *Moldova Europeană 2030*, aprobată prin Legea 315 din 17 noiembrie 2022, publicată în Monitorul Oficial al Republicii Moldova nr.409-410 (8453-8454) din 21.12.2022, art. 757-758.
8. Grishanov, L.; Țurcan, V. *Sotsiologicheskiye problemy adaptatsii studentov mladsikh kursov. Avtoreferat dissertatsii na soiskaniye uchenoy stepeni kandidata psikhologicheskikh nauk. Moskva, Rossiya, 1990, 44 s.*
9. Bucun, N.; Musteață, S.; Guțu, Vl.; Rudic, Gh. *Bazele științifice ale dezvoltării învățământului în Republica Moldova*. Prometeu, Chișinău, Republica Moldova, 1997, 399 p. ISBN 5-7790-0361-0.
10. Pleșca, M. *Mecanisme psihologice de bază ale adaptării studenților la activitatea de învățare*. Autoreferatul tezei de doctor în științe psihologice. Chișinău, Republica Moldova, 2002, 23 p.
11. Țarină, E. *Adaptarea studentului în mediul universitar*. UPS „Ion Creangă”, Chișinău, Republica Moldova, 2013, 193 p. ISBN 978-9975-46-158-0.
12. Rusnac, S.; Verdeș, V. *Adaptabilitatea social-psihologică ca o condiție a depășirii crizei vârstei adulte*. În: *Materialele Conferinței Științifice Internaționale „Preocupări contemporane ale științelor socio-umane”*, ULIM, Chișinău, Republica Moldova, 2015, 1, pp. 389-397. ISBN 978-9975-933-80-3.
13. Puzur, E. *Adaptarea psihosocială a studenților anului I din instituțiile de învățământ superior*. Autoreferatul tezei de doctor în psihologie. Chișinău, Republica Moldova, 2016, 34 p.
14. Paladi, O. *Orientările valorice și adaptarea psihosocială la vârsta adolescenței: abordări teoretice*. Institutul de Științe ale Educației. Print Caro SRL, Chișinău, Republica Moldova, 2021, 261 p.
15. Zlate, M.; Avram, E. *Reprezentarea perspectivelor profesionale și relația cu gradul de adaptare la cerințele mediului academic*. Revista de psihopedagogie. Editura Universității, București, România, 2004, V..2, p. 33-46.
16. Zlate, M.; Negovan, V. *Adaptare și strategii de adaptare. Probleme fundamentale ale psihologiei și științelor educative*. Editura Universității, București, România, 2006, 180 p.
17. Negovan, V.; Dincă, M. *Adaptarea la mediul universitar*. În: *Câmpul universitar – o cultură a provocărilor*. Editura Universitară, București, România, 2010, p. 66-87.
18. Dima, E.; Cobeț, D.; Manea, L.; Dănilă, E.; Dima, G.; Dănilă, A.; Botoșineanu, L. *Dicționar Explicativ Ilustrat al Limbii Române*. ARC; Gunivas, Chișinău, Republica Moldova, 2007, 2280 p. ISBN 978-9975-61-155-8.
19. Negovan, V., *Psihologia carierei*. Meteor Press, București, România, 2021, 285 p. ISBN 978-973-728-817-2.
20. Schlossberg, N. K. *A Model for Analyzing Human Adaptation to Transition*, *The Counseling Psychologist* 1981, 9 (2), pp. 2–18, doi: 10.1177/001100008100900202.
21. Chelcea, A. *Psihoteste. Cunoașterea de sine și a celorlați*. Știință și Tehnică, București, România, 1997, 302 p.
22. Raport anual privind diagnosticarea nevoilor actuale de de cadre didactice calificate în învățământul general prin monitorizarea procesului de plasare în câmpul muncii al absolvenților programelor de studii în domeniul „Științe ale Educației”, 2023. Disponibil online: https://mec.gov.md/sites/default/files/16.01.2023_final_completat_redactat_proiect_raport_anual_2022.pdf (accesat pe 15.02. 2025).

Citation: Goras, M. Adaptation of beginning teachers in the transition process from the university environment to the school environment. *Journal of Social Sciences*, 8 (3), pp. 110-125. [https://doi.org/10.52326/jss.utm.2025.8\(3\).09](https://doi.org/10.52326/jss.utm.2025.8(3).09).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).10](https://doi.org/10.52326/jss.utm.2025.8(3).10)
CZU 316.752-053.6(478):316.74:172.12(4)



THE IMPACT OF EUROPEAN VALUES ON YOUTH MINDSETS IN THE REPUBLIC OF MOLDOVA

Cristina Lazariuc *, ORCID: 0000-0003-0585-1675

Technical University of Moldova, 168, Ștefan cel Mare Blvd., Chisinau, Republic of Moldova

* Corresponding author: Cristina Lazariuc, cristina.lazariuc@ssu.utm.md

Received: 08. 15. 2025

Accepted: 09. 22. 2025

Abstract. This study was motivated by evolving perspectives in historical and anthropological discourse, which emphasize the importance of understanding collective mentalities for interpreting social transformations and assessing the feasibility of reforms. The research hypothesis postulated that the dominant principles and values in a society significantly influence individual behaviors and attitudes, especially among young people. The main objective of the research was to analyze the role of European values in shaping the mentality of young people in the Republic of Moldova. To achieve this, the research explored how values underlie behavioral norms and influence social cohesion, highlighted the main manifestations of the modern crisis of cultural values, including in Moldovan society, and outlined the specifics of two types of mentalities among Moldovan youth: the flexible-autonomous and the rigid-collectivist mentalities. The main findings indicated that certain fundamental values have a strong impact on young people's attitudes and that shared values promote greater cultural understanding and social solidarity. The study concluded that identifying and promoting common values is crucial for supporting social cohesion and guiding effective social reforms and highlighted the importance of interconnecting fundamental values with national and European values to develop a sense of belonging to European culture and civilization.

Keywords: *attitude, behavior, crisis, education, mentality, social integration, social representations, value system.*

Rezumat. Acest studiu a fost motivat de perspectivele în evoluție din discursul istoric și antropologic, care subliniază importanța înțelegerii mentalităților colective pentru interpretarea transformărilor sociale și evaluarea fezabilității reformelor. Ipoteza cercetării postula că principiile și valorile dominante dintr-o societate influențează semnificativ comportamentele și atitudinile individuale, în special în rândul tinerilor. Obiectivul principal al cercetării a fost analiza rolului valorilor europene în modelarea mentalității tinerilor din Republica Moldova. Pentru a realiza acest demers, cercetarea a explorat modul în care valorile stau la baza normelor comportamentale și influențează coeziunea socială, a subliniat care sunt principalele manifestări ale crizei moderne a valorilor culturale, inclusiv în societatea moldovenească, și a conturat specificul a două tipuri de mentalități în rândul

tinerilor moldoveni: mentalitatea flexibil-autonomă și cea rigid-colectivistă. Principalele constatări au indicat faptul că anumite valori fundamentale au un impact puternic asupra atitudinilor tinerilor și că valorile comune promovează o mai mare înțelegere culturală și solidaritate socială. Studiul a concluzionat că identificarea și promovarea valorilor comune sunt cruciale pentru susținerea coeziunii sociale și ghidarea reformelor sociale eficiente și a subliniat importanța interconectării valorilor fundamentale cu valorile naționale și cele europene pentru a dezvolta un sentiment de apartenență la cultura și civilizația europeană.

Cuvinte-cheie: *atitudine, comportament, criză, educație, mentalitate, integrare socială, reprezentări sociale, sistem de valori.*

1. Introduction

The contemporary era represents a pivotal moment in history, characterized by a transformation in human thought as it moves beyond regional and national identities toward a more global consciousness. This shift is driven by two primary factors. The first is the diminishing influence of religious, political, and social beliefs that have historically shaped the foundations of our civilization. The second is the creation of completely new conditions of existence and thinking, generated by the accelerated evolution of the information society and, more recently, of the knowledge-based one. The contemporary era is characterized by a transitional phase, as the enduring influence of past ideas continues to shape the present, while the concepts destined to replace them are gradually taking shape and consolidating. At present it is not easy to predict the feasibility of this complex and contradictory process of spiritual maturation of humanity, which may result, one day, by replacing the oscillating state of contemporary man, with the certainty of identifying a state of self-balance and with the whole Universe. Although the fundamental principles upon which future societies will be constructed remain uncertain, we can confidently assert that their organization will be grounded in a "new" form of authority—the sovereign of the modern age: the power of the collective mentality. This assertion emphasizes the growing influence of shared beliefs, cultural norms, value systems, social consensus, and collective consciousness in shaping societal structures. This perspective suggests that as technology advances, especially in communication and information dissemination, societal influence increasingly stems from collective mentalities rather than top-down authority. Social media, mass media, and digital networks enable ideas, values, and narratives to circulate rapidly and widely, effectively creating a new form of sovereignty rooted in the collective mind.

Thus, in the following, we aim to highlight the importance of researching collective mentalities [1,2] as an essential step in awareness and understanding of the contemporary world [3,4], whose profound transformations depend on changes in the existing value system [5], the attitude of contemporary man towards these values [6,7], as well as the need to focus on the following questions: what do we have today a crisis of values [8] or a crisis situation that can be overcome by appealing to values; why in a given society, at a given historical moment, some principles and values influence more strongly than others, as shown by the content of norms and value criteria that guide people's daily behavior and what is the impact of education in cultivating a stable value system and favorable to the formation of responsible prosocial behaviors [9]. For these reasons, we consider it essential to conduct a comprehensive analysis of the role of general human values and European values [10], in particular, in shaping the mentality of young people in Moldova, given that values are the "hard core of mentalities" and identifying common values promotes a better understanding

of the cultural differences between us and others and increasing the degree of social solidarity, both nationally and globally.

2. Mentality-social representations-values

The most recent perspectives in the field of historical and anthropological discourse refer to the promotion of an innovative image of the past, but also to the realization of predictions regarding the degree of feasibility of social reforms, given the ways in which people perceive the world around them, themselves, others, as well as the system of values according to which they model their attitudes, behaviors and reactions, in other words, the mental paradigm specific to a certain historical time. The complex and heterogeneous nature of mentalities involves a wide variety of value judgments, behaviors, representations, attitudes depending on their age, origin and duration, which makes the concept of mentality difficult to be defined and explained, regardless of the accuracy of words used by historians engaged in the effort to highlight the substance of mentalities. Some of them, being affected by the lack of precision and inadequacies of the concept, gave up "mentalities" as an outdated term, and preferred alternative terminology established by other human sciences, such as "*imaginary*", "*representations of the imaginary*", "*History of representations*". The *imaginary* is a closely related to concept to the mentality, but they are not identical in meaning.

By their very nature, the *imaginary* and the *mentality* are objects of interest of several disciplines, whether it is: History of religions, History of arts and literatures, History of sciences and mentalities or Historical Anthropology, Psychology or Sociology, etc. "They all share their vast domain of the imaginary, discouraging any attempt at decolonization" [11, p. 11]. The multidisciplinary nature of approaches to the phenomenon of mentality (*imaginary*) is demonstrated by dissolving the boundaries of knowledge, as a result of awareness of the need for interdisciplinary "partnerships" initiated by researchers from various countries, among which, a place of honor is occupied by those from France. The French historian, Georges Duby, mentions that "a society is explained not only by its economic foundations, but also by the representations it makes about itself". In this order of ideas, the historian proposes to carry out a study of cultural models, of the *value system* in a community or society, in order to understand how people's vision of reality, about social, evolves. We can say more about a people, says G. Duby, if we make a rigorous analysis of people's and groups' attitudes towards marriage, family, towards maintaining and dissolving it, towards children and childhood, towards work and education, etc. The collective mind has on the surface transient emotions, towards depths, more stable mental structures, and in depth, the most resistant to change frames. Thus, the mentality is a system of "images and representations, arranged differently according to various groups or layers that make up the social formation" [12, p. 234], which governs people's behavior.

The same vision is shared by the Romanian historian, Al. Duțu, who claims that the history of mentalities cannot be made without strongly linking it to the history of cultural systems, systems of beliefs, values, mental equipment where they were developed, lived and evolved [13, p. 12]. Advocating, including, for a history of culture, the author emphasizes that talking about mentality means talking about behaviors, attitudes, visions, values that differ from one place to another, from one culture to another. In turn, Al. F. Platon systematizes the following features of mentalities: collective, extremely stable, irreducible and hierarchical. At the same time, the author claims that mentalities are manifested in and through a series of permanent frames (the "cosmological" framework, the religious phenomena and behaviors,

the morals, the categories of social life, the sacred and the profane, the *values* and hierarchies, the identity and the otherness.), regardless of time and space, of all social categories, their only variable being that of content, marked by the imprint of the era. Emerging from this, the above-mentioned historians find that each social group, "fabricated", images exalting its historical role and position in global society, "probed" its past and projected its future, expressed its aspirations, specific ideals, in other words, was defined through these representations [14, p. 65].

Thus, in a general sense, mentality means the set of mental structures and ways of thinking of a community, which includes valuable orientations, predispositions and other latent, common cultural patterns [15, p. 67], which have in their content ideas, *values*, behavioral schemes, social representations and ways of being, "diffuse latencies" that express the soul realities of a people [16, p. 6]. In a narrow sense, the term designates the set of intellectual and moral orientations, cognitive and affective, specific to a community, the mentality being expressed through opinions, attitudes, ***value criteria***, beliefs, habits and specific representations. In multiethnic communities, the individual comes into contact with various cultures that are foreign to him, encountering certain difficulties in the process of establishing interpersonal relationships and social integration. This is due to the fact that the way of interethnic relations is developed is influenced by several factors, such as: the purpose, *the value systems* of the involved actors, the context in which the interactions take place, etc. Decisive for initiating such relationships are the cognitive patterns, the beliefs that underlie the development of the system of expectations towards the other, a generalized "Alter", respectively ethnic stereotypes and *social representations*. Representations refer to a common repository of social knowledge and information, which people share in the form of "theories" of common sense and, starting from them, build social reality. Social representations allow social actors to acquire certain knowledge and integrate it into a consistent framework with their cognitive functioning and the *values* to which they adhere. Social representations also play an important role in defining personal and group identity, compatible with the system of socially and historically determined norms and *values*. Thus, representations allow individuals or groups to situate themselves in the social field, to express themselves and to act in relation to others. By knowing and understanding the main representations of our fellow human beings, of those sets of images, myths and symbols, which define their relationship to reality, we are generally more willing to accept and tolerate the differences that separate us. Consequently, the research of the imaginary, as a dynamic factor of the collective mentality, can lead to a better understanding of cultural differences, to the identification of common *values*, but also to the increase of the degree of social solidarity.

Our values and beliefs reflect our identity, tell us who we are, what we want and what we believe that we can be or do, and especially what we can become if we choose to explore our potential. The analysis of the existential dimension of the world of values requires the consideration of the possibilities of classifying the values, according to certain criteria in a contemporary extension. The traditional classification took into account, in particular, the *values of culture*, divided into material values and spiritual values. *Material values* serve as a means of satisfying human needs, they being objects of the external world. The origin of material values or material goods lies in nature and labor. *Spiritual values* are distinguished by their immateriality and by their absolute or unconditional validity. Spiritual values are: *theoretical or knowledge values*, grouped under the category of *truth*, *ethical values*, grouped under the category of *moral good*, having an imperative character, *aesthetic values*, grouped

under the category of *beauty* and religious values, grouped under the category of *sacred*. The French philosopher L. Lavelle classifies values into three groups: 1. *economic and emotional values*, which ensure the existential existence of man in the world; 2. *intellectual and aesthetic values*, which reflect man's attitude towards the world; 3. *moral and religious values*, which express the rise of man above the world people [17, p. 123]. In his turn, highlighting eight types of values, among which: economic, vital, legal, political, theoretical, aesthetic, moral and religious, T. Vianu delimits them into values-purpose and values-means. This delimitation is very current especially in the context of the crisis of modernity which is characterized by the reversal of the natural relationship between means and ends. The values-means acquired supremacy, which determined the subordination of the spiritual values to the material ones.

Therefore, even if there are different classifications that separate the values by groups according to certain criteria, the values cannot be separated from each other in the context of social interaction. Value takes refuge among other values, it is supported by others, so that a person who participates, according to his own capacity and in the context of some circumstances, in the realization of a value, participates at the same time in the realization of all. In other words, the hierarchy of values is complex, being the result of a long historical process in which authentic values are always placed in the same system as non-values. An absolute hierarchy of values is for man only an ideal, which a noble conscience must constantly pursue. Hence the need to cultivate critical thinking so that the individual can select authentic values from this offer and distinguish them from non-values [18, p. 160]. In essence, values are both foundational and adaptable, guiding societal norms and individual behaviors but generally evolving through subtle shifts rather than sudden, revolutionary changes. This dynamic process allows societies to adapt gradually to new circumstances while maintaining a core set of guiding principles.

3. Crisis and values or the crisis of (European) values

Humanity has been created and survives because of values and for these values to become the element of social cohesion globally. Each historical stage represents, in relation to its needs, a hierarchical table of values that constitutes a guide and a stimulus of the creative activity of man. General human values go hand in hand with human rights, because they establish a framework of minimum requirements to create and strengthen resilient social structures in which people are treated with dignity. Values (economic, aesthetic, social ones) are the filter of normative and attitudinal information and, once changed, there is a change of mentalities, desires, aspirations and habits. At the same time, a system of values cannot undergo a radical and definitive change, but only a "rearrangement of the constitutive values", of the "dominant" values [19, p. 18]. Values serve as a filtering mechanism through which normative (what ought to be) and attitudinal (how one feels or behaves) information is processed. When these values shift, they can lead to transformations in mentalities, desires, aspirations, and habits, effectively altering how individuals and societies think and act.

However, many of us have the impression that we live in a time of crisis, especially in the contemporary period, when the topicality and relevance of the principles and values that make up the object of ethics are subject to doubt. Good and evil, virtue and vice, right and duty, finally all the ideas that were thought necessary, unchangeable, are called to show their titles before the experience [...]. It seems that humanity is not guided only by an idea, by a light; every epoch, every evening, it extinguishes the light it used, [20, p. 123]. Gh. Bunescu, in turn, is convinced that we can no longer interpret the world as a "perfect harmony nor as

an ocean of order with (only) islands of disorder, but as an ocean of disorder in which the islands of order appear through the knowledge effort and human creation” [21, p. 112]. The current crisis is fundamentally rooted in a decline of the moral model [22, p. 185], which has been exacerbated by industrialization. This ongoing process has deepened various crises across multiple domains, including moral, cultural, and spiritual values, as well as critical areas such as the environment, resource sustainability, health, food security, and education. According to Borza, Popa and Osoian [23, p. 46], this multifaceted deterioration underscores the interconnected nature of societal challenges stemming from a waning moral framework amid rapid industrial development.

Research in the field highlights the systemic and continuous nature of the crisis of cultural values of the XXI century, whose main manifestations [24, p. 25-26], which emerge from each other, are:

1. *Diminishing the appreciation of the role of classical art and culture in the system of formation and education of the society and maximizing the impact of low-quality mass culture*; Today we are witnessing a real digital revolution and a remarkable information explosion in which we are caught disoriented, without well-defined criteria to guide us in trying to distinguish the truth from falsity, persuasion from manipulation, authenticity from counterfeiting and good from evil. As a consequence, Th. Adorno observes an adaptation of art to the consumer society. As a result, art degrades, becoming a consumer good, loses its *raison d'être* and integrates into the world of cultural industry [25, p. 305]. Thus, young people, as a generation characterized by a high degree of use and increased familiarity with communication, media and digital technologies, are the main target of the massive media bombardment (movies, videos, certain genres of music, social networking sites, etc.), being difficult for them not to fall prey to the assimilation of non-values or deviant behaviors. This constant bombardment can lead to a loss of moral and cultural landmarks, leaving individuals as "objects of manipulation" and exposed to "anti-models" that exacerbate a crisis of values within society. Consequently, many young people may struggle to recognize their own identity, comprehend the vast flow of information they receive, or establish meaningful boundaries and understanding. This situation underscores the importance of fostering critical media literacy and promoting values that help guide young individuals through the complex digital landscape.

2. *The pervasive influence of consumerism—a lifestyle centered on the superficial accumulation of goods –on individual identity and society at large*". Today, consumerism, also known as economic materialism, is a force that undermines personal uniqueness and promotes superficial values. This perspective contrasts consumerism with the ideals of a healthy, simple lifestyle championed by anti-consumerist viewpoints, which emphasize minimalism and authentic living [26, p. 172-173]. In 1955, economist Victor Lebow stated that: "Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions, our ego satisfactions, in consumption. The measure of social status, of social acceptance, of prestige, is now to be found in our consumptive patterns" [27, p. 3]. In other words, Lebow articulates how modern economies have transformed consumption into a central life ritual, equating social status and acceptance with purchasing patterns. He suggests that in contemporary society, the pursuit of material goods fulfills spiritual and ego-driven needs, positioning consumption as a key measure of worth.

Similarly, writer Jeff Gates underscores the global expansion of consumerism, where economic interests drive a relentless race for profit across borders. He warns that financial values have increasingly replaced traditional ethical, religious, and community-based values, emphasizing the dominance of material pursuits over moral considerations. Overall, he critiques consumerism for fostering superficiality, diminishing individuality, and prioritizing material wealth over deeper societal and personal values.

3. *The depreciation of the general-human values in relation to the economic ones;* The models of ethics and behavior that society offers to young people today are poor and lacking in depth (superficiality, easy glory, gain without work, overnight enrichment, violence, etc.), and some politicians or business people, many of whom are leaders of opinion, show indifference, apathy, breach of promise, lack of respect for human dignity, attitudes that lead to intensification of antisocial behavior: lying, blackmail, violence, discrimination, corruption, tax evasion, crime in any form, which violates freedom, human health and life, all in the name of the over-accumulation of economic goods. In contemporary society, economic values are of particular importance because they are transferred in monetary value. Money has come to act as an equivalent of other human values, and people have come to believe that with the help of money they can procure other values. Thus, the ideology of the consumer society gradually inspires people with a simple and easily assimilable idea: everything is sold and everything is bought.

4. *The decrease of the general formation level of the society and of the personal intellect.* In mass culture, Adorno states that we can meet that curious man, presenting a nihilistic character: "everything he cannot recognize, subsumes: he verifies; everything he cannot assimilate as such, he rejects as stupidity, ideology, wrong subjectivity; what he knows and what has been identified thereby becomes worthless, mere repetition". In addition, in some countries, university diplomas are in many cases just a screen behind which hides the unprofessionalism of recent graduates, which the labor market absorbs according to completely different criteria than those strictly valuable. Instead of focusing on the advancement of knowledge and the holistic development of students, educational institutions appear to prioritize cultivating skills that will serve economic competitiveness, potentially at the expense of deeper intellectual growth

5. *The degradation of interpersonal relations* as a result of the establishment of a fierce competition of enrichment, devoid of any principle and norm of regulation, dominated only by the cult of greed and illicit material enrichment, and having as main rule of the game: whoever owns more has control. This competitive environment replaces trust and cooperation with selfishness and exploitation. Within such a context, professional integrity diminishes as unethical practices like corruption, influence peddling, blackmail, nepotism (*cumătrism*), and careerism become normalized and accepted. These phenomena undermine the principles of meritocracy, which emphasize competence and fairness, leading to a distorted and unjust professional landscape where power and possession overshadow merit and ethical conduct. In these conditions, we are currently witnessing the legitimization in the professional field of phenomena such as: corruption, influence peddling, blackmail, *cumătrism* and careerism, which exclude from the beginning the observance and application of the principle of meritocracy.

6. *Depreciation of the concepts: "honor", "shame", "dignity", "gratitude" "politeness", "generosity".* The depreciation of these virtues signifies a shift away from a society grounded in moral consciousness and respectful interpersonal relations towards one where shamelessness and unrestrained behavior dominate. In this sense, Andrei Pleșu expresses his conviction that: "today's entanglement of local realities has an irritating obscene dimension, a close affinity with the psychology of shamelessness: shamelessness in politics, shamelessness in journalism, shamelessness in morals, in public behavior, in speech, in the way of (not) thinking. [...]. It is about a nonchalance without criteria of aggressive exhibitionism, a generalized suspension of values and good manners. It is about the dissolution of shyness, of scruples, of any inner censorship. The result is a landscape that is both hilarious and dramatic" [28, p. 5]. His analysis suggests that contemporary society is experiencing a depreciation - or devaluation - of these core virtues, leading to a cultural landscape marked by shamelessness and a loss of moral restraint. The humor arises from the absurdity of shameless behaviors, while the drama reflects the potential moral and social crises stemming from the loss of these foundational virtues. Pleșu's perspective warns of the dangers inherent in this cultural transformation, emphasizing the importance of restoring these values to maintain social cohesion and moral integrity.

7. *The degradation of family values and, as a result, the destruction of the family institution* accompanied by the *reduction of the responsibility* of one or both parents towards the children or the elderly parents' fate, potentially resulting in neglect, reduced support, and diminished social cohesion within families. In families where quarrels have become more frequent, accompanied by both verbal and physical aggression, children often grow up with the feeling that they are the cause of these conflicts, which affects their self-confidence, self-esteem and future self-image. In addition, due to the lack of material resources, most families found themselves with either one or both parents working abroad to meet their children's needs. Thus, family education - the value pillar in the preparation of future members of the community - was replaced by the sums of money sent by parents, which led in time to the formation in the consciousness of young people, the belief that taking possession of goods without making the necessary efforts represents a value. Such trends can have significant social implications, including increased vulnerability of children and the elderly, weakened community bonds, and broader societal instability. Addressing this issue typically involves promoting family-oriented values, strengthening social support systems, and encouraging responsible parenthood and eldercare.

8. *The egocentric vision of man in his relationship with nature, and the destruction of the biosphere and the increased risk of global ecological catastrophe*, as a consequence of the industrial revolutions that began around 1760, as a result of the invention of the steam engine. The second revolution occurred about a decade later, being characterized by mass production in new industries such as steel, oil industry and key inventions that radically changed human life such as: light bulb, telephone and internal combustion engine. Subsequently, the invention of semiconductors, PCs and the Internet marked the third industrial revolution that began in the 1960s. In this regard, Jeremy Rifkin, President of the Foundation on Economic Trends and adviser to the European Union, emphasizes in his book *The Third Industrial Revolution*, the seriousness of the consequences of human activity on the environment, calling us "the fossil fuels people" because "we grow our food in petrochemical fertilizers and pesticides. Most of our construction materials - cement, plastics and so on - are made of fossil fuels, as are most of our pharmaceutical products. Our clothes, for the most part, are made of petrochemical synthetic fibers. Our transport, power, heat, and light are all reliant on fossil fuels as well", concluding, finally, that we have built "an entire civilization on the exhumed carbon deposits" [29]. In other words, human activities such as deforestation, pollution, overfishing, and fossil fuel consumption have resulted in habitat loss, species extinction, climate change, and degradation of vital natural systems.

Today we are already talking about the Fourth Industrial Revolution also known as the digital revolution, which refers, in simple terms, to the way in which new technologies such as artificial intelligence, autonomous vehicles and the Internet merge with people's physical lives. Zvika Krieger of the World Economic Forum (WEF) highlights two key aspects that distinguish this revolution from the previous three:

- *blurring boundaries*: unlike earlier industrial revolutions, the lines separating the digital, physical, and biological worlds are becoming less defined. This convergence enables new possibilities but also raises complex ethical and societal questions;

- *rapid pace of change*: technological advancements are occurring at an unprecedented speed, challenging societies, economies, and governments to adapt quickly.

Klaus Schwab, the founder and executive chairman of the WEF, expressed concerns in 2016 that the most significant fear associated with the Fourth Industrial Revolution is the potential for increased inequality. There are risks associated with rapid technological change, including job displacement, increased inequality, and privacy concerns. This fact emphasizes the need for robust regulation, ethical frameworks, and policies that ensure inclusive growth.

9. *Inequality between people in terms of access to information and of the inability to effectively manage information sufficiency in the digital age*, in which both IT giants and users with a high degree

of digital literacy are driven by the Machiavellian maxim ("Purpose excuses means"), which means that they admit that they may infringe the limits of privacy, the limits of data integrity and security and the security of individuals, the limits of the principle of confidentiality, the limits of private property, including intellectual property, and all in the name of profit, measured in money, goods, power and influence. The digital revolution, on the one hand, has widened access to information and communication resources, making them available to an increasing number of individuals, and on the other hand has concentrated certain resources in the hands of interest groups. Thus, even if the number of users who have some access to development resources is constantly increasing, the number of those who can concentrate the critical mass of these resources and control them is decreasing. Therefore, if previously it was considered that whoever has the information has the power, in the new circumstances, this maxim must be reformulated as follows: whoever has the critical mass of information, he has the power: of decision, leadership and control. In other words, unequal access to information is nothing more than unequal access to economic and cultural resources, so that the same generation knows a range of lifestyles at opposite extremes, and the mechanism of social mobility is gradually eliminated from the system.

The question of whether the digital revolution represents a higher stage in human evolution hinges on how we interpret its impact on individual development and societal progress. On one side, proponents argue that digitalization streamlines daily tasks, freeing up time that can be invested in multi-dimensional human growth. This includes not only acquiring knowledge and skills but also integrating core principles and values such as human and social responsibility. In this view, technology acts as a catalyst for personal and collective advancement, enabling individuals to reach their full potential and fostering a more interconnected, conscious global community.

Conversely, critics highlight the challenges and risks associated with digitalization. They point out that excessive or unmindful engagement with digital technologies can lead to a loss of quality time, increased exposure to superficial content, and a decline in genuine human interactions. The idolization of technology and immediate success has led to the externalization of life and the alienation of man in the technical universe. Man is deprived of moral and existential landmarks, subjected to a process of robotization and standardization of attitudes and behaviors, human life is emptied of authentic aspirations and experiences [28, p.160]. This environment may diminish critical thinking, erode individuality, and make young people more vulnerable to manipulation or dependence on digital stimuli. Such effects could hinder personal freedom and authentic self-expression, raising concerns about whether digital progress truly equates to human evolution or simply transforms existing vulnerabilities.

Therefore, we note with regret that what Lebow said in 1955 is still relevant today, after more than six decades: "The greater the pressures on the individual to conform to safe and accepted social standards, the more does he tend to express his aspirations and his individuality in terms of what he wears, drives, eats- his home, his car, his pattern of food serving, his hobbies [27, p. 3]. In a society that produces to consume and creates to produce, we meet the consumer man, dependent on the material elements around him. In such a society the value of things suffers an alteration, because of the same character of their consumption. In such a society we must be aware of the need to review priorities, reconsider the system of rules and principles governing behavior, activity and human life. Such a society, confused by so many double standards, must rely on a pillar of authentic values, on the pillar of European values. According to Articles 1a and 2 of the Treaty of Lisbon, "the European Union" is based on the values of respect for human dignity, liberty, democracy, equality, the rule of law, and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society characterized by pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and

men [30]. These values are the pillars of any sustainable and welfare-oriented society, or the European Union seeks to promote peace, its values and the well-being of its peoples.

Looking through the prism of social realities, in the Moldovan society, the following phenomena are attested: dissolution and compromise of values; consumerist behavior; giving up the value of the profession; the renunciation of the family values, of the identity ones, consequently the acceptance of other life models, of the sociocultural environment in which the individual tries not to integrate, but rather to let himself be assimilated. Since the Republic of Moldova became an independent state (in transition to democracy), European values have often been present as elements of manipulative communication, camouflaging narrow interests, both in solemn declarations and electoral speeches, and in various normative acts and documents signed by the authorities, at national and international level, but very rarely implemented in political, social and economic practice or consistently pursued. As a result, Moldovan citizens no longer trust the power of these values in rehabilitating our anemic society in all respects, because the political elite, through the adopted actions and behavior, determined that European values be compromised at the level of the collective mentality. In other words, today we are witnessing a real crisis of European values in Moldovan society, a minefield for any political force that dares to manifest through concrete actions its pro-European and genuinely democratic beliefs. This crisis of (European) values is deepened by the freezing of the Republic of Moldova in the Soviet project, which is to blame not only Moscow, but also the duplicity of our political class, obsessed with power and money. However, there are also people with an autonomous mentality, who advocate for fairness, civility, integrity, responsibility and genuine solidarity - that is, what we generically call "European values". As long as there are such efforts, there is hope that our society will become a prosperous society.

From this, we rightly state that, in caring for the well-being of society as a whole, we must start by educating the younger generation in the spirit of European values: human dignity and the common good, honesty and integrity kindness and generosity, love and wisdom, sincerity and loyalty, respect and tolerance, compassion and gratitude, solidarity and altruism, empathy and responsibility. The formation of prosocial behaviors, since family and school, is an imperative of modern education and an indisputable social need, which will result in the cultivation of responsible youth personalities with an adequate self-image, able to develop continuously and integrate into the community in which they live, thus contributing to its development.

4. European values – the "hard core" of the young Moldovans' mentality

The process of building, transforming and consolidating mentalities is one of the prominent topics at the heart of public debates in all countries of the world, but especially in countries in transition. The way in which the citizens of a country perceive, filter information and relate to immediate realities, is identified as one of the main obstacles to substantial social change. As a result, we consider that the issue addressed is relevant for the Republic of Moldova, starting from the need to highlight the multiple ways of perceiving, thinking and acting in a society in continuous transition, where the failure of the transition is due: first of all, to the weakness of state institutions, towards which there is a social apathy, secondly, to the lack of firmness and the political and geopolitical oscillation of the governing elites, which do not show verticality and do not promote a stable system of values and principles, and, last but not least, to the deficiency of civil society, divided from a cultural, identity and

geopolitical point of view, which as a result cannot influence or hold accountable the representatives of power for a government oriented towards the interests of the citizens.

In the process of transition from totalitarian to democratic regime, our country has systematically undergone transformations that have changed its social, demographic and economic structure, with direct effects on both cultural and social norms and values, as well as on the individual and collective mentality. Consequently, the growth, education and development of the young people personality (mentality), in a still in transition society has been and is marked, by almost three decades, of continuous oscillation between democratic values and principles and nostalgia for the Soviet past, between integrity and corruption, between the law and illicit schemes, between rights/freedoms and discrimination, between reform and stagnation, between hope, trust and deep disappointments. V. Sprânceană and P. Negură consider that our transition should not be approached only as a description of a situation that we have not yet overcome, but also as a mechanism through which power relations are reproduced or as a cunning way to make us accept without hesitation (and even with enthusiasm) some political experiments conceived outside and which are imposed on us in the same logic as those, which are administered from within (*the billion theft*). In this regard, it should be noted that both the authorities and citizens have turned into habit, the tendency to justify and even legitimize certain phenomena that erode Moldovan society by appealing to the concept of transition. They argue that it is natural that these antisocial phenomena (corruption, social injustice, discrimination, violation of the law, *cumătrism*, influence peddling) to happen constantly, since we are still in transition. Consequently, we notice as a predominant manifestation, the attempt of the population of the Republic of Moldova to adapt to these realities, to accept them, considering them normal and even to resort to them for solving personal problems than the effort to fight them.

All these has profoundly influenced the lifestyle and way of relating to the immediate reality of the new generation of young people, a generation that was born in the first days of independence, graduated from school, high school and university and has already made the first attempts to integrate into public life (in politics, business, science or the education of younger generations), a generation that has been exposed to processes that previous generations did not have much science and experience in, such as consumerism, virtual reality games, migration table, communication in virtual space. At the same time, the new generations of young people have been and are formed and shaped in a social climate in which previous generations have tried and still insist on projecting on them a certain version of the past as the only true one, often using various levers (educational, informational and , even, political) in order to root beliefs and representations, which subsequently determine their views on life, electoral choices and personal identity. The competition between the desire to belong to the European space and the desire to belong to the Russian space, considered as the only possible options, separated the population into two antagonistic segments which, despite often engaging in violent rhetorical disputes, came to the understanding that being on the border of two distinct geopolitical worlds (EU and Russia), with roots and affinities alike in both, our country cannot afford to promote a foreign policy and an unidirectional self-identification, to the West or to the East. This bipolarity of the Moldovan collective mentality is deepened by the contribution of political elites who use identity and cultural wars as a tool to obtain, exercise and maintain power and who contribute to the alteration of representative democracy by "technical" rigging of elections, which further disorients our young people. At the same time, wider phenomena such as economic

globalization, the explosion of the Internet and social networks and the technological revolution along with the crisis of spiritual values in favor of material ones, have left their mark on both models of thinking, action and behavior and the perception of the role that every citizen has in overcoming the problems that grind the stability of our country.

These realities eventually led to the shaping of two types of *mentalities* among young people: *flexible-autonomous mentality* and *rigid-collectivist mentality*. Young people with a *flexible-autonomous mentality* are distinguished by their options that are sometimes different from those of the group of origin, but which voluntarily show solidarity, based on common values, such as fairness, honor and dignity; they are receptive to reforms, they learn, gain experience, and contribute to the materialization of the aspirations of those they interact with, working continuously to become better. For them, there are no self-imposed limits, but challenges that must be overcome, and when they encounter difficulties, they assume their mistakes, seeing any problem encountered as an opportunity to overcome themselves and find better solutions. Young people with a *flexible-autonomous mentality* show love for their peers, aspire to the development and transformation of the society in which they live and are open to assimilating good practices, basing their attitudes and prosocial actions on universal principles and values. In their turn, young people with a *rigid-collectivist mentality* identify too much with their position and see everything in shades of superior and inferior. Slaves of consumerism and of the idea of having instead of being, they end up losing their identity and being dominated by unethical, illicit realities built on non-values, just because they are not able to realize the difference between what is good and what is bad. They are often resistant to change and innovation, show tolerance and support for the resources, legacies and contradictory discourses of the past in relation to the present of an independent, fragile and anemic state and outlining their political and electoral choices and behaviors, starting from this conviction, which having the meaning of "who is not with us, is against us", cannot represent an engine for the society.

In other words, in the Republic of Moldova, starting from the segmentation of the population on geopolitical criteria, are distinguished: "communist mentality" as a survival mentality based on appeal to relatives and relationships ("*cumătrism*", influence peddling), (as manifested in communist dictatorial regime, dominated by the policy of one party governing and the cult of personality), censorship and lying, with the rank of law, starting from the highest level of the state, poverty with multiple and serious shortcomings generating systematic thefts from the state budget (the billion theft), as well as various constraints, which have generated and still maintain the chronic distrust of the Moldovan people in the current government, whatever its political color is; and "*Western mentality*", which focuses on democracy, the rule of law, human dignity, the well-being and prosperity of society, respect for the principles and value system specific to developed countries, which creates optimal conditions for achieving new performance and modernizing society, starting from good practices and high standards, valid for all states that adhere to Western principles and values.

Therefore, taking as a point of reference this segmentation of the youth collective mentality, which further stagnates the acceptance and implementation of social reforms, we consider that young Moldovans remain a generation that still needs a stable system of values, that provides them with criteria of orientation towards the idea of Good, Truth and Beauty in a captive society, administered by an oligarchic political regime; a society impoverished with a down-to-earth economy, which bears the burden of the "billion theft"; a society in which a quarter of the population works permanently or temporarily abroad, leaving children in the

care of others and parents in the bondage of loneliness; a society in which reform is either not desired or only mimicked, and a well-defined development project for the country for at least the next 10 years, is missing and we do not even know if it can be adopted in conditions of permanent confrontations between political parties, which are fighting for positions and authority and less for the fulfillment of their electoral promises. Young Moldovans must understand that they can achieve their goals, only if they shape their mentality, by assimilating authentic values that guide them in this regard, by overcoming old patterns of thinking and by constructive critical analysis of all information that knowledge-based society gives them the opportunity to access and/or receive. In this sense, we consider important the role of the education system in cultivating European values as the core of the mentality of young Moldovans, a flexible mentality, open to change and reflected in adopting a responsible prosocial behavior.

In this sense, in Carol Dweck's view, any person can change their mentality into a flexible-autonomous one, but this effort must be accompanied and coordinated by a new system of beliefs and trust in all state institutions and their leaders [31]. The same idea is put forward by N. Niță who considers that the change of mentality must start from within the political class, in order for it to improve its capacity to build "vocation leaders", based on three important criteria [32, p. 9]:

- to have a passion for what they do, respecting high work standards;
- to show high social responsibility;
- to have a sense of temperance and moderation, with the purpose of guaranteeing the common good, but not the primitive impulses, which generate egocentrism.

In other words, both authors reiterate the need to identify political leaders who will become a model of public dignity and professional integrity for new generations. In addition, we believe that, in order to ensure the sustainability of the European destiny, the new mentalities of young people should be able to transform, in turn, the mentality of other members of the community, through social contagion, through the power of example of prosocial behavior, especially given that "theoretical values, as well as aesthetic, ethical and religious ones, are goods that are above the contingencies of time and the preferences of one generation or another: they must form permanent and equally justified targets of any generation, because in this way the spiritual treasure of Europe and, with it, of the whole humanity will be enriched" [33, p.383]. This perspective underscores the role of youth as catalysts for cultural and moral continuity, ensuring that Europe's rich spiritual and moral treasures are preserved and enhanced for future generations.

5. Conclusions

The historical communities that have succeeded each other over time have not only committed deeds and created institutions, but have accumulated, preserved and transmitted a "mental baggage" in the form of memories, concepts, values, ideals, norms, habits and traditions. For these reasons, the research of collective mentalities is an essential step in knowing and understanding the contemporary world and in trying to transform it. Values, in turn, represent guidance in life, set the direction we go and build our personality, while personal beliefs, which must be based on spiritual values, are the fuel that drives the engine called the person in action. As a result, taken together, values and beliefs, structure and shape our mentality on which our whole existence is based.

An open to change and innovation society is the society that invests in the education of new generations of citizens, in order to create a healthy environment for training and shaping their personality, by cultivating common values of freedom, solidarity, tolerance, compassion, empathy and social responsibility. Only in an environment, characterized by these values, young people can become creators of important and groundbreaking services, goods, innovations, solutions and contributions, which will ultimately provide the resources needed to ensure a decent life and well-being (determined by the existence of the hope of tomorrow, the maintenance of interpersonal relationships of cooperation and mutual support, ensuring the psychological climate conducive to productivity and emotional balance, etc.) of the entire population.

As a result, our young people will want to contribute to the transformation of our country into a developed and prosperous country, in which honest people condemn and do not admit to government politicians with immoral behavior, based on lies and lack of transparency, but advocate for promotion and respect of the principle of meritocracy and professional and personal integrity. They will also realize that in order for this transformation to take place, it is necessary for every citizen to adopt and consistently respect a system of authentic values that allows each individual to develop according to their own abilities and aspirations. The profound and sustainable transformation and consolidation of the mentality of young people will eventually lead to the manifestation of another type of behavior, which will become contagious at the societal level, being learned through the power of example, when honor, as a value-imperative, forces everyone to assume their mistakes and be aware of and respect their individual social role. In this sense, each individual contribution counts in supporting, at the social level, a culture of *self-confidence* and *trust in others*, *self-respect* and *respect for others*, *personal responsibility* through awareness of self-worth in the equation of totality and *social responsibility* through self-annihilation and active participation in the reform and development of the community in which they live. Therefore, transmitting values, teaching young people to respect and cultivate them in all that they are and in all that they do, means nothing more than reflecting this fact in their own behavior - a mirror of values, which anyone one can rely on.

Thus, it is necessary, in the process of exploring values in the educational environment, at all levels, to focus on developing the creative, psychological and social potential of educational subjects, by interconnecting *fundamental values*: Good, Truth, Justice, Beauty, Freedom; *with European values*: ethnic, cultural and religious tolerance, cooperation, respect for human dignity and human rights, the human ideal; *and national values*: identity, dignity, solidarity, equity, sovereignty, independence, language, history, culture, educational ideal, national ideal, etc. As a result, *education in the spirit of European values* will aim at shaping individual and community consciousness in the sense of assuming European values, developing a sense of belonging to European culture and civilization, exercising rights and responsibly assuming obligations and, last but not least, promoting human beings as an end in themselves and not as a means to something else, believing in man's ability to surpass himself and respecting his dignity.

Ultimately, recognizing the immense value of time underscores the importance of cultivating enduring human values - such as empathy, integrity, and responsibility - that serve as the foundation of meaningful existence. Whether digitalization becomes an evolutionary leap depends on our collective ability to harness its benefits consciously, while safeguarding the core principles that define our humanity. Balancing technological advancement with a

commitment to personal and ethical development is crucial in ensuring that the digital revolution elevates rather than diminishes the human condition.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Tompea, T. A. Social Mentalities. Contemporary Social Perspectives. *Anuarul Universitatii "Petre Andrei" Din Iasi - Fascicula: Drept, Stiinte Economice, Stiinte Politice* 2017, 20, pp. 223-235.
2. Pohlmann, M.; Bär, S.; Valarini, E. The analysis of collective mindsets: introducing a new method of institutional analysis in comparative research. *Revista de Sociologia e Politica* 2014, 22(52), pp. 7-25.
3. Orianne, J.-F.; Eustache, F. Collective memory: between individual systems of consciousness and social systems, *Frontiers in Psychology* 2023, 14, pp. 1-14.
4. Wertsch, J. V.; Roediger III, H. L. Themes for future research on memory, mind and media. *Memory, Mind & Media* 2022, 1(e18), pp.1-11.
5. Lavi, E.; Reich, Y. System Value Analysis: Model and Example, In: *Proceedings of the International Conference on Engineering Design (ICED23)*, Bordeaux, France, 24-28 July, 2023, pp. 3285-3294.
6. Hanel, P.H.P.; Foad, C.M.G.; Maio, G.R. Attitudes and Values. Available online: <https://repository.essex.ac.uk/36645/1/Attitudesandvalues-acceptedversion.pdf> (accessed on 9 March, 2025).
7. Schulz, W.; Ainley, J.; Fraillon, J.; Losito, B.; Agrusti, G.; Damiani, V.; Friedman, T. Attitudes Toward Important Issues in Society. In: *Education for Citizenship in Times of Global Challenge*. Springer, Cham, Switzerland, 2025, pp. 123-164.
8. McMurtry, J. The Global Crisis of Values. Philosophy and World Problems. What is good? What is bad? The Value of all Values through time, place and theories. *Encyclopedia of Life Support Systems* 2004, 1, pp. 3-43.
9. Zuziak, W. Values as a basis for human's education. *Logos I etos* 2014, 2(37), pp. 7-20.
10. Krasnova, D.; Grinavica, M. European values: a comparative culture analysis/ Europejskie wartości: porównawcza analiza kulturowa. *Economic and Regional Studies* 2024, 17(2), pp. 331-346.
11. Boia, L. *Pentru o istorie a imaginarului*. Humanitas, București, Romania, 2000, p. 11.
12. Duhamel-Amado, C.; Lobrichon, G.; Duby, G. *L'écriture de l'Histoire. Bibliotheque Du Moyen Age*. De Boeck Université, Bruxelles, Belgium, 1996, 234 p.
13. Dușu, Al. *Dimensiunea umană a istoriei: Direcții în istoria mentalităților*. Meridiane, București, România, 1986, p. 12.
14. Nicoară, S. *Mentalități colective. Imaginarul social, istoria în durată lungă*. Accent, Cluj-Napoca, România, 2009, p. 65.
15. Voicu, B. Penuria Pseudo-Modernă a Postcomunismului românesc. Volumul I. In: *Schimbarea socială și acțiunile indivizilor*. Projects, Iași, România, 2005, p. 67.
16. Betea, L. *Mentalități și remanențe comuniste*. Nemira, București, România, 2005, p. 6.
17. Prozorovschi, S. Locul valorilor religioase în sistemul axiologic contemporan. *Revistă de Istorie și Politică* 2011, 1, pp. 122-132.
18. Aderov, V.; Sculea, L. Orientări și ierarhii valorice în epoca relativismului axiologic. *Anuar științific: muzică, teatru, arte plastice*, 2012, 1(14), pp. 157-161.
19. Iluț, P. Dinamica valorilor sociale. În: *Sociologie Românească*, Polirom, Iași, România, 2004, 2, p.18.
20. Leonardescu, C. *Etica și conduita civică*. Lumina Lex, București, România, 1999, p. 123.
21. Bunescu, Gh. *Școala și valorile morale*. Didactică și Pedagogică R.A, București, România, 1998, p. 112.
22. Lazariuc, C. Relația mentalitate colectivă – responsabilitate socială în condițiile noilor provocări societale. In: *Materialele conferinței științifice internaționale "Cercetarea, dezvoltarea și inovarea din perspectiva eticii globale"*, 15 aprilie 2022, Chișinău, Republica Moldova, 2022, p. 183-196.
23. Borza, A.; Osoian, C.; Popa, M. „Criza de model moral” – o realitate? *Management and Marketing Journal* 2007, 1, pp. 45-58.
24. Lazariuc, C. Criză și valori sau criza valorilor (europene). In: *Identitate și valori culturale în context European*. Centrul Editorial-Poligrafic al USM, Chișinău, Republica Moldova, 2021, pp. 25-26.
25. Adorno, Th. Schema culturii de masă. Available online: <https://idea.ro/revista/ro/article/XMtXTiwAADgAz83E/schema-culturii-de-masa> (accessed on 1 June, 2025).
26. Swagler, R. Modern Consumerism. In: *Encyclopedia of the Consumer Movement*, Brobeck, S. (ed.). ABC-Clío, Santa Barbara, California, SUA, 1997, pp. 172-173.
27. Lebow, V. Price Competition in 1955. *Journal of Retailing* 1955, p. 3.
28. Pleșu, A. *Obscenitatea publică*. Humanitas, București, România, 2005, p. 5.

29. Roach, B.; Goodwin E.; Nelson, J. Consumption and the consumer society. 2019. Available online: https://www.bu.edu/eci/files/2019/10/Consumption_and_Consumer_Society.pdf (accessed on 8 June, 2025).
30. Uniunea Europeană. Tratatul de la Lisabona de modificare a Tratatului privind Uniunea Europeană și a Tratatului de instituire a Comunității Europene, semnat la Lisabona, C2007/306/01. Available online: https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=uriserv%3AOJ.C_.2007.306.01.0001.01.RON&toc=OJ%3AC%3A2007%3A306%3ATOC#a-001 (accessed on 14 April 2025).
31. Dweck, C.S. *Mentalitatea învingătorului. O nouă psihologia a succesului*. Curtea Veche, București, Romania, 2013, 384 p.
32. Niță, N. Rolul și influența mentalității în adoptarea atitudinilor și comportamentelor coruptibile vs. incoruptibile în România. *Acta Universitatis George Bacovia. Juridica* 2020, 9, p. 9.
33. Bagdasar, N. *Scrieri*. Eminescu, București, România, 1988, 420 p.

Citation: Lazariuc, C. The impact of European values on youth mindsets in the Republic of Moldova. *Journal of Social Sciences*, 8 (3), pp. 126-141. [https://doi.org/10.52326/jss.utm.2025.8\(3\).10](https://doi.org/10.52326/jss.utm.2025.8(3).10).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).11](https://doi.org/10.52326/jss.utm.2025.8(3).11)
CZU 616.89-008.441.13-053.6(675-25):159.9.072.43



ADDICTION TO PORNOGRAPHY AMONG TEENAGERS IN KINSHASA AND ITS DETERMINANTS

Jonathan Enguta Mwenzi *, ORCID: 0000-0002-0647-2610,
Nassy Mutunga Nassy, ORCID: 0009-0004-0058-0591,
Carmy Tshayima Mayunga, ORCID: 0009-0005-1317-8582

Université de Kinshasa, 1 avenue de l'Université/Lemba, B.P. 127 Kinshasa XI, République Démocratique du Congo
* Corresponding author: Jonathan Enguta Mwenzi, psyjonathanenguta@gmail.com

Received: 07. 22. 2025
Accepted: 09. 11. 2025

Abstract. The aim of this research was to evaluate pornography addiction in a sample of 405 adolescents in the city of Kinshasa, as well as its explanatory factors. A pornography addiction assessment test was administered to the adolescents targeted in the study. After correction of this test, it was found that 123 subjects (30.4%) out of the 405 surveyed had developed pornography addiction. What's more, only the district of residence variable influenced pornography addiction. Specifically, there are more adolescent pornography addicts residing in the Lukunga district compared to other districts in the city of Kinshasa.

Keywords: *Addiction to pornography, adolescents, sociodemographic determinants, sexuality, Kinshasa*

Rezumat. Scopul acestei cercetări a fost de a evalua dependența de pornografie la un eșantion de 405 adolescenți din orașul Kinshasa, precum și factorii explicativi ai acesteia. Adolescenților vizați în studiu li s-a administrat un test de evaluare a dependenței de pornografie. După corectarea acestui test, s-a constatat că 123 de subiecți (30,4%) din cei 405 chestionați au dezvoltat dependență de pornografie. Mai mult, doar variabila districtului de reședință a influențat dependența de pornografie. Mai exact, există mai mulți adolescenți dependenți de pornografie care locuiesc în districtul Lukunga în comparație cu alte districte din orașul Kinshasa.

Cuvinte cheie: *Dependență de pornografie, adolescenți, determinanți sociodemografici, sexualitate, Kinshasa*

1. Introduction

Depuis toujours, l'adolescence est considérée comme une période de la vie humaine au cours de laquelle l'individu développe des conduites tant socialement admises que déviantes. Parmi les conduites acceptables par la société, on retrouve la curiosité, le goût du défi et de la découverte... Dans la liste des conduites déviantes, on peut citer: la prise excessive de la drogue ou d'alcool, le temps trop prolongé devant les écrans des télévisions ou des portables, la forte envie de jouer à des jeux d'argent etc. [1]. Ces différentes conduites

excessives sont qualifiées d'addiction. Ainsi, une addiction est une dépendance à une substance ou à une activité avec des conséquences nuisibles sur la santé physique et mentale. Et, cette dépendance se caractérise par un désir souvent puissant ou compulsif de consommer une substance ou de pratiquer une activité [2]. De ces différentes conduites déviantes, le temps prolongé devant les écrans semble attirer la curiosité des chercheurs. De nos jours, les adolescents sont de plus en plus collés aux écrans de leurs téléphones. Ils passent ainsi plusieurs heures devant leurs téléphones.

Si on peut admettre que ces adolescents sont en tout moment sur réseaux sociaux ou sur internet pour causer avec leurs amis, on ne peut pas non plus nier leur forte tendance à consulter des sites pornographiques. Plusieurs de ces adolescents passent des journées entières à télécharger des vidéos et images pornographiques. Ce désir puissant s'explique par le fait que l'adolescence est une période qui marque l'éveil de la sexualité. C'est pourquoi, plusieurs recherches menées à travers le monde ont démontré que l'addiction à la pornographie est le type d'addiction le plus récurrent chez les adolescents suite à la libéralisation de leur sexualité. D'ailleurs, d'après les données issues d'une étude française auprès d'un échantillon de dix mille adolescents âgés de 14 à 18 ans, il a été constaté que 80% des garçons et 45% des filles ont déjà eu accès à des contenus pornographiques. En plus, ces sujets affirment être des spectateurs assidus ou des consommateurs quotidiens de la pornographie [3-5].

Ces spectateurs assidus rajoutent qu'ils se livrent aussi au sexting, qui consiste à envoyer des photos ou des vidéos partiellement ou totalement dévêtus à partir des smartphones [5]. A ce sujet, D'orlando [6] affirme que dans le passé les utilisateurs de pornographie devaient se présenter dans des endroits publics (centres de location de vidéos, boutiques etc.) et dépenser un peu d'argent pour obtenir un film ou un exemplaire de magazine pornographique. Cependant, depuis quelques temps, ils ont la possibilité d'avoir accès au même contenu gratuitement et directement à leur domicile grâce à Internet, et cela, dans leurs smartphones. C'est dans ce contexte que Cooper [7] affirme que c'est la nature abordable, accessible et anonyme d'informations sexuelles sur Internet à partir des smartphones, qui conduit les adolescents à en consommer d'avantage. De plus, l'accessibilité au contenu pornographique s'avère plus facile que jamais et la gratuité de la majorité des sites diffusant du matériel pornographique permet aux adolescents de visionner sans déboursier [6,8,9].

Pour Castro-Calvo et al. [10] ainsi qu'Hermand et al. [11], les conduites addictives à la pornographie sont des conduites issues des addictions aux écrans, et particulièrement aux téléphones intelligents. Bull Acad [12] dresse, à ce sujet, une liste qui donne un aperçu sur les proportions et les pourcentages des contenus pornographiques selon les réseaux sociaux à partir des smartphones. Ainsi, on a: (a) facebook avec 12 millions des vidéos de nudité des enfants et d'exploitation sexuelle, (b) youtube avec 80% de contenu sexuel explicite, (c) tiktok avec 30,9% de nudité adulte et (d) telegram avec 25% de trafic de vidéo sexuelle. Cette addiction de la pornographie a des conséquences à court et à long termes sur la vie sociale et affective des jeunes. Elle est associée à des problèmes émotifs (symptômes dépressifs, honte, culpabilité, faible niveau d'estime de soi), à l'isolement social, à des problèmes relationnels, à des problèmes scolaires (réduction de la productivité ou altération de la performance au travail ou dans les études, échecs scolaires), à des problèmes financiers, à des problèmes légaux, à des problèmes de santé et des problèmes sexuels (dysfonctions érectiles, troubles du désir). Tous ces effets de l'addiction à la pornographie justifient

l'importance des études sur la prévalence des addictions à la pornographie à travers le monde [10,11]. Ces études permettent de comprendre l'ampleur de cette addiction, ses effets sur la santé mentale des jeunes ainsi que d'identifier les axes d'intervention à privilégier lors de la prise en charge de ce problème de santé. En tenant compte de l'importance de la prévention de cette addiction, il nous a paru important de mener une étude évaluant la prévalence de l'addiction à la pornographie chez une population des jeunes de la République Démocratique du Congo (en l'occurrence les adolescents de la ville de Kinshasa). En plus, il est aussi question de déterminer les facteurs sociodémographiques pouvant expliquer cette addiction chez les adolescents de la ville de Kinshasa. Cette étude se justifie par le fait que dans le contexte congolais, les études de la prévalence de l'addiction à la pornographie sont très rares. La plupart d'études réalisées jusque-là se sont proposé d'identifier les jeunes congolais qui recourent à la pornographie dans le cadre de leurs pratiques sexuelles [13-16]. La pertinence de cette étude, dans le contexte de la ville de Kinshasa, est dictée par sa forte religiosité [13], qui logiquement devrait être un facteur explicatif d'une faible prévalence de cette addiction chez les adolescents de cette ville.

2. Méthodologie

2.1. Cadre physique de l'étude

La ville de Kinshasa est le cadre physique de l'étude. Elle est la capitale de la République Démocratique du Congo. Elle a 24 communes regroupées en quatre districts: (1) Lukunga, (2) Mont-Amba, (3) Funa et (4) Tshangu. Sa superficie est estimée à 9.965 km².

2.2. Participants à l'étude

La population de notre recherche est constituée de tous les adolescents de la ville de Kinshasa. Nous avons tiré, de cette population, un échantillon par convenance de 405 sujets. Cet échantillon varie en fonction des caractéristiques sociodémographiques ci-après : (1) le sexe, (2) la tranche d'âge, (3) le niveau de scolarité, (4) le district de résidence et (5) la confession religieuse. En ce qui concerne le sexe, nous avons 201 garçons et 204 filles. Au niveau de l'âge, il y a 126 adolescents âgés de 13-15 ans et 279 âgés de 16-18 ans. S'agissant du niveau d'études, nous avons 48 sujets sans niveau, 150 sujets inscrits en 1^{ère} et 2^{ème} années des humanités ainsi que 207 sujets de 3^{ème}–4^{ème} années des humanités. En ce qui concerne le district de résidence, notre échantillon est constitué de 100 sujets de la Tshangu, 101 du Mont-Amba, 102 de la Funa et 102 de Lukunga. Enfin, s'agissant de la confession religieuse, on retrouve 24 chrétiens catholiques, 204 chrétiens des églises de réveil et 177 chrétiens protestants.

2.3. Instrument de récolte des données

Pour évaluer la prévalence de l'addiction à la pornographie auprès de notre échantillon d'étude, nous avons adapté le test d'addiction à l'internet de Young [9] à la problématique de l'addiction à la pornographie. Dans sa version originale, le test comprend 20 items correspondant à vingt situations pour lesquelles le sujet doit indiquer la fréquence à laquelle il recourt à l'internet sur une échelle de 1 (rarement) à 5 (toujours). Notre adaptation de ce test s'est inspirée de plusieurs adaptations de ce même instrument à l'évaluation des addictions spécifiques [17-20]. Notre adaptation a consisté à la réduction de nombre d'items à 12. En plus, le concept « internet » dans les énoncés du test a été remplacé par l'expression « sites sexuels en ligne ou sites pornographiques ». L'analyse de la consistance interne a démontré une bonne homogénéité interne avec une valeur alpha de

Cronbach supérieure au seuil de .70 (soit 82 pour l'ensemble du test). Le score total obtenu par chaque sujet est compris entre 12 et 60. Le score seuil est de 30. Dans ce contexte, le sujet est qualifié d'«addict» à la pornographie lorsqu'il a un score supérieur ou égal à 30.

3. Résultats de l'étude

En premier lieu, nos résultats se rapportent à la prévalence de l'addiction à la pornographie chez les sujets enquêtés. En deuxième lieu, nous croisons la prévalence de l'addiction à la pornographie en fonction des variables sociodémographiques ciblées dans l'étude.

Tableau 1

Prévalence de l'addiction à la pornographie		
Addiction à la pornographie	Effectif (E)	Pourcentage (%)
Non-addict	282	69,6
Addict	123	30,4
Total	405	100,0

La lecture du Tableau 1 indique que seuls 123 sujets (30,4%) sur les 405 enquêtés ont développé de l'addiction à la pornographie ou sont addicts à la pornographie. On peut conclure que ce groupe des 123 sujets est plus préoccupé par la pornographie car il reste plus longtemps sur des sites sexuels en ligne. Ces adolescents négligent les tâches et travaux scolaires pour passer plus de temps dans les sites à caractère sexuels. Ils se sentent agacés si quelqu'un leur dérange pendant qu'ils naviguent sur les sites pornographiques. Il arrive de fois où ils manquent de sommeil parce qu'ils sont restés tard dans les sites pornographiques. Ils choisissent de passer plus de temps sur des sites pornographiques que de faire autre chose comme étudier ou sortir avec leurs proches. Ils regardent la pornographie pour échapper aux difficultés ou pour soulager leur mauvaise humeur. La situation des sujets non-addicts à la pornographie ne leur exempte pas de la consommation de la pornographie. Cependant, l'usage qu'ils en font est non problématique car il n'affecte pas leurs relations sociales. On pourrait bien retrouver dans ce groupe des non-consommateurs et des consommateurs occasionnels de la pornographie.

Tableau 2

Prévalence de l'addiction à la pornographie selon le sexe (p.0, 05)						
Sexe	Addiction à la pornographie			Khi ²	Sig.	Décision
	Non-addict	Addict	Total			
Masculin	132 (65,7%)	69 (34,3%)	201 (100%)	0,98	0,32	NS
Féminin	150 (73,5%)	54 (26,5%)	204 (100%)			

Légende: Sig. - signification; NS - non-significative; Khi² - test Chi-carré.

Du Tableau 2, il a été dégagé qu'il y a plus de garçons (34,3%) addicts à la pornographie que des filles (26,5%). Cette différence numérique n'est pas statistiquement significative ($p > 0,05$). Ainsi, on peut conclure que le sexe n'a pas affecté significativement la prévalence de l'addiction à la pornographie chez les sujets enquêtés.

Tableau 3

Tranche d'âge	Addiction à la pornographie			Khi ²	Sig.	Décision
	Non-addict	Addict	Total			
13-15 ans	87 (69,1%)	39 (30,9%)	126 (100%)	0,01	0,92	NS
16-18 ans	195 (69,9%)	84 (30,1%)	279 (100%)			

Légende: Sig. - signification; NS - non-significative; Khi² - test Chi-carré.

La lecture du Tableau 3 a révélé qu'il y a plus des sujets addicts âgés de 13-15 ans (30,9%) comparativement à ceux âgés de 16-18 ans (30,1%). Cependant, cette différence numérique ne se confirme pas statistiquement car la probabilité y associée est supérieure à la probabilité critique ($p > 0,05$).

Tableau 4

Niveau de scolarité	Addiction			Khi ²	Sig.	Décision
	Non-addict	Addict	Total			
Non-scolarisé	17 (35,4%)	31 (64,6%)	48 (100,0%)	11,63	0,07	NS
1 ^{ère} -2 ^{ème} années des humanités	102 (68,0%)	48 (32,0%)	150 (100%)			
3 ^{ème} - 4 ^{ème} années des Humanités	163 (78,7%)	44 (21,3%)	207 (100%)			

Légende: Sig. - signification; NS - non-significative; Khi² - test Chi-carré.

Du Tableau 4, on constate que les sujets non-scolarisés (64,6%) sont plus addicts à la pornographie que les autres adolescents. Les adolescents inscrits en classes terminales du niveau secondaire (3^{ème}-4^{ème} années des humanités) (21,3%) sont moins addicts à la pornographie que les autres adolescents. Cependant, ces différences numériques n'ont pas donné lieu à une différence statistiquement significative pouvant permettre de conclure à l'effet du niveau de scolarité sur l'addiction à la pornographie chez les adolescents enquêtés ($p > 0,05$).

Tableau 5

District de résidence	Addiction			Khi ²	Sig.	Décision
	Non-addict	Addict	Total			
Lukunga	41 (40,2%)	61 (59,8%)	102 (100,0%)	4,63	0,00	S
Tshangu	81 (81,0%)	19 (19,0%)	100 (100%)			
Mont-Amba	74 (73,3%)	27 (26,7%)	101 (100%)			
Funa	86 (84,3%)	16 (15,7%)	102 (100%)			

Légende: Sig. - signification; NS - non-significative; Khi² - test Chi-carré.

Il ressort du Tableau 5 qu'il y a plus d'adolescents consommateurs excessifs de la pornographie dans le district de la Lukunga comparativement aux autres districts. Cet effet de la variable district de résidence a été confirmé statistiquement ($p < 0,05$).

Tableau 6

Prévalence de l'addiction à la pornographie selon la confession religieuse ($p < 0,05$)

Confession religieuse	Addiction			Khi ²	Sig.	Décision
	Non-addicts	Addicts	Total			
Catholique	15 (62,5%)	9 (37,5%)	24 (100%)	0,61	0,73	NS
Eglises de réveil	138 (67,6%)	66 (32,4%)	204 (100%)			
Protestante	129 (72,9%)	48 (27,1%)	177 (100%)			

Légende: Sig. - signification; NS - non-significative; Khi² - test Chi-carré.

Du Tableau 6, il ressort que les chrétiens catholiques (37,5%) sont plus addicts à la pornographie par rapport aux sujets d'autres confessions religieuses. Cependant, ces différences numériques n'ont pas donné lieu à une différence statistique pouvant permettre de conclure à une variabilité de la prévalence de l'addiction à la pornographie selon la confession religieuse ($p > 0,05$).

3. Résultats des Discussion

Les résultats obtenus indiquent que 123 sujets (30,4%) sur les 405 enquêtés ont développé de l'addiction à la pornographie. Ces résultats vont de pair avec ceux de Reynié [21] où il a été constaté que moins de 50% de jeunes français âgés de 14 ans et plus enquêtés étaient addicts à la pornographie. Ils remettent en question ceux de Javion [22] où il a été constaté que 65,4% des adolescents français enquêtés étaient addicts à la pornographie. Cet écart entre nos résultats et ceux de Javion Louis [22] peut se justifier par le contexte culturel des milieux d'études. En effet si en France, la sexualité n'est pas un sujet tabou, cela n'est pas le cas en République démocratique du Congo (RDC), où les sujets liés à la sexualité font partie des tabous [23]. Les parents et les enfants évitent d'en parler. Dans le contexte congolais, les jeunes obtiennent généralement les premières informations sur la sexualité dans la rue. Cet écart en matière d'initiation à la sexualité entre les contextes congolais et français est même observé au niveau des écoles. En effet, en RDC, le programme éducatif n'aligne les premières informations sur la sexualité qu'à l'école secondaire alors qu'en Europe en général et (en France en particulier), l'école primaire apporte des informations sexuelles aux enfants conformément à la loi éducation à la vie relationnelle, affective et sexuelle.

Ce tabou fait que les jeunes adolescents ont du mal à affirmer via des questionnaires qu'ils consomment de la pornographie au risque d'être indexés par la société en cas de fuite d'informations. On peut donc croire qu'il y aurait d'autres addicts à la pornographie qui ne sont pas affichés. Cette situation d'énorme écart de prévalence de la pornographie auprès de la population française et congolaise réconforte la conclusion d'Enguta et Andia [24] selon laquelle la prévalence des addictions (réseaux sociaux, pornographie...) varie d'un pays à un autre et est loin d'être la même partout. En plus, la conclusion selon laquelle la prévalence des addictions varie en fonction des spécificités de l'échantillon se confirme aussi dans l'étude. Les adolescents consommateurs exceptionnels de la pornographie affirment passer

plus de temps à consulter des sites et réseaux en ligne de pornographie. On peut donc comprendre qu'ils passent plus de temps devant les écrans de leurs téléphones. Ces résultats réconfortent ceux de Reynié [21] où il a été constaté que l'addiction à la pornographie contribue aux addictions à l'écran (notamment l'addiction aux réseaux sociaux).

D'ailleurs, Vaillancourt-Morel et al. [25] ont démontré, à ce sujet, que les sites en ligne à caractère pornographique (YouPorn, Pornhub, Xhamster, Xxnn, Dorcel club Africain, Brazzers, Xvideos...) peuvent être facilement retrouvés dans les réseaux sociaux tels que Youtube, Facebook, telegram, twitter ou x, Tiktok...). On peut ainsi comprendre que l'usage que les adolescents consommateurs de la pornographie font des réseaux sociaux ou de l'internet est purement distrayant au travers du plaisir obtenu en regardant les images et vidéos pornographiques. Cette situation nous inquiète car ces derniers sont en âge scolaire. En principe, l'usage qu'ils devaient faire de l'Internet devait être instructif en lieu et place d'un usage distrayant. D'ailleurs, ils affirment négliger les tâches quotidiennes (scolaires) afin de passer plus de temps sur des sites sexuels en ligne. Signalons que le téléphone n'est pas l'unique matériel à partir duquel ces adolescents consomment de la pornographie. En effet, ils suivent aussi les programmes réservés aux adultes dans plusieurs médias ou programmes de télévision (Canal plus, Startimes, Bleusat...). Ces sujets ont affirmé, lors des entretiens informels, suivre des chaînes pour adultes ci-après: Dorcel TV Africa, Dorcel TV, Private, Xxl, Vixeu TV, Pink TV (chaîne du groupe manx), Golmax TV. Certains ont affirmé, lors de ces entretiens informels, avoir la préférence pour la pornographie africaine. Ils affirment connaître même des chaînes propres aux congolais (comme Elengilisation TV), dont les contenus sont diffusés chez Dorcel TV Africa.

L'analyse différentielle a révélé que seule la variable district de résidence a influencé l'addiction à la pornographie des adolescents enquêtés. En d'autres termes, il y a plus d'adolescents consommateurs exceptionnels de la pornographie dans le district de la Lukunga comparativement aux autres districts. Ces résultats peuvent se justifier par le fait que le district de Lukunga est le district prestigieux où les conditions de vie de ses habitants sont, dans la plupart de cas, bonnes. Ainsi, les adolescents résidant dans ce district ont la possibilité d'avoir des chambres personnelles. Dans ce contexte, ils peuvent s'isoler dans leurs chambres à tout moment de la journée pour regarder la pornographie dans leurs téléphones. Nos résultats ont révélé aussi que les variables sexe, tranche d'âge, niveau de scolarité de résidence et confession religieuse n'ont pas influencé l'addiction à la pornographie des adolescents enquêtés. La non-influence de la variable sexe chez l'addiction à la pornographie des adolescents enquêtés remet en question la conclusion de Sergerie et Corneau [26] selon laquelle les garçons consomment plus la pornographie que les filles. La non-influence de la variable tranche d'âge sur l'addiction à la pornographie chez les adolescents enquêtés remet en question la conclusion de Reynié [21] selon laquelle les moins âgés consomment plus de la pornographie que les plus âgés. Le manque d'influence de la variable confession religieuse sur l'addiction à la pornographie chez les sujets enquêtés remet en question la conclusion de plusieurs études où cette variable est identifiée comme un des déterminants de la consommation de la pornographie. En effet, toutes les confessions religieuses considèrent la pornographie comme un péché contre soi-même ou une souillure. A ce titre, les sujets très ancrés dans les religions devraient éviter de consommer de la pornographie. Malheureusement cette observation n'a pas été vérifiée dans cette étude.

4. Conclusion

Dans cette étude, notre préoccupation était d'évaluer la prévalence de l'addiction à la pornographie auprès d'un échantillon non-probabiliste (de commodité ou par convenance) de 405 adolescents de la ville de Kinshasa. Ainsi, un test d'évaluation de l'addiction à la pornographie a été administré aux adolescents ciblés dans l'étude. Les résultats ont révélé que 123 sujets (30,4%) sur les 405 enquêtés ont développé de l'addiction à la pornographie. Seule la variable district de résidence a affecté l'addiction à la pornographie des adolescents enquêtés. Au regard des résultats de cette étude, il nous paraît important de suggérer aux ministères ayant en charge la santé publique et la jeunesse d'organiser des campagnes de sensibilisation sur les effets de la pornographie sur la santé mentale. De telles campagnes sont importantes pour prévenir cette addiction en insistant particulièrement sur les conduites à tenir des adolescents.

Conflits d'intérêt: Il n'y a aucun conflit d'intérêt.

Références

1. Reynié, D. *Les addictions chez les jeunes*. Hal open science, Paris, France, 2018, p. 61.
2. Francine, D. *L'éducation à la sexualité dans le contexte de la réforme de l'éducation*. Ministère de l'éducation, Québec, Canada 2003, p. 58.
3. Désert, S. Les adolescents et la pornographie. *Archives of Sexual Behavior* 2002, pp. 243-251.
4. Dagenais, D. *L'éducation sexuelle fondements théoriques pour l'intervention*. Éditions nouvelles, Montréal, Canada, 2005, p. 180.
5. Académie Nationale de Médecine. *Rapport sur l'accès à la pornographie chez l'enfant et l'adolescent : conséquences et recommandations*. Editions de l'Académie Nationale de Médecine de la France, Paris, France, 2023, p. 32.
6. D'Orlando, F. The Demand for Pornography. *Journal of Happiness Studies* 2011, 12(1), pp. 51-75.
7. Cooper, A. Sexuality and the Internet: Surfing into the new millennium. *Cyber Psychology & Behavior* 1998, 1(2), pp. 187-193.
8. Cooper, A.; Boies, S.; Maheu, M.; Greenfield, D. *Sexuality and the Internet: The next Sexual revolution*. John Wiley & Sons Inc, New Jersey, SUA, 2000, 545 p.
9. Young, K.S. Internet Addiction: The Emergence of a New Clinical Disorder. *Cyberpsychology & behavior* 1998, 1(3), pp. 237-244.
10. Castro-Calvo, J.; Ballester-Arnal, R.; Billieux, J.; Julia, B-G., Gil-Llario M.D. Spanish validation of the sexual addiction screening test. *Journal of Behavioral Addictions* 2018, 7(3), pp. 584-600.
11. Hermand, M.; Amine, B.; Donnadieu-Rigole, H.; Pétillon, A. Addictive Use of Online Sexual Activities and its Comorbidities: a Systematic Review. *Curr Addict Rep* 2020, 7, pp. 194-209.
12. Cohen, D. Rapport 23-01. Accès à la pornographie chez l'enfant et l'adolescent: conséquences et recommandations. *Bull Acad Natl Med* 2023, 207, pp. 381-398.
13. Tshimanga Mukadi, R. ; Mwana Ntambe, M. ; Tamubango Kitoko, H. ; Malashi Mwise, J. Sexualité des jeunes en milieu scolaire dans la ville de Lkasi en République démocratique du Congo. *Pan African Medical Journal* 2018, 31(34), pp. 55-66.
14. Mahunda Nzondo, J.B. Evaluation du fonctionnement conjugal par le questionnaire de Trudel. *Education et développement* 2019, 1 (23), pp. 56-77.
15. Ngonzo Kitumba, R.; Mauricio Garcia, P.M.; Tingu Yaba Nzolameso, M. Discours et représentations sociales de quelques pratiques sexuelles chez les adolescents scolarisés de la ville de Kinshasa. *Education et développement* 2020, 1(24), pp. 9-26.
16. Khake Kabuo, M. Comportement sexuel des adolescents congolais : Étude des besoins, pratiques et expériences sexuels. *Editions Universitaires Européennes*, London, UK, 2022, p. 196.
17. Kim, E.J.; Namkoong, K.; Ku, T.; Joo Kim, S. The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European psychiatry* 2008, 23(3), pp. 212-218.

18. Chan, P.A.; Rabinowitz, T. A cross-sectional analysis of video games and attention deficit hyperactivity disorder symptoms in adolescents. *Annals of general psychiatry* 2006, 5, pp. 16–26.
19. Brand, M.; Laier, C.; Pawlikowski, M.; Schaechtle, U. Watching pornographic pictures on the Internet: role of sexual arousal ratings and psychological-psychiatric symptoms for using Internet sex sites excessively. *Cyberpsychology, behavior and social networking* 2011, 14(6), pp. 371–377.
20. Pawlikowski, M.; Brand, M. Excessive Internet gaming and decision making: do excessive World of Warcraft players have problems in decision making under risky conditions? *Psychiatry research* 2011, 188(3), pp. 428–433.
21. Reynié, D. *Porno addiction. Nouvel enjeu de société*. Editions de la Fondation pour l'innovation politique, Paris, France, 2017, p. 48.
22. Javion, L. *Génération X, influence de la pornographie numérique sur les relations des adolescents*. Mémoire de maîtrise en métiers de l'enseignement, de l'éducation et de la formation, Lyon. Université Lyon, France 2023, p. 66.
23. Enguta Mwenzi, J.; Ngonzo Kitumba, R.; Mayala Basinsa, L. Attitudes des étudiants des universités de la Ville de Kinshasa face à l'homosexualité. *Revue africaine des sciences sociales. Penser genre, penser autrement* 2022, 2(2), pp. 198-216.
24. Enguta Mwenzi, J.; Andia Moyamani, E. Social Networks Addictions and Academic Performance of Students at the University of Kinshasa. *Futurity Education* 2023, 3(2), pp. 213–226.
25. Vaillancourt-Morel, M.; Daspe, M.; Godbout, N.; Sabourin, S. Les déterminants et les corrélats de la compulsion sexuelle. *Revue québécoise de psychologie* 2015, 36(3), pp. 7-33.
26. Sergerie, M.; Corneau, S. Usage problématique de la pornographie conceptualisation, évaluation et traitement. *Revue québécoise de psychologie* 2017, 38(1), pp. 259–282.

Citation: Enguta Mwenzi J, Mutunga Nassy N, Tshayima Mayunga, C. Addiction to pornography among teenagers in Kinshasa and its determinants. *Journal of Social Sciences*, 8 (3), pp. 142-150. [https://doi.org/10.52326/jss.utm.2025.8\(3\).11](https://doi.org/10.52326/jss.utm.2025.8(3).11).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright:© 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).12](https://doi.org/10.52326/jss.utm.2025.8(3).12)
CZU 621.798.1:678.5:664(4+478)



MIGRATION OF CHEMICAL COMPOUNDS FROM FOOD PACKAGING: REGULATORY ASPECTS AND ASSESSMENT OF POTENTIAL RISKS

Rodica Sturza *, ORCID: 0000-0002-2412-5874,
Aliona Ghendov-Moșanu, ORCID: 0000-0001-5214-3562,
Veronica Dragancea, ORCID: 0000-0002-5938-0410,
Dmitri Lazacovici, ORCID: 0000-0001-9078-1098

Technical University of Moldova, 168 Stefan cel Mare Blvd., Chisinau, Republic of Moldova

* Corresponding author: Rodica Sturza, rodica.sturza@chim.utm.md

Received: 07. 18. 2025

Accepted: 09. 11. 2025

Abstract. Plastics have become prevalent in food packaging, although the transfer of additives with potential for migration into food is a significant public health concern. The article reviews various packaging materials, explores the factors influencing the migration of chemicals from packaging into food, reviews the literature on the presence of migrants in food, and identifies potential health risks. The regulatory aspects of the use of food packaging made of polymeric materials in the European Union and the Republic of Moldova are reviewed, as well as the mechanisms governing the migration of additives from packaging into food. The process of migration of additives from plastic containers during microwave heating of food, the use of recycled plastic containers, and their combined effect present topics for extensive biomonitoring, necessary to minimize migration from a food safety perspective.

Keywords: *food packaging, polymeric materials, plasticizers, flame retardants, antioxidants, UV stabilizers, phthalates, bisphenols, microwaves, diffusion, biomonitoring.*

Rezumat. Materialele plastice au devenit predominante în ambalajele alimentare, deși transferul aditivilor cu potențial de migrare în alimente reprezintă o preocupare semnificativă pentru sănătatea publică. Articolul examinează diverse materiale de ambalare, explorează factorii care influențează migrarea substanțelor chimice din ambalaje în alimente, analizează datele bibliografice privind prezența migranților în alimente și identifică riscurile potențiale pentru sănătate. Sunt analizate aspectele de reglementare ale utilizării ambalajelor alimentare fabricate din materiale polimerice în Uniunea Europeană și Republica Moldova, precum și mecanismele care guvernează migrarea aditivilor din ambalaje în alimente. Procesul de migrare a aditivilor din recipientele de plastic în timpul încălzirii alimentelor la microunde, utilizarea recipientelor din plastic reciclat și efectul lor combinat prezintă subiecte pentru o biomonitorizare extinsă, necesară pentru a minimiza migrarea din perspectiva siguranței alimentare.

Cuvinte cheie: *ambalaje alimentare, materiale polimerice, plasifianți, ignifuge, antioxidanți, stabilizatori UV, ftalați, bisfenoli, microunde, difuzie, biomonitoring.*

1. Introducere

Ambalajele sunt esențiale pentru condiționarea și transportul diferitelor substanțe. Beneficiile materialelor plastice, precum durabilitatea și versatilitatea lor oferă protecție împotriva daunelor fizice, contaminării și alterării microbiene. În plus, creșterea economică a generat o cerere tot mai mare de alimente prefabricate și a dus la creșterea producției de alimente ambalate. În consecință, materialele plastice au devenit predominante în ambalajele alimentare, deși prezența migrantilor din plastic în alimente a stârnit îngrijorări semnificative în ultimii ani [1]. Nu mai puține îngrijorări trezește și contaminarea de mediu, cauzată de microplastice, care este omniprezentă pe uscat, în mare și în aer, afectând și sănătatea umană [2,3]. Dar în ciuda eforturilor semnificative de reducere a utilizării, plasticul rămâne cel mai utilizat material de ambalare în prezent. În tabelul 1 sunt prezentate doar câteva exemple de aplicații ale polimerilor drept ambalaje alimentare.

Tabel 1

Exemple de aplicații ale polimerilor drept ambalaje alimentare [4]

Polimerul	Abrevierea	Tipul de ambalaje
Polietilenă	PE	Pungi, folii de ambalare
Polietilenă de înaltă densitate	HDPE	Folii, sticle, pungi cu fermoar
Polietilenă de joasă densitate	LDPE	Folii, pungi pentru congelator
Polipropilenă și copolimeri	PP	Folii de ambalare, sticle
Clorură de polivinil	PVC	Diferite recipiente, veselă, folii alimentare
Polistiren	PS	Tăvi, oale de gătit
Polietilenă tereftalat	PET	Sticle, pungi pentru cuptor
Poliamidă (nilon)	PA	Ambalaje cu barieră de oxigen, ustensile de gătit
Poliuretan	PU	Folii laminate, adezivi
Poliesteri		Acoperire capace
Policarbonat	PC	Diverse recipiente
Copolimer acrilonitril, butadienă și stiren		Capace, articole de bucătărie
Acid polilactic	PLA	Pahare, sticle

Materialele plastice sunt polimeri compuși din lanțuri lungi de carbon formate din unități monomerice. Polimerii sunt clasificați în polimeri termorezistenți și polimeri termoplastici. Aceștia din urmă sunt cei mai utilizați în fabricarea ambalajelor alimentare; în special PP, PET și HDPE și LDPE. Proprietățile mecanice și chimice ale materialelor plastice sunt îmbunătățite prin adăugarea de aditivi în timpul sintezei polimerilor. Aditivii sunt substanțe chimice de diferite tipuri. Bisfenolii (BP) și ftalații sunt doi aditivi utilizați în mod obișnuit [5]. BP servesc ca antioxidanți și stabilizatori UV în materialele plastice. Ftalații, pe de altă parte, sunt utilizați pentru a crește plasticitatea, flexibilitatea și transparența materialelor plastice. Aceste două grupuri de molecule sunt perturbatori endocrini și factori de risc pentru cancer. Aditivii pot migra în alimente atunci când intră în contact cu ambalajele din plastic. Aceasta depinde de polimerul constituent și de condițiile de utilizare. Condițiile de utilizare sunt definite pentru fiecare plastic de calitate alimentară [6].

2. Aspecte normative ale utilizării ambalajelor alimentare din materiale polimerice

Limitele migrării chimice sunt impuse de normele și reglementările stricte ale Uniunii Europene (UE) privind materialele de ambalare (MCA). Regulamentul-cadru al UE reglementează MCA la nivel de uniune, inclusiv ambalajele, utilajele și aparatele de gătit. Un număr considerabil de diverse directive, reglementări și amendamente au fost stabilite la nivel comunitar (Tabelul 2).

Tabelul 2

Reglementări ale UE privind materialele de ambalare pentru produse alimentare [7]

Reglementări, directive	Subiect	Materiale de contact
(UE) 1935/2004	Regulament-cadru cheie privind materialele și obiectele destinate să vină în contact cu alimente.	Toate materialele
(UE) 10/2011	Materiale și obiecte din plastic destinate să vină în contact cu alimente.	Toate materialele
2023/2006/CE	Bune practici de fabricație aplicabile tuturor materialelor care intră în contact cu alimentele.	Toate materialele
93/11/CEE	Eliberarea de N-nitrozamine și substanțe N-nitrozabile din materialele care intră în contact cu alimentele utilizate pentru sugari.	Nitrozamine
82/711/CEE	Regulament pentru testarea migrării nitrozaminelor.	
93/8/CEE 97/48/CE	Amendamente.	
2005/72/CE	Directiva Comisiei de modificare a Directivei 2002/72/CE privind materialele și obiectele din plastic destinate (monomeri) să vină în contact cu alimentele.	Aditivi monomerici
2004/1/CE	Amendamentul la Directiva 96/77/CE enumeră criteriile specifice de puritate pentru aditivii alimentari, alții decât coloranții și îndulcitorii.	
2004/19/CE 2005/79/CE 2007/19/CE 2008/39/CE 2009/975/CE	Amendamente la Directiva 2002/72/CE care actualizează dispozițiile privind utilizarea plastifiantilor.	
78/142/CEE	Limitarea monomerului de clorură de vinil în materialele și obiectele destinate să vină în contact cu alimentele.	
80/766/CEE	Analiza clorurii de vinil eliberate de materiale și obiecte destinate să vină în contact cu alimentele.	Elastomeri și cauciucuri
81/432/CEE	Metode de analiză pentru asigurarea uniformității testării pentru monomerul de clorură de vinil.	
372/2007/CE	Autorizarea limitelor de migrare tranzitorii pentru plastifiantii din garniturile capacelor.	Plastic reciclat
2008/282/CE	Cerințe specifice pentru siguranța materialelor plastice reciclate, inclusiv procese de decontaminare și metode de testare pentru a asigura utilizarea materialelor plastice reciclate în materialele care intră în contact cu alimentele.	

Continuare Tabelul 2

1895/2005/CE	Utilizarea unor substanțe specifice cunoscute sub numele de BADGE (eter diglicidilic al bisfenolului A), BFDGE (eter diglicidilic al bisfenolului F) și NOGE (eter glicidilic al novolacului) în materialele de contact cu alimentele.	Acoperiri
(CE) nr. 450/2009	Reguli și cerințe specifice pentru materialele care pot modifica în mod activ starea alimentului sau a mediului înconjurător.	Materiale active și inteligente
84/500/CEE	Materiale și obiecte ceramice destinate să vină în contact cu alimentele și băuturile.	Ceramica
2005/31/CE	Amendament la directiva 84/500/CEE .	
2007/42/CE	Materialele și articolele fabricate din folie de celuloză regenerată destinate să vină în contact cu alimentele.	Folie de celuloză regenerată
2011/8/UE	Materiale și articole din plastic destinate să vină în contact cu alimente, restricționând utilizarea bisfenolului A în biberonele din policarbonat pentru sugari.	
(UE) 2023/1627	Utilizarea substanței bis(2-etilhexil) ciclohexan-1,4-dicarboxilat, ca aditiv (plastifiant) în poli(clorură de vinil) în concentrație de până la 25% în contact cu alimente apoase, acide și cu conținut scăzut de alcool, pentru depozitare pe termen lung la temperatura camerei sau mai mică (refrigerate și congelate).	Bisfenol A
(UE) nr. 202/2014	Evaluări științifice favorabile pentru 2-fenil-3,3-bis(4-hidroxifenil)ftalimidină (3) și 1,3-bis(izocianatometil)benzen (4), adăugate pe lista UE de substanțe autorizate pentru materiale de contact cu alimentele (MCA).	
(UE) 2018/2005	Înregistrarea, evaluarea, autorizarea și restricționarea substanțelor chimice (REACH) referitoare la ftalatul de bis(2-etilhexil) (DEHP), ftalatul de dibutil (DBP), ftalatul de benzil butil (BBP) și ftalatul de diizobutil (DIBP).	Ftalați
(UE) 2025/40	Regulamentul Parlamentului European și al Consiliului privind ambalajele și deșeurile de ambalaje.	Toate materialele
(UE) 2025/351	Bunele practici de fabricație pentru materialele și obiectele destinate să vină în contact cu alimentele, în ceea ce privește plasticul reciclat și alte aspecte legate de controlul calității și de fabricarea materialelor și obiectelor din plastic destinate să vină în contact cu alimentele.	Toate materialele

Regulamentul-cadru al UE stabilește cerințe specifice pentru fabricarea și comercializarea materialelor și obiectelor din plastic destinate să vină în contact cu alimentele sau care sunt deja în contact cu alimentele sau despre care se poate aștepta în mod rezonabil să vină în contact cu alimentele. Regulamentul Comisiei (UE) 2018/2005 restricționează utilizarea DEHP, DBP, BBP și DIBP la o concentrație egală sau mai mică de 0,1 în masă în plastifianții din articolele utilizate de consumatori sau în spațiile interioare.

În 2025, noile reglementări ale Uniunii Europene transformă ambalajele alimentare din plastic, în special Regulamentul privind ambalajele și deșeurile de ambalaje, care a intrat în vigoare la 11 februarie 2025 și își propune trecerea la ambalaje reciclabile până în 2030, să crească utilizarea materialelor plastice reciclate și să reducă deșeurile de ambalaje în total. În plus, un regulament separat, Regulamentul (UE) 2025/351, a introdus cerințe mai stricte privind puritatea, migrarea și etichetarea materialelor din plastic care intră în contact cu alimentele, începând cu martie 2025, cu un termen limită de conformitate de septembrie 2026.

Numeroase protocoale de analiză specifice pentru compuși specifici au fost utilizate pentru testarea migrării pentru a obține o Limită Specifică de Migrare, care descrie cantitatea unei substanțe care poate fi prezentă în materialul de ambalare și cantitatea care ar putea migra potențial în alimente. Controlul conformității materialelor de ambalare cu reglementările CE este un subiect complex, iar Regulamentul-cadru a fost stabilit pentru a îndeplini cerințele de utilizare a materialelor și obiectelor care vin în contact cu produsele alimentare (Tabelul 3). Printre numeroasele provocări evidențiate se numără numărul enorm de compuși de pe listele pozitive, lipsa informațiilor despre potențialii migranți, lipsa metodelor analitice standardizate, durata procedurilor analitice și problemele practice în aplicarea acestora [6].

Republica Moldova implementează un cadru legislativ solid privind ambalajele alimentare din plastic, aliniat cu standardele UE (Tabelul 3).

Tabelul 3

Reglementări referitoare la materialele plastice admise pentru contactul cu alimentele în Republica Moldova*

Acte normative	Denumire acte normative	Domeniul de aplicare
HG nr. 278/2013	Regulament sanitar privind materialele și obiectele din plastic destinate să vină în contact cu produsele alimentare.	Materiale plastice (contact cu alimente)
HG nr. 492/2015	Regulament sanitar privind materialele și obiectele din plastic reciclat destinate să vină în contact cu produsele alimentare.	Plastic reciclat (contact alimentar)
HG nr. 594/2014	Regulamentul sanitar privind buna practică de fabricație a materialelor și obiectelor destinate să vină în contact cu produsele alimentare.	Bună practică de fabricație
HG nr. 945/2018	Regulamentul sanitar privind materialele și obiectele active și inteligente destinate contactului cu produsele alimentare.	Materiale inteligente/active
HG nr. 561/2020	Regulament privind ambalajele și deșeurile de ambalaje, care introduce principiul Responsabilității Extinse a Producătorului (REP) în Republica Moldova.	Gestionarea ambalajelor (REP)
Instrucțiune oficială	Instrucțiune oficială referitoare la implementarea regulamentului aprobat prin HG nr. 561/2020.	Gestionarea ambalajelor (REP)

* <https://www.legis.md/>

Reglementările referitoare la materialele plastice admise pentru contactul cu alimentele sunt stabilite prin Hotărârea Guvernului nr. 278 din 24 aprilie 2013, care aprobă „Regulamentul sanitar privind materialele și obiectele din plastic destinate să vină în contact cu produsele alimentare”. Acest Regulament transpune Regulamentul (UE) nr. 10/2011 al

Comisiei din 14 ianuarie 2011, care reglementează materiale plastice potrivite pentru contactul cu alimentele: lista de monomeri, aditivi și materiale auxiliare de producție polimerică și macromolecule din fermentare autorizate pentru folosire (Anexa I); limită de migrare specifică pentru substanțe individuale și limită generală de migrare pentru totalul substanțelor.

Prin Regulamentul privind ambalajele și deșeurile de ambalaje (HG nr. 561/2020) se introduce principiul Responsabilității Extinse a Producătorului (REP), obligând producătorii și importatorii să gestioneze ambalajele puse pe piață. Din ianuarie 2023, doar agenții economici înregistrați în Sistemul Informațional Automatizat – Managementul Deșeurilor au dreptul să plaseze pe piață mărfuri cu ambalaje din plastic. Se impune un obiectiv minim de reciclare a ambalajelor din plastic de la 10% (2023) până la 20% (2029).

Regulamentul sanitar privind materialele și obiectele active și inteligente destinate contactului cu produsele alimentare (HG nr. 945 din 3 octombrie 2018) introduce noțiunea de barieră funcțională pentru materiale care vin în contact cu produsele alimentare, menite să asigure că materialul în condiții normale sau previzibile de utilizare nu transferă produselor alimentare substanțele din compoziția sa în cantități care ar putea să pericliteze sănătatea sau să producă o modificare inacceptabilă a compoziției sau a caracteristicilor organoleptice produselor alimentare.

Totuși, în Republica Moldova se atestă lipsa unor studii care ar elucida migrarea unor componente potențial toxice din ambalaje alimentare în produse alimentare, cu excepția vinurilor și a produselor alcoolice [8,9]. Scopul prezentului studiu constă în evaluarea riscurilor potențiale, asociate migrației unor componente potențial toxice din ambalaje alimentare din plastic.

3. Aditivi cu potențial de migrare din materiale plastice utilizate pentru ambalare

Materialele plastice sunt compuși macromoleculari organici obținuți prin polimerizare, policondensare sau poliadiție din molecule cu greutate moleculară mică (monomeri) sau prin modificarea chimică a moleculelor, la care se adăuga substanțe auxiliare pentru a facilita formularea lor și pentru a îmbunătăți proprietățile lor mecanice, termice, chimice [10]. Aceste substanțe chimice sunt numite „aditivi”. Unii aditivi sunt utilizați ca monomeri; de exemplu, bisfenolul A (BPA) este monomerul policarbonatului (PC) și al rășinilor epoxidice, dar și un stabilizator în alți polimeri. Principalele funcții ale aditivilor sunt ca agenți de ignifugare; pigmenți, agenți de umplutură, antioxidanți și plastifianți (Tabelul 4).

Tabelul 4

Tipuri de aditivi cu potențial de migrare utilizați pentru producerea celor mai răspândite materiale plastice [11-19]

Tipul aditivilor	Tipul materialelor plastice	Aplicarea aditivului	Compoziția chimică a aditivului
Plastifianți	Clorură de polivinil (PVC).	Constituie 10-70% din masa polimerului. Se utilizează cca 80% din totalul plastifianților produși.	Parafine clorurate cu lanț scurt, mediu și lung (SCCP/MCCP/LCCP); ftalat de diizoheptil (DIHP); DHNUP; ftalat de benzil și butil (BBP); ftalat de bis(2-etilhexil) (DEHP); ftalat de bis(2-metoxietil) (DMEP); ftalat de dibutil (DBP); ftalat de dipentil (DPP), adipat de di-(2-etilhexil) (DEHA),

Continuare Tabelul 4

			diociladipat (DOA), ftalați de dietil (DEP), ftalat de diizobutil (DiBP); fosfat de tris(2-cloroetil) (TCEP); ftalat de dicitlohexil (DCHP), ftalat de butil benzil (BBP), adipat de diheptil (DHA), adipat de heptil (HAD) și adipat de heptil octil (HOA).
	Plastic pe bază de celuloză: celofan, acetat de celuloză, acetat-butirat de celuloză (CAB), nitrat de celuloză, celuloid.	Se utilizează cca 20% din totalul plastifianților produși.	
Ignifuge	HDPE	12-18% din masa polimerului.	Parafine clorurate cu lanț scurt, mediu și lung (SCCP/MCCP/LCCP); acid boric; agenți ignifugi bromurați cu antimoniu (Sb) ca agent sinergic (de exemplu, eteri difenil polibromurați (PBDE); decabromodifeniletan;
	LDPE	12-18% din masa polimerului.	tetrabromobisfenol A (TBBPA); agent ignifug fosforos (de exemplu, tris(2-cloroetil)fosfat (TCEP) sau tris (2-cloroizopropil)fosfat (TCPP); hexabromociclohexan (HBCDD).
	Polipropilenă (PP)	12-18% din masa polimerului.	
Stabilizatori, antioxidanți, stabilizatori UV	HDPE	0,05-3% din masa polimerului.	Bisfenol A (BPA); compuși de cadmiu și plumb; compuși de nonilfenol; octilfenol; 1,3,5-Tris(oxiran-2-ilmetil)-1,3,5-triazinan-2,4,6-trionă (TGIC)/1,3,5-tris[(2S și 2R)-2,3-epoxipropil]-1,3,5-triazin-2,4,6-(1H,3H,5H)-trionă (β-TGIC), hidroxitoluen butilat (BHT), 2- și 3-t-butil-4-hidroxianisol (BHA), tetrakismetilen-(3,5-di-t-butil-4-hidroxihidrocinamat)metan (Irganox 1010) și compuși bisfenolici precum Cyanox 2246 și 425, fosfat de tris-nonilfenil (TNPP), fosfit de tris(2,4-di-tert-butilfenil) (Irgafos 168).
	LDPE	0,05-3% din masa polimerului.	
	PP	0,05-3% din masa polimerului.	
	PVC	0,5-3% din masa polimerului.	
Coloranți	Toate tipurile de plastice	0,001–2,5% - pigmenti organici	Trei categorii principale de pigmenti organici: compuși policiclici; compuși azoici (mono- și di-) și complecși metalici (exemplu -cobalt(II) diacetate). Sulfură de zinc, oxid de zinc, oxid de fier, pe bază de cadmiu-mangan, pe bază de crom, ultramarin și dioxid de titan;
		0,01–10% - pigmenti anorganici	pulberi de Al și Cu, carbonat de plumb sau bismutoxiclorură și substanțe cu fluorescență, pentru efecte speciale.

Plastifianți sunt cei mai larg utilizați aditivi din materiale plastice, care fac polimerii flexibili și facilitează formularea acestora [11,12]. Primii plastifianți utilizați au fost celuloidele obținute din camfor și ulei de ricin, înlocuite ulterior de camfor și uleiul de ricin, ceea ce a condus la utilizarea plastifianților pe bază de esteri ai acidului ftalic [13,14]. Plastifianții sunt amestecați cu polimeri termoplastici pentru a reduce numărul de legături secundare care se pot forma între lanțurile lungi de polimeri, ceea ce facilitează reducerea temperaturii de tranziție vitrosă [15,16]. Însă nefiind fixați prin legături chimice, plastifianții pot părăsi polimerul în timp, un proces care are loc mai rapid la temperaturi mai ridicate și crește fragilitatea plasticului, ceea ce prezintă riscuri enorme pentru mediu și sănătate [17].

Ignifugele sunt materiale adăugate materialelor plastice pentru a le îmbunătăți rezistența la foc. Inflamabilitatea materialelor plastice este reglementată în multe țări din întreaga lume, în special în țările îngrijorate de toxicitatea arderii. Preocupările actuale legate de mediu conduc la respingerea ignifugelor halogenate și înlocuirea acestora cu compuși fosfatici și dioxid de titan [18,19].

Stabilizatorii UV și antioxidanții sunt agenții anti-îmbătrânire, care previn următoarele reacții: dehidroclorarea, atacul oxigenului sau ozonului și degradarea sub influența radiațiilor ultraviolete. Antioxidanții ajută la încetinirea reacțiilor cu radicalii liberi care apar în timpul oxidării sau expunerii la razele UV. Cele mai frecvent utilizate familii de compuși ca antioxidanți includ în principal aminele și fenolii. Aceștia din urmă sunt adesea utilizați deoarece au o tendință mai mică de aderență, cum ar fi benzofenonele și bisfenolii [14].

Pigmenții sunt utilizați pentru colorarea plasticului. Aceștia sunt coloranți insolubili în apă, cu o putere de opacifiere variabilă. Există pigmenți organici și anorganici. Pigmenții organici sunt compuși chimici formați dintr-una sau mai multe structuri benzenice cu transparență înaltă și capacitate de colorare puternică. Se utilizează în special violetul de carbazol, anina, perilena, izoinolinona și ftalocianina albastră și verde. Pigmenții anorganici sunt complecși metalici, cu densitate mai mare. Cel mai frecvent utilizați sunt: dioxidul de titan, sulfura de cadmiu (galben), complecși de cobalt albastru și turcoaz, oxizi de fier roșii și galbeni, negru de fum etc. [12]. Colorantul încorporat în formulările de plastic are un efect semnificativ asupra stabilității materialelor plastice. Spre exemplu, pigmenții de antrachinonă, ftalocianină și dicetopirolopirrol permit luminii UV să degradeze polimerul, promovând formarea de microplastice.

În compoziția materialelor plastice mai intră și **agenții de umplutură**, utilizați în cantități de până la 50% din masa polimerului sunt aditivi solizi încorporați în matricea plasticului pentru a-i crește densitatea. Acestea sunt în principal materiale anorganice care pot fi clasificate în funcție de efectul lor asupra proprietăților mecanice ale plasticului final. Acesta sunt materiale de umplutură inerte, al căror rol este de a reduce costul produsului final prin creșterea masei acestuia - fibre de bumbac, făina de lemn, iar materialele de umplutură de armare (până la 15–30% din masa polimerului) îmbunătățesc proprietățile mecanice ale polimerilor, spre exemplu, negrul de fum. Datorită materialelor de umplutură, polimerii pot concura cu alte materiale precum sticla, ceramica și chiar metalul în majoritatea domeniilor activității umane [13].

O categorie aparte o constituie **stabilizatorii termici**, utilizați în proporție de 0,5–3% din masa polimerului, în principal în PVC. Prezintă compuși de cadmiu, bariu, zinc și plumb; nonilfenol (săruri de bariu și calciu), utilizați în principal în PVC [18]. Agenții de alunecare (0,1–3% din masa polimerului) prezintă amide de acizi grași (erucamidă primară și oleamidă),

esteri de acizi grași, stearați metalici (de exemplu, stearat de zinc) și ceruri. Sunt utilizate în funcție de structura chimică a agentului de alunecare și de tipul de polimer plastic.

Agenți de expandare - azodicarbonamidă, benzen disulfonil hidrazidă (BSH), pentan, CO₂ sunt aplicați în special pentru producerea polistirenului și poliuretanului expandat. Biocidele (0,001–1% din masa polimerului) prezintă compuși de arseniu, compuși organici de staniu; triclosan. PVC și poliuretani expandați sunt principalii consumatori de biocide [19].

4. Mecanisme de migrare a substanțelor chimice din ambalaje de plastic

Substanțele chimice prezente în materialele plastice pot migra lent din interiorul plasticului către suprafață și către mediul care intră în contact cu recipientul. Restricțiile privind cantitatea de aditivi care pot fi adăugați polimerului sunt mai severe atunci când se utilizează materiale plastice ca ambalaje alimentare. Recipientele nealimentare nu au aceleași cerințe ca și recipientele alimentare.

Ambalajele din plastic sunt fie de calitate alimentară, fie nealimentare. Ambalajele de calitate alimentară au specificațiile necesare pentru contactul cu alimentele, spre deosebire de cele nealimentare. Principalele pictograme care autorizează utilizarea materialelor plastice pentru contactul cu alimentele sunt prezentate în Figura 1.



Figura 1. Pictogramele care reflectă siguranța ambalajului din plastic: a) admis pentru contactul cu produsele alimentare; b) siguranță pentru utilizarea în cuptoarele cu microunde; c) siguranța pentru utilizarea în frigidere; d) siguranța pentru utilizarea în mașinile de spălat.

Specificațiile ambalajelor „de calitate alimentară” iau în considerare capacitatea redusă de a elibera 18 poluanți prin teste de siguranță, caracteristicile suprafeței materialului în contact cu alimentele și adecvarea locațiilor și condițiilor de producție, depozitare, transport și distribuție pentru a rezista la impacturi. Utilizarea repetată, de durată sau în condiții neadecvate constituie cauzele migrației nedorite a componentelor din ambalaje și a contaminării produselor alimentare [20]. În general, interacțiunile dintre alimente și ambalaje pot fi împărțite în trei grupe: migrarea, transferul componentelor ambalajului în alimente; sorbția, care este transferul componentelor alimentare către ambalaj și permeația, care este transferul componentelor prin ambalaj în orice direcție [21].

Migrarea este un proces de difuzie supus atât regulilor cinetice, cât și termodinamice. Acest proces este descris de legile lui Fick ale difuziei, în care temperatura joacă un rol deosebit de important prin influențarea atât a ratei de difuzie, cât și a coeficientului de partiție dintre polimer și aliment. Mecanismele de migrare a diferiților aditivi și toxicitatea asociată sunt prezentate în Tabelul 5 [7,22].

Mecanismele de migrare sunt extrem de variate, în funcție de natura polimerului, tipul monomerilor, a aditivilor, de natura produsului, condițiile de utilizare, suprafața de contact, etc [22]. Temperaturile ridicate pot accelera procesul de migrare, deci ambalajele alimentare trebuie să fie proiectate pentru a rezista la temperaturile întâlnite în timpul depozitării, transportului și utilizării, durata de contact - perioada de contact dintre ambalaj și aliment

poate influența migrarea, iar contactul prelungit crește probabilitatea ca substanțele să pătrundă în alimente; compoziția alimentelor - anumite tipuri de alimente sunt mai susceptibile să interacționeze cu materialele de ambalare și să faciliteze migrarea [23]. Pentru a atenua riscurile de migrare, este recomandată utilizarea acoperirilor de barieră, selectarea materialelor de ambalare adecvate, optimizarea condițiilor de depozitare și efectuarea testelor de migrare pentru a asigura conformitatea cu reglementările.

Tabelul 5

Mecanisme de migrare a diferiților aditivi din ambalaje polimerice și toxicitatea asociată

Aditivi	Compus chimic	Aplicații	Mecanism de migrație	Toxicitate asociată
Plastifianți	Ftalați și esteri ai acidului adipic.	Polimeri pentru închidere capace, garnituri de etanșare pentru containere alimentare, PVC.	Masă moleculară mică facilitează migrarea din ambalaj alimente.	Ftalații sunt toxici, cauzează dezechilibre hormonale, risc crescut de cancer, toxicitate reproductivă și de dezvoltare.
Aditivi de alunecare	Amide de acizi grași – palmitamidă, stearamidă, erucamidă.	Poliiolefine, polistiren, PVC (pentru proprietăți de lubrifiere).	Migrarea din filmele de ambalaj lipidele alimentare cauzează rănecizire și mirosuri neplăcute.	Schimbări în gust, miros și textură, dar efectul este minim și acceptabil.
Stabilizatori la lumină	Amine polimerice steric blocat.	Creșterea rezistenței intemperii.	la dimensiunea moleculară, polaritatea, permeabilitatea și solubilitatea influențează rata de migrare.	Pot provoca sensibilitate cutanată sau alergii la contact direct.
Antioxidanți	Tocoferoli, tocoferoli, ascorbat, vitamina A, carotenoizi, seleniu, fitocompuși, BHT, BHA.	Ambalaje active pentru reducerea riscurilor legate de aditivi și conservanți.	Cantități excesive degradează rapid reducerea compușilor activi disponibili pentru protecția alimentelor.	Doze excesive cauzează greață, diaree, tulburări gastrointestinale, risc de pietre la rinichi, cancer pulmonar, căderea părului, deficiențe nutriționale.
Cerneluri și adezivi	Hidrocarburi, alcooli, eteri glicolici, cetone, esteri.	Forme de soluții/dispersii în solvenți pentru imprimare.	Substanțele organice pot migra direct sau prin spațiul liber din interiorul ambalajului.	Pot cauza iritații cutanate/oculare, probleme respiratorii și tulburări neurologice.

Continuare Tabelul 5

Monomeri și oligomeri	Stiren, izocianați, clorură de vinil, acrilonitril, PET, (caprolactam/poliamide).	Cartoane lactate, tăvi carne, ambalaje ouă; poliuretani și adevizi; PVC; fibre sintetice, rășini, cauciucuri; PET; nylon pentru procesare termică.	Migrare prin degradare, temperaturi înalte, stocare îndelungată; catalizatori reziduali (Sb ₂ O ₃) pot migra.	Iritații cutanate, oculare, respiratorii, depresia sistemului nervos central (SNC), risc crescut de cancer.
Acoperiri	Rășini epoxidice – diglicidil eteri de bisfenol A (BADGE).	Acoperiri interne pentru conserve, rășini epoxidice.	Migrarea grupărilor epoxidice nerealizate, accentuată de degradarea UV.	Dereglări hepatice, hematopoietice, oboseală, dureri gastrice.
Hârtie	Dioxine, benzofenonă, nitrozamine, clorofenoli și cloroanizoli.	Ambalaje din hârtie; foto-inițiator pentru cerneluri; hârtie și containere cerate; fungicide, biocide, erbicide.	Migrare influențată de conținutul de grăsimi, pH, temperatură, timp de contact și reciclare.	Carcinogenic, boli cardiovasculare, endocrine, tulburări de dezvoltare în sarcină, hipercolesterolemie, leziuni necrotice.
Alți contaminanți	Difeniltiouree, peroxid de hidrogen, lubrifianți.	Stabilizatori termici, geți de procesare, miros străin în conserve.	Contaminare accidentală prin practici incorecte de procesare.	Expunerea cronică conduce la afectarea SNC, rinichilor și sistemului reproducător.

Polistirenul (PS) este utilizat pe scară largă în diverse forme pentru ambalarea multor produse alimentare, cum ar fi carnea, lactatele și produsele de panificație. Există o potențială migrare a monomerului de stiren din ambalajele PS în alimentele care intră în contact cu acestea (farfurii, cești, recipient pentru carne). Astfel de caracteristici ale alimentelor, precum conținutul de grăsimi, pH, condițiile de păstrare și vehiculare pot afecta semnificativ migrarea stirenului. Migrarea stirenului în alimente poate afecta proprietățile senzoriale, precum și cauza probleme de sănătate. În unele cazuri, prezența stirenului în alimente poate cauza probleme cancerigene, hematologice, citogenetice și neurotoxice [24]. PS a cauzat o migrare rapidă în uleiul de măsline [25], în lapte, iaurt, înghețată [26], sucuri, băuturi răcoritoare [27].

Polietilen tereftalatul (PET) prezintă rate de migrare scăzute în condiții tipice de utilizare, dar nivelurile de migrare cresc odată cu temperaturile mai ridicate, depozitarea prelungită și expunerea la lumina soarelui [28]. Migranții cheie includ monomeri reziduali (acidul tereftalic și etilen glicolul), oligomerii și reziduurile de catalizator (antimoniul) etc [29]. Alimentele și băuturile cu conținut ridicat de grăsimi prezintă un potențial mai mare de migrare. Condițiile de procesare, în special în cazul PET-ului reciclat (rPET), pot influența, de asemenea, semnificativ cantitatea și tipurile de substanțe care migrează din ambalajele PET. Spre exemplu, acetaldehida, care poate fi periculoasă pentru consumatori, a fost găsită atât

în soluție de acid acetic apos 3%, cât și în uleiul de măsline, după 10 minute de încălzire la microunde în PET.

O analiza sistematică a publicațiilor (91 de studii) privind migrarea componentelor din sticle de polietilen tereftalat în diferite medii alimentare a arătat, că din 193 de substanțe chimice investigate, 150 au fost detectate în băuturi: apă, sucuri, suc, lapte etc [30]. Nivelurile de migrare variază în funcție de durata de depozitare, numărul de reutilizări și conținut. Dintre cele 150 de substanțe chimice găsite în băuturi, 18 au avut niveluri care depășesc limitele de reglementare ale UE, inclusiv reziduuri de ftalați și nichel, în special în alimente grase sau simulanți alimentari. Doar 41 din cele 150 de substanțe chimice detectate sunt incluse în regulamentul UE privind „lista pozitivă” a materialelor din plastic MCA. Unele dintre substanțele chimice care migrează din PET prezintă substanțe adăugate neintenționat, contaminanți suplimentari care intră în plastic în timpul procesului de reciclare [31].

Plasifianții au fost detectați frecvent în băuturi și produse alimentare [32]. Deoarece ftalații nu sunt legați chimic de plastic, aceștia pot migra în apă sau alimente în timp atunci când intră în contact cu recipientul de plastic. Analiza reziduurilor de ftalați din băuturile răcoritoare depozitate în sticle de PET arată că valorile medii cuantificate ale ftalaților pot ajunge la 542,6 $\mu\text{g/L}$. După depozitarea în aer liber timp de patru luni, migrarea, în special pentru ftalatul de dibutil (DBP) și ftalatul de di[2-etilhexil] (DEHP), a crescut de până la 24 de ori [33]. Astfel, siguranța și calitatea băuturilor răcoritoare carbogazoase au fost serios compromise de compușii ftalați din sticlele PET. Condițiile și timpul de depozitare sunt stabilite ca fiind principalele cauze ale migrării ftalaților în băuturile răcoritoare carbogazoase îmbuteliate [34].

În Figura 1 este prezentat diapazonul reziduurilor de ftalați depistați în diferite categorii de alimente și băuturi.

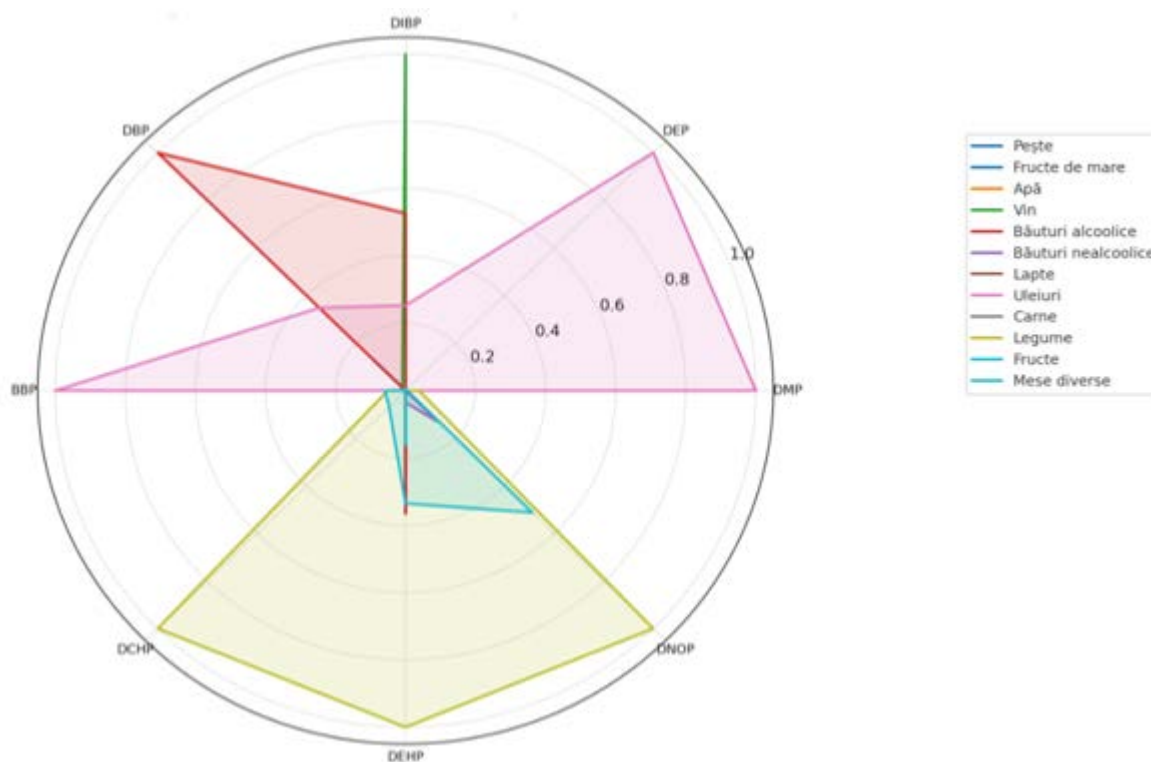


Figura 1. Contaminarea diferitor categorii de produse alimentare cu reziduuri de ftalați - analiză comparativă, conform [32-40].

O contaminare majoră este atestată în cazul uleiurilor, migranții principali fiind di(2-etilhexil) ftalat (DEHP), ftalat de dicitlohexil (DCHP) și ftalat de di-n-octil (DNOP), urmată de băuturile nealcoolice, vinuri și băuturi alcoolice. Autorii unui studiu recent [35] au analizat conținutul reziduurilor de ftalați (ftalat de dimetil, ftalat de dietil, ftalat de diizobutil, ftalat de dibutil, ftalat de bis(2-etilhexil), ftalat de di-n-octil) și de BPA în berea ambalată în sticle PET și depozitată la două temperaturi (4 °C și 20 °C) timp de patru luni. Datele obținute arată că berea ambalată în sticle PET poate conține cantități semnificative de BPA și că concentrația acestora crește odată cu timpul de depozitare. În probe s-au identificat și ftalați, cea mai mare concentrație de ftalat de bis(2-etilhexil) fiind găsită în proba păstrată la 20 °C după 1 lună de depozitare, concentrație a fost de 164,814 μg/L. BPA a fost înregistrat cu cea mai mare concentrație în proba depozitată timp de 4 luni la o temperatură de 20 °C.

În ceea ce privește analiza ftalaților din vinuri, numeroase studii arată, că majoritatea vinurilor îmbuteliate conțin cantități variabile [36-42]. Nivelurile mediane de ftalați din vinurile comerciale (0,385 μg/mL) au fost mai mari decât cele din vinurile neîmbuteliate (0,204 μg/mL) [36]. Rezultatele studiului [37] denotă prezența DBP în 85% din probele de vinuri studiate, adică un conținut de DBP mai mare decât limita de cuantificare (0,01 μg/mL). S-a stabilit că contaminarea cu ftalați are un caracter tehnogen și este rezultatul contactului cu materiale polimerice. DBP, DEHP și BBP au fost compușii cel mai frecvent detectați în vinurile franceze analizate [43]. În timp ce doar 15% dintre probele examinate conțineau concentrații cuantificabile de DEHP și BBP, 59% dintre vinuri conțineau cantități semnificative de DBP, cu o valoare mediană de până la 0,0587 μg/mL. Doar 17% dintre probe nu conțineau nicio cantitate detectabilă din cel puțin unul dintre ftalați, iar 19% conțineau doar urme necuantificabile.

Acoperirile cu rășină epoxidică utilizate în vinării au reprezentat principala sursă de contaminare [44]. Evaluarea analitică a reziduurilor de ftalați din resursele de apă în scopuri industriale, soluri și materii prime vegetale a arătat că există poluare, în special pe terenurile agricole [45,46]. În timpul tratării apei potabile, contaminarea cu ftalați apare din cauza contactului cu diverse materiale plastice, cauciuc, materiale de umplură etc. Principalii contaminanți din grupa ftalaților sunt DEHP și DBP. În cazul materiilor prime vegetale, contaminarea cu ftalați apare predominant la suprafața fructelor, mai degrabă decât în vrac. Acest lucru sugerează că contaminarea poate fi asociată cu operațiuni agricole și/sau poluarea aerului (precipitații). Studiile efectuate pentru a determina rata de migrare a ftalaților din acoperirile polimerice, PVC și obiectele din cauciuc în soluții model care simulează medii alimentare au arătat că acestea își păstrează capacitatea de a elibera ftalați chiar și după o utilizare prelungită. Rata de migrare a ftalaților din materialele plastice depinde de compoziția chimică a mediului de extracție. Mediile cu polaritate ridicată sunt cele mai contaminate, în special atunci când sunt implicați factori termici.

Probele de apă potabilă conțin mai puțini ftalați decât vinurile [47]. Conținutul de ftalați din apa îmbuteliată, provenit în principal din sticlele de plastic PET, variază de la <0,026 μg/L la peste 279 μg/L în funcție de marcă, timpul de depozitare și temperatură [48-50]. Creșterea temperaturii și a timpului de depozitare conduc la o migrare mai mare a ftalaților din plastic în apă. Deși concentrațiile sunt în general mai scăzute decât în alte tipuri de băuturi, sunt mai mari în apa îmbuteliată decât în apa de la robinet [49]. Totuși există o diferență semnificativă între nivelurile de reziduuri de ftalați din apa depozitată în PET, policarbonat și sticlă. Ftalații precum DEHP și DBP au fost detectați în cantități de aproximativ 0,104 μg/L și, respectiv, 0,082 μg/L. S-a constatat, că contaminarea din producție, nu

migrarea, a fost cauza concentrațiilor mari de ftalați în sticlele de policarbonat [50]. Reutilizarea sticlelor de apă din materiale plastice crește riscul ca suprafața interioară să se deterioreze și să elibereze mai mulți ftalați, ceea ce ridică îngrijorări cu privire la siguranța apei potabile din sticle de plastic.

DEP, DEHP, DBP și BBP sunt principalii ftalați detectabili în apa potabilă. Conform rezultatelor unui studiu recent [46], temperatura de păstrare, iluminarea și tipul de ambalaj sunt responsabile de nivelul de ftalați din apa potabilă. Gradul de uzură al sticlei contribuie esențial la creșterea numărului de ftalați detectați în apa îmbuteliată; potențialul de migrare a esterului ftalat în apă crește odată cu grosimea sticlei. S-a considerat că există mai multe motive ale migrării materialelor potențial dăunătoare în apa îmbuteliată: deplasarea internă a componentelor din recipiente; contaminarea în timpul îmbutelierii în fabricile care utilizează tuburi de plastic, poluarea accidentală din cauza utilizării frecvente a uneltelor din plastic, dar și datorită omniprezenței și ecotoxicității ftalaților [47]. Se recomandă ca apa îmbuteliată să fie depozitată corespunzător, cu o expunere minimă la lumina soarelui și fără expunere la căldură [48-49].

BP sunt utilizați pe scară largă ca monomeri în producția de materiale plastice din policarbonat și rășini epoxidice, care sunt comune în ambalajele alimentare, acoperiri și adezivi. Conform unui studiu recent [51], prezența BP a fost atestată în diverse produse alimentare (Figura 2).

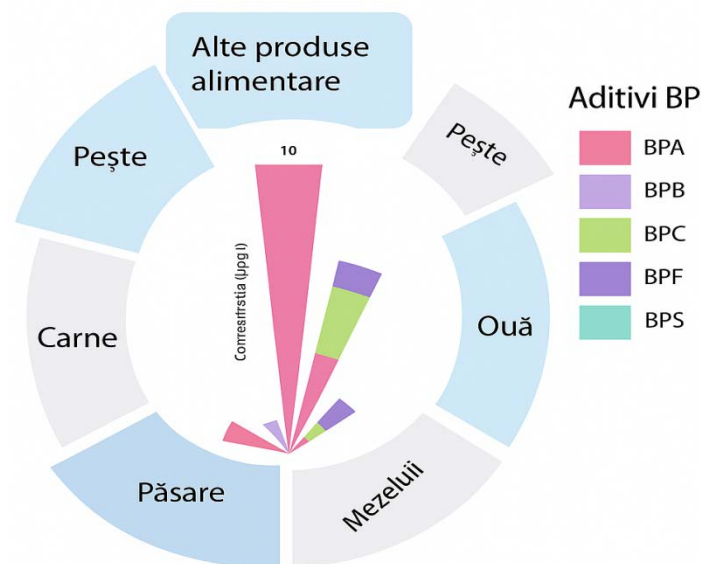


Figura 2. Distribuția bisfenolilor în diferite categorii de alimente [52]:

BPA - 4,4'-dihidroxi-2,2-difenilpropan; BPB - 4-[2-(4-hidroxifenil)butan-2-il]fenol; BPC - 2,2-bis(3-metil-4-hidroxifenil)propan; BPF - 4,4'-metilendifenol; BPS - 4,4'-(propan-2,2-diil)difenol; BPAF - 4,4'-[2,2,2-trifluoro-1-(trifluorometil)etiliden]difenol.

BP au fost detectați în diverse produse marine, inclusiv pește proaspăt, crustacee și conserve. BPA, BPF și BPS au fost găsite în 96,2%, 46,2% și, respectiv, 42,3% din probele de fructe de mare conservate analizate (n = 26), cu o concentrație totală medie de BP de 46,72 ng/g [53]. Alți autori au raportat concentrații de 50,9 ng/g [54], 109,43 ng/g [55] și 168 ng/g [56] în probele de pește, creveți și calmar colectate din supermarketuri. BPA și BPS au fost găsite atât în compozitele de pește ambalate, cât și în cele neambalate, BPS fiind prezent în 50% din probele ambalate și 24% din cele neambalate [57].

BP au fost detectați într-o gamă largă de produse din carne, inclusiv carne proaspătă, carne de pasăre, mezeluri și conserve, cu concentrații cuprinse între 2,7 și 12,22 ng/g [58]. BPS a fost găsit în 50% din probele de piept de pui la niveluri de până la 18,7 ng/g [59]. În China, BPA, BPF și BPS au fost identificate în produse din carne conservate, concentrațiile totale de BP ajungând la 43,1 ng/g și BPA, prezent în toate probele la o medie de 77 ng/g [60].

Studiul efectuat asupra conservelor de carne din Portugalia, Spania și Franța a arătat concentrații medii de 49,22 ng/g (BPA), 19,34 ng/g (BPB), 15,05 ng/g (BPF) și 10,83 ng/g (BPAF) [61]. În Africa de Sud, BPA a fost detectat în probele de carne de vită conservată în saramură, cu concentrații de până la 191 ng/g [62]. BP au fost detectați în produse lactate, cu o medie de 22,49 ng/g în lapte [63], iaurt (10,29 ng/g) și brânză (0,35 ng/g) [64], în principal BPA, BPB și BPF, proveniți din ambalajele de plastic. În ouă, reziduuri de BP au fost identificate cu o concentrație medie de 1,98 ng/g, posibil din cauza expunerii prin furaje sau materiale de ambalare contaminate [60]. BP au fost detectați în uleiuri, cu o medie de 7,86 ng/g și alte categorii de alimente - supe, jeleuri, gemuri, sirop de clătite și pudră de cremă de vanilie, ambalate în recipiente de plastic, BPA fiind identificat în concentrații de până la 25,67 ng/g. În alimentele pentru bebeluși s-au găsit BP la 25,88 ng/g, BPS fiind compusul dominant [61]. În cereale, fructe și legume, au fost raportate concentrații medii de 0,034 ng/g s.u, 0,028 ng/g s.u. și 0,023 ng/g s.u. respectiv [62].

BPA a fost detectat în băuturi răcoritoare și sucuri de fructe, ceea ce reflectă prezența lor pe scară largă [63-65]. În Italia, BPA a fost găsit în 57% din băuturi răcoritoare și 50% din băuturi necarbogazoase consumate de copii, cu o concentrație medie de 2,12 μg/L, acest lucru fiind atribuit rășinilor epoxidice utilizate ca acoperiri interne în ambalaje [64]. În Malaezia, BPA a fost poluantul predominant în băuturi, cu o concentrație medie de 2,46 μg/L [65].

Aditivii plastici prezenți în materialele de ambalare pot migra în alimente în timpul tratamentelor termice (de exemplu, cuptorul cu microunde, încălzirea convențională) și al depozitării. Acest fenomen depinde în primul rând de natura chimică a alimentului (apoasă, acidă, alcoolică sau grasă), de durata și temperatura contactului, precum și de structura chimică a polimerului utilizat [66]. Procesul de migrare a aditivilor din materialul de ambalare pentru microunde în alimente poate fi separat în trei stări: difuzie în polimer, dizolvare la interfața polimer-aliment și dispersie în alimente în vrac. Difuzia este transferul de masă datorat mișcării aleatorii a moleculelor din regiunile cu concentrație mai mare către regiunile cu concentrație mai mică [66]. Cu toate acestea, rata de difuzie depinde doar de factorul termic și nu este afectată de concentrație. Spre exemplu, când se introduc alimente congelate în cuptorul cu microunde, activitatea structurilor moleculare macroscopice din interiorul plasticului începe să crească din ce în ce mai mult; cu cât temperatura de încălzire este mai mare, cu atât flexibilitatea moleculelor de polimer este mai mare și, prin urmare, ratele de migrare sunt mai mari.

Toate materialele plastice utilizate în ambalajele alimentare sunt transparente pentru microunde. Cele mai comune materiale plastice utilizate în ambalajele pentru microunde sunt PP sau PET, datorită punctului lor de topire ridicat. Autorii [68] au stabilit, că pe măsură ce timpul de încălzire la microunde crește, acetaldehida s-a format atât în soluție apoasă de acid acetic (3%), cât și în ulei de măsline. În acest caz, chiar deși PET este admis de reglementări, aceste recipiente PET pentru microunde ar putea conduce la niveluri critice odată cu creșterea temperaturii, în special când alimentul are un conținut ridicat de acid sau grăsime [69].

Pentru a evalua și gestiona aceste riscuri, se efectuează în mod curent teste de reglementare care utilizează simulanți alimentari standardizați (cum ar fi etanolul sau acidul

acetic) [70]. Aceste teste vizează stabilirea unor limite specifice de migrare pentru fiecare compus chimic potențial migrator, asigurând astfel conformitatea cu standardele de siguranță stabilite de autoritățile de reglementare. Deși Comisia Europeană a definit limitele de migrare specifice, concentrațiile maxime admise de substanțe pe care materialele plastice le pot elibera în alimente, doar pentru opt dintre cei cincizeci și doi de aditivi analizați sunt reglementați [71]. În prezent, compararea concentrațiilor de aditivi a fost extinsă pentru a include toate studiile relevante, nu doar pe cele care implică alimente ambalate [72].

Concluzii

Având în vedere numeroasele avantaje și proprietățile structurale unice ale plasticului, eliminarea completă a acestuia din viața de zi cu zi este nerealistă. Cu toate acestea, utilizarea greșită a plasticului de către consumatori poate crește semnificativ riscurile potențiale pentru sănătate.

În ciuda progreselor în înțelegerea contaminării cu aditivi din plastic, persistă lacune semnificative, în special în mecanismele care guvernează migrarea acestora de la ambalaje la alimente în condiții realiste. Natura multifactorială a migrării împiedică prezicerea precisă a comportamentului aditivilor și a expunerii consumatorilor. În plus, datele privind aditivii emergenți și recent introduși rămân limitate. Peste 1800 de substanțe au fost identificate ca potențiali migranți din materialele care intră în contact cu alimentele. Multe dintre acestea nu sunt încă listate ca aditivi autorizați și rămân slab caracterizate atât în ceea ce privește comportamentul lor migrator, cât și efectele toxicologice.

Cadrelor de reglementare prezintă, de asemenea, limitări. Reglementările actuale evaluează în mare măsură substanțele individuale. De asemenea, acestea rareori iau în considerare efectele amestecurilor, în ciuda dovezilor tot mai mari că expunerile combinate la mai mulți aditivi pot duce la efecte toxice aditive sau sinergice - un fenomen cunoscut sub numele de „*cocktail effects*”.

Provocările analitice complică și mai mult peisajul. Metodele convenționale, cum ar fi cromatografia cuplată cu spectrometria de masă, sunt concepute în principal pentru analize specifice și pot trece cu vederea contaminanți necunoscuți sau nespecificați. Testele de migrare sunt efectuate în condiții de laborator standardizate, utilizând simulanți alimentari, care pot să nu reflecte cu exactitate scenariile de utilizare din viața reală, putând duce la subestimări sau supraestimări ale expunerii.

Care ar fi soluțiile pentru diminuarea impactului migrator al contaminanților din ambalaje de plastic? Cele mai eficiente măsuri combinate sunt: selectarea materialelor și formulărilor sigure, bariere fizice/coatinguri, reducerea temperaturii/timpului de expunere, control analitic strict și politici care limitează substanțele cu risc.

Procesatorii de alimente ar trebui să selecteze ambalajele cu risc scăzut de migrație pentru tipul de produs, să evite utilizarea plastifiantilor agresivi, inclusiv folosind straturi-barieră, de exemplu, bariere siliconice sau pelicule comestibile/biopolimeri pentru reducerea migrației. Evitarea concentrațiilor mari de aditivi „funcționali” (antioxidanți, plastifianți, stabilizanți); utilizarea formulărilor în care substanțele active sunt fixate, pentru a limita eliberarea. Encapsulările (ciclodextrine, liposomi) reduc migrația pentru agenți activi. Proiectarea ambalajelor în funcție de condițiile reale, limitarea reutilizării ambalajelor de unică folosință pentru încălzire, deoarece la încălzirea în microunde se atestă o migrație accelerată.

Consumatorii ar trebui să evite încălzirea alimentelor direct în recipiente din plastic, mai ales alimentele grase, în favoarea vaselor de sticlă sau ceramică. Alimentele trebuie păstrate la temperaturi recomandate, fără a prelungi timpul de contact înainte de consum, deoarece temperaturile ridicate și timpul de păstrare prelungit cresc migrația. În general, trebuie citit cu atenție simbolurile și de urmat instrucțiunile producătorului.

Deoarece rămân încă o serie de incertitudini: multe substanțe detectate în biomonitoring nu au un profil toxicologic complet; efectele expunerii la amestecuri de migrați (*cocktail effects*) sunt insuficient cunoscute; există lacune în regimul testelor pentru materiale reciclate și pentru substanțele adăugate neintenționat, există o serie de priorități pentru asigurarea inofensivității ambalajelor din plastic: testarea compușilor cunoscuți și screening non-target a produselor alimentare în programele de control alimentar; aplicarea unor reguli stricte pentru utilizarea materialelor reciclate în ambalaje alimentare, asigurarea trasabilității ambalajelor; informarea publică privind evitarea încălzirii în plastic, preferința pentru recipiente adecvate, etc. Deoarece biopolimerii și filmele comestibile sunt promițătoare, dar au limitări (performanța de barieră, stabilitate, posibile riscuri chimice proprii etc.), evaluarea riscului pentru acestea trebuie făcută la fel de riguros ca pentru recipientele din plastic fără acoperiri.

Direcțiile de cercetare ar trebui să includă prioritar biomonitoringul extins, deoarece studii recente arată prezența a mii de substanțe provenite din ambalaje plastice în probe umane (bisfenoli, ftalați), ceea ce indică, că reglementările trebuie adaptate la expuneri reale. Pentru identificarea substanțelor adăugate neintenționat și a efectelor combinatorii a migrației este necesară adaptarea metode analitice non-target și modele toxicologice noi, pentru a nu pierde contaminanți relevanți.

Acknowledgments: Această lucrare a fost susținută printr-un grant de la ANCD, proiect numărul 25.80012.5107.19SE Evaluarea riscurilor asociate migrației unor componente potențial toxice din ambalaje alimentare din plastic pe piața Republicii Moldova, realizat în cadrul UTM.

Conflicts of Interest: The authors declare no conflict of interest

References

1. Pascall, M.A.; DeAngelo, K.; Richards, J.; Arensberg, M.B. Role and Importance of Functional Food Packaging in Specialized Products for Vulnerable Populations: Implications for Innovation and Policy Development for Sustainability. *Foods* 2022, 11, 3043.
2. Maddela, N.R.; Kakarla, D.; Venkateswarlu, K.; Megharaj, M. Additives of plastics: Entry into the environment and potential risks to human and ecological health. *J. Environ. Manag.* 2023, 348, 119364.
3. Ashrafy, A.; Liza, A.A.; Islam, M.N.; Billah, M.M.; Arafat, S.T.; Rahman, M.M.; Rahman, S.M. Microplastics pollution: A brief review of its source and abundance in different aquatic ecosystems. *J. Hazard. Mater. Adv.* 2023, 9, 100215.
4. Tajeddin, B.; Arabkhedri, M. Polymers and food packaging. In: *Polymer Science and Innovative Applications*; Al Maadeed, M.A.A.; Ponnamma, D.; Carignano, M.A., Eds.; Elsevier, Amsterdam, The Netherlands, 2020, pp. 525–543.
5. Ramanayaka, S.; Zhang, H.; Semple, K.T. Environmental fate of microplastics and common polymer additives in non-biodegradable plastic mulch applied agricultural soils. *Environ. Pollut.* 2024, 363, 125249.
6. Amirullah, N.; Samsudin, M.; Norrrahim, M.; Ilyas, R.; Nurazzi, N.; Jenol, M.; Hawanis, H.; Gunny, A. Regulations for food packaging materials. *Phys. Sci. Rev.* 2024, 9, pp. 2711–2735.
7. Gupta, R.K.; Pipliya, S.; Karunanithi, S.; Eswaran, U.G.M.; Kumar, S.; Mandliya, S.; Srivastav, P.P.; Suthar, T.; Shaikh, A.M.; Harsányi, E.; et al. Migration of chemical compounds from packaging materials into packaged foods: Interaction, mechanism, assessment and regulations. *Foods* 2024, 13, 3125.

8. Sturza, R.; Lazacovich, D. Monitoring the overall phthalate burden—A public health problem. *RIVEMed* 2017, 2, pp. 73–86.
9. Sturza, R.; Melenciuc, M.; Nistor, D.; Boudissa, F.; Terkani, T.; Abdelkader, N.-H.H.; Abdelkrim, A. Recyclable porous materials for the uptake of Bisphenol A. *Food Environ. Saf.* 2017, 16(4), pp. 282–286.
10. Davoodi, S.; Al-Shargabi, M.; Wood, D.A.; Rukavishnikov, V.S.; Minaev, K.M. Synthetic polymers: A review of applications in drilling fluids. *Petroleum Sci.* 2024, 21(1), pp. 475–518.
11. Depczynska, E.; Burawska, I. Overview and evaluation of chemicals and methods for flame retardancy in glued laminated wood systems. *Polymers* 2025, 17, 1459.
12. Key, S.; Ryan, P.G.; Gabbott, S.E.; Allen, J.; Abbott, A.P. Influence of colourants on environmental degradation of plastic litter. *Environ. Pollut.* 2024, 347, 123701.
13. Mazitova, A.K.; Zaripov, I.I.; Aminova, G.K.; Ovod, M.V.; Suntsova, N.L. Fillers for polymer composite materials. *Nanotechnol. Constr.* 2022, 14(4), pp. 294–299.
14. Andrady, A.L.; Heikkilä, A.M.; Pandey, K.K.; Bruckman, L.S.; White, C.C.; Zhu, M.; Zhu, L. Effects of UV radiation on natural and synthetic materials. *Photochem. Photobiol. Sci.* 2023, 22(5), pp. 1177–1202.
15. Stanciu, I. A review: Other types of esters used as plasticizers. *Int. J. Chem. Stud.* 2025, 13(1), pp. 46–47.
16. Huang, L.; Zhu, X.; Zhou, S.; Cheng, Z.; Shi, K.; Zhang, C.; Shao, H. Phthalic acid esters: Natural sources and biological activities. *Toxins* 2021, 13(7), 495.
17. Giuliani, A.; Zuccarini, M.; Cichelli, A.; Khan, H.; Reale, M. Critical review on the presence of phthalates in food and evidence of their biological impact. *Int. J. Environ. Res. Public Health* 2020, 17, 5655.
18. Hahladakis, J.N.; Velis, C.A.; Weber, R.; Iacovidou, E.; Purnell, P. An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling. *J. Hazard. Mater.* 2018, 344, pp. 179–199.
19. Lau, O.-W.; Wong, S.-K. Contamination in food from packaging material. *J. Chromatogr. A* 2000, 882(1–2), pp. 255–270.
20. Farrell, R.; Cortese, Y.J.; Devine, D.; Pezzoli, R. The function and properties of common food packaging materials and their suitability for reusable packaging: The transition from a linear to circular economy. *Curr. Res. Green Sustain. Chem.* 2024, 9(21), 100429.
21. Senthilkumar, P.; Barani Kumar, S.K.; Aishwarya, V.; Rahul Jacob Michael, R.J.; Nivethitha, B.; Sanjay Sharan Nallamuthu, S.S.; Kokila, S.; Shanmugam, V.; Naveen Kumar, R.J.; Gayathri Devi Selvaraju, G.D.; Rajendran K. Selvakesavan, R.K.S.; Jintae, L.; Devaraj, B. Nanoplastics in heat-sensitive food packaging: A review of migration, detection, health, and environmental impacts. *Food Control* 2025, 169, 111002.
22. Sanches-Silva, A.; Cruz Freire, J.M.; Sendón, R.; Paseiro Losada, P. Time–temperature study of the kinetics of migration of DPBD from plastics into chocolate, chocolate spread and margarine. *Food Res. Int.* 2007, 40, pp. 679–686.
23. Duncan, B.; Urquhart, J.; Roberts, S. Review of Measurement and Modelling of Permeation and Diffusion in Polymers. NPL REPORT DEPC MPR 012, January 2005. Available online: https://eprintspublications.npl.co.uk/3221/1/DEPC_MPR12.pdf (accessed on 29 August 2025).
24. Pilevar, Z.; Bahrami, A.; Beikzadeh, S.; Hosseini, H.; Jafari, S.M. Migration of styrene monomer from polystyrene packaging materials into foods: Characterization and safety evaluation. *Trends Food Sci. Technol.* 2019, 91, pp. 248–261.
25. Cai, R.; Nthoiwa, K.K.M.; Ge, C. Effect of microwave heating on the migration of additives from PS, PP and PET containers into food simulants. *J. Appl. Packag. Res.* 2014, 6, pp. 1–14.
26. Guazzotti, V.; Hendrich, V.; Gruner, A.; Fiedler, D.; Störmer, A.; Welle, F. Migration of Styrene in Yogurt and Dairy Products Packaged in Polystyrene: Results from Market Samples. *Foods* 2022, 11, 2689.
27. Vallejos, S.; Trigo-López, M.; Arnaiz, A.; Miguel, Á.; Muñoz, A.; Mendía, A.; García, J.M. From Classical to Advanced Use of Polymers in Food and Beverage Applications. *Polymers* 2022, 14, 4954.
28. Takahashi, N.; Miyanishi, Y.; Kato, R.; Amimoto, T.; Iwamoto, Y.; Takeda, K. Migration of terephthalate from scraps of poly(ethylene terephthalate) (PET) in water and artificial seawater. *Sci. Total Environ.* 2022, 838, 156053.
29. Mousavi Khaneghah, A.; Limbo, S.; Shoeibi, S.; Mazinani, S. HPLC Study of Migration of Terephthalic Acid and Isophthalic Acid from PET Bottles into Edible Oils. *J. Sci. Food Agric.* 2014, 94, pp. 1552–1558.
30. Gerassimidou, S.; et al. Unpacking the complexity of the PET drink bottles value chain: A chemicals perspective. *J. Hazard. Mater.* 2022, 412, 128410.

31. Hazira, A.R.; Ungku Zainal Abidin, U.F.; Selamat, J.; Syaliza, O.; Maimunah, S. Effect of contact time on the level of phthalates in polyethylene terephthalate-bottled water from the point of sale. *Pertanika J. Trop. Agric. Sci.* 2021, 44, pp. 389–400.
32. Arrigo, F.; Impellitteri, F.; Piccione, G.; Faggio, C. Phthalates and their effects on human health: Focus on erythrocytes and the reproductive system. *Comp. Biochem. Physiol. C Toxicol. Pharmacol.* 2023, 270, 109645.
33. Yousefi, Z.; Ala, A.; Babanezhad, E.; Mohammadpour, R.A. Evaluation of exposure to phthalate esters through the use of various brands of drinking water bottled in polyethylene terephthalate (PET) containers under different storage conditions. *Environ. Health Eng. Manag. J.* 2019, 6, pp. 247–255.
34. Gambino, I.; Bagordo, F.; Grassi, T.; Panico, A.; De Donno, A. Occurrence of microplastics in tap and bottled water: Current knowledge. *Int. J. Environ. Res. Public Health* 2022, 19, 5283.
35. Mastanjević, K.; Kartalović, B.; Kovačević, D.; Krstanović, V.; Habschied, K. Migration of phthalates and bisphenol A from polyethylene terephthalate bottles into beer during storage at controlled temperatures. *Foods* 2025, 14, 2689.
36. Iannone, A.; Di Fiore, C.; Carriera, F.; Avino, P.; Stillittano, V. Phthalates: The main issue in quality control in the beverage industry. *Separations* 2024, 11, 133.
37. He, N.X.; Bayen, S. An overview of chemical contaminants and other undesirable chemicals in alcoholic beverages and strategies for analysis. *Compr. Rev. Food Sci. Food Saf.* 2020, 19, pp. 3916–3950.
38. Cinelli, G.; Avino, P.; Notardonato, I.; Centola, A.; Russo, M.V. Rapid analysis of six phthalate esters in wine by ultrasound-vortex-assisted dispersive liquid–liquid micro-extraction coupled with gas chromatography–flame ionization detector or gas chromatography–ion trap mass spectrometry. *Anal. Chim. Acta* 2013, 769, pp. 72–78.
39. Montevecchi, G.; Masino, F.; Di Pascale, N.; Vasile, S.G.; Antonelli, A. Study of the repartition of phthalate esters during distillation of wine for spirit production. *Food Chem.* 2017, 237, pp. 46–52.
40. Carrillo, J.D.; Salazar, C.; Moreta, C.; Tena, M.T. Determination of phthalates in wine by headspace solid-phase microextraction followed by gas chromatography–mass spectrometry: Fibre comparison and selection. *J. Chromatogr. A* 2007, 1164, pp. 248–261.
41. Duca, G.H.; Sturza, R.; Lazakovich, D. The study of the phthalates migration in wine products by GC-MS method. *Chem. J. Moldova* 2012, 7, pp. 98–102.
42. Chatonnet, P.; Boutou, S.; Plana, A.; Plana, A. Contamination of wines and spirits by phthalates: Types of contaminants present, contamination sources and means of prevention. *Food Addit. Contam. Part A* 2014, 31, pp. 1–11.
43. Sturza, R.; Lazacovici, D. Monitoring of phthalate contamination in the wine industry in the Republic of Moldova. In: *Ecological Chemistry*. CEP USM, Chisinau, Moldova, 2022, pp. 314–330. ISBN 978-9975-159-05-0. Available online: <https://ichem.md/sites/default/files/2022-05/Monografia-Duca.pdf> (accessed on 29 August 2025).
44. Han, Y.; Zhang, C.; Yang, Y.; Weng, Y.; Ma, P.; Xu, P. Epoxidized isosorbide-based esters with long alkyl chains as efficient and enhanced thermal stability and migration resistance PVC plasticizers. *Polym. Test.* 2023, 123, 108048.
45. Farhadi, M.; Sepahvand, A.; Beiranvand, B.; Soleimani, F. Phthalate concentrations in drinking water in WPRO regions: A systematic review and meta-analysis. *Desalination Water Treat.* 2025, 322, 101217.
46. Mrema, E.E.; Chaula, D.N.; Chove, B. Levels of phthalate acid esters in drinking water bottled in PET (Polyethylene Terephthalate) and PC (Polycarbonates) bottles - stored under different storage conditions. *Chem. Sci. Int. J.* 2024, 33, pp. 11–24.
47. Lu, M.; Jones, S.; McKinney, M.; Kandow, A.; Donahoe, R.; Faulk, B.C.; et al. Assessment of phthalic acid esters plasticizers in sediments of coastal Alabama, USA: Occurrence, source, and ecological risk. *Sci. Total Environ.* 2023, 897, 165345.
48. Wang, C.; Huang, P.; Qiu, C.; Li, J.; Hu, S.; Sun, L.; Bai, Y.; Gao, F.; Li, C.; Liu, N.; Wang, D.; Wang, S. Occurrence, migration and health risk of phthalates in tap water, barreled water and bottled water in Tianjin, China. *J. Hazard. Mater.* 2021, 408, 124891.
49. Rekibi, S.; Duflos, G.; Grard, T.; Dehaut, A. Exposure to the main organic plastic additives through food contamination. *Environ. Pollut.* 2025, 376, 126359.
50. Rodríguez-Ramos, R.; Santana-Mayor, A.V.; Herrera-Herrera, A.; Socas-Rodríguez, B.; Rodríguez-Delgado, M.A. Recent advances in the analysis of plastic migrants in food. *TrAC Trends Anal. Chem.* 2024, 178, 117847.
51. Repposi, A.; Farabegoli, F.; Gazzotti, T.; Zironi, E.; Pagliuca, G. Bisphenol A in edible part of seafood. *Ital. J. Food Saf.* 2016, 5, 5666.

52. Cao, X.-L.; Kosarac, I.; Popovic, S.; Zhou, S.; Smith, D.; Dabeka, R. LC-MS/MS analysis of bisphenol S and five other bisphenols in total diet food samples. *Food Addit. Contam.* 2019, 36, pp. 1740–1747.
53. Castro, G.; Fourie, A.J.; Marlin, D.; Venkatraman, V.; González, S.V.; Asimakopoulos, A.G. Occurrence of bisphenols and benzophenone UV filters in wild brown mussels (*Perna perna*) from Algoa Bay in South Africa. *Sci. Total Environ.* 2022, 813, 152571.
54. Shaaban, H.; Mostafa, A.; Alqarni, A.M.; Almohamed, Y.; Abualrahi, D.; Hussein, D.; Alghamdi, M. Simultaneous determination of bisphenol A and its analogues in foodstuff using UPLC-MS/MS and assessment of their health risk in adult population. *J. Food Compos. Anal.* 2022, 110, 104549.
55. Mahlangu, W.B.; Maseko, B.R.; Mongadi, I.L.; Makhubela, N.; Ncube, S. Quantitative analysis and health risk assessment of bisphenols in selected canned foods using the modified QuEChERS method coupled with gas chromatography-mass spectrometry. *Food Packag. Shelf Life* 2023, 37, 101078.
56. Tian, L.; Zheng, J.; Pineda, M.; Yargeau, V.; Furlong, D.; Chevrier, J.; Bayen, S. Targeted screening of 11 bisphenols and 7 plasticizers in food composites from Canada and South Africa. *Food Chem.* 2022, 385, 132675.
57. Cao, P.; Zhong, H.; Qiu, K.; Li, D.; Wu, G.; Sui, H.; Song, Y. Exposure to bisphenol A and its substitutes, bisphenol F and bisphenol S from canned foods and beverages on Chinese market. *Food Control* 2021, 120, 107502.
58. Cunha, S.C.; Inácio, T.; Almada, M.; Ferreira, R.; Fernandes, J.O. Gas chromatography–mass spectrometry analysis of nine bisphenols in canned meat products and human risk estimation. *Food Res. Int.* 2020, 135, 109293.
59. Grumetto, L.; Gennari, O.; Montessano, D.; Ferracane, R.; Ritiene, A.; Albrezio, S.; Barbato, F. Determination of five bisphenols in commercial milk samples by liquid chromatography coupled to fluorescence detection. *J. Food Protect.* 2013, 76, pp. 1590–1596.
60. Xiao, Z.; Wang, R.; Suo, D.; Li, T.; Su, X. Trace analysis of bisphenol A and its analogues in eggs by ultra-performance liquid chromatography-tandem mass spectrometry. *Food Chem.* 2020, 327, 126882.
61. García-Córcoles, M.T.; Cipa, M.; Rodríguez-Gómez, R.; Rivas, A.; Olea-Serrano, F.; Vilchez, J.L.; Zafra-Gómez, A. Determination of bisphenols with estrogenic activity in plastic packaged baby food samples using solid-liquid extraction and clean-up with dispersive sorbents followed by gas chromatography tandem mass spectrometry analysis. *Talanta* 2018, 178, pp. 441–448.
62. Barghi, M.; Shin, E.; Son, M.-H.; Choi, S.-D.; Pyo, H.; Chang, Y.-S. Hexabromocyclododecane (HBCD) in the Korean food basket and estimation of dietary exposure. *Environ. Pollut.* 2016, 213, pp. 268–277.
63. Fasano, E.; Esposito, F.; Scognamiglio, G.; Di Francesco, F.; Montuori, P.; Amodio Cocchieri, R.; Cirillo, T. Bisphenol A contamination in soft drinks as a risk for children's health in Italy. *Food Addit. Contam.* 2015, 32, pp. 1207–1214.
64. Hassan, N.H.; Othman, H.I.A.A.; Abdul Malek, N.R.; Zulkurnain, M.; Saad, B.; Wong, Y.F. Simultaneous quantitative assessment of ochratoxin A, patulin, 5-Hydroxymethylfurfural, and bisphenol A in fruit drinks using HPLC with diode array-fluorimetric detection. *Foods* 2020, 9, 1633.
65. Regueiro, J.; Wenzl, T. Determination of bisphenols in beverages by mixed-mode solid-phase extraction and liquid chromatography coupled to tandem mass spectrometry. *J. Chromatogr. A* 2015, 1422, pp. 230–238.
66. Deng, X.; Huang, H.; Huang, S.; Yang, M.; Wu, J.; Ci, Z.; He, Y.; Wu, Z.; Han, L.; Zhang, D. Insight into the incredible effects of microwave heating: Driving changes in the structure, properties and functions of macromolecular nutrients in novel food. *Front. Nutr.* 2022, 9, 941527.
67. Duan, F.; Chen, M.-q.; Zhu, Y.; Zhang, J. Study the migration process of chemical substances through the packaging/food interface during microwave treatment. *Mathematical Problems in Engineering* 2013, 150687.
68. Cai Rochester, R.; Mokwena Nthoiwa, K.; Ge, C. Effect of microwave heating on the migration of additives from PS, PP, and PET containers into food simulants. *J. Appl. Packag. Res.* 2014, 6(1), pp.11-22.
69. Bhunia, K.; Tang, J.; Sablani, S.S. Microwave-based sustainable in-container thermal pasteurization and sterilization technologies for foods. *Sustainable Food Technol.* 2024, 2, pp. 926–944.
70. Kourkopoulos, A.; Sijm, D.T.H.M.; Geerken, J.; Vrolijk, M.F. Compatibility and interference of food simulants and organic solvents with the in vitro toxicological assessment of food contact materials. *J. Food Sci.* 2025, 90, e17659.
71. Grob, K.; Pfenninger, S.; Pohl, W.; Rieger, K. European legal limits for migration from food packaging materials: 1. Food should prevail over simulants; 2. More realistic conversion from concentrations to limits per surface area. PVC cling films in contact with cheese as an example. *Food Control* 2007, 18, pp. 201–210.
72. Seref, N.; Cufaoglu, G. Food packaging and chemical migration: A food safety perspective. *J. Food Sci.* 2025, 90, e70265.

Citation: Sturza, R.; Ghendov-Moșanu, A.; Dragancea, V.; Lazacovici, D. Migration of chemical compounds from food packaging: regulatory aspects and assessment of potential risks. *Journal of Social Sciences*, 8 (3), pp. 151-171. [https://doi.org/10.52326/jss.utm.2025.8\(3\).12](https://doi.org/10.52326/jss.utm.2025.8(3).12).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright:© 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md

[https://doi.org/10.52326/jss.utm.2025.8\(3\).13](https://doi.org/10.52326/jss.utm.2025.8(3).13)
CZU 631.3:664.002.5(048)



REVIEW OF THE BOOK "EQUIPMENT AND INSTALLATIONS IN THE AGRI-FOOD PRODUCTS INDUSTRY", PUBLISHED BY THE ROMANIAN ACADEMY PUBLISHING HOUSE, AUTHOR PROF. UNIV. DR. IOAN ȚENU

Petru Marian Cârlescu*, ORCID: 0000-0003-1039-0412
"Ion Ionescu de la Brad" University of Life Sciences of Iași, Romania
3, Aleea Mihail Sadoveanu, Iași 700490, Romania

Received: 07, 23, 2025
Accepted: 08, 23, 2025

Abstract. In the context of the rapid development of agri-food processing technologies, the development of processes underlying the conception, design, manufacture and exploitation of specific equipment, machines and installations is particularly topical. The increase in production capacities requires an accelerated dynamics of development of complex and automated technological lines, based on high-performance equipment, compliant with the technical requirements of international standards. Thus, the work *EQUIPMENT AND INSTALLATIONS FOR THE AGRI-FOOD INDUSTRY*, which addresses in detail the work processes of technological lines, equipment and installations for the industrialization of agri-food products, designed by the author of the book in an accessible and feasible way, constitutes a valuable material for the training and development of technical and technological skills of students, master's and doctoral students, as well as a useful manual for teachers and specialists working in this field.

Keywords: *food processing, equipment, technological lines, automation, process design.*

Rezumat. În contextual dezvoltării rapide a tehnologiilor de procesare a produselor agroalimentare, dezvoltarea proceselor care stau la baza conceperii, proiectării, fabricării și exploatarea utilajelor, mașinilor și instalațiilor specifice este deosebit de actuală. Creșterea capacităților de producție impune o dinamică accelerată de dezvoltare a liniilor tehnologice complexe și automatizate, bazate pe echipamente performante, conforme cerințelor tehnice ale standardelor internaționale. Astfel, lucrarea *UTILAJE ȘI INSTALAȚII PENTRU INDUSTRIA PRODUSELOR AGROALIMENTARE*, care abordează în mod detaliat procesele de lucru ale liniilor tehnologice, utilajelor și instalațiilor de industrializare a produselor agroalimentare, concepute de autorul cărții în mod accesibil și fezabil constituie un material valoros pentru formarea și dezvoltarea aptitudinilor tehnice și tehnologice ale studenților, masteranzilor și doctoranzilor, precum și un manual util pentru cadrele didactice și specialiștii care lucrează în acest domeniu.

Cuvinte cheie: *procesarea alimentelor, utilaje, linii tehnologice, automatizare, proiectare procese.*

Profesorul univ. dr. Ioan ȚENU, membru titular al Academiei de Științe Agricole și Silvicultură "Gheorghe Ionescu-Șișești" București, este un nume de referință în domeniul industriei de prelucrare a produselor agroalimentare din România, cu o carieră didactică, de cercetare științifică și de producție de peste 50 de ani. Tematica cărții, abordată de autor, reprezintă un demers științific important în domeniul industriei agroalimentare, cu impact major asupra dezvoltării economiei și securității alimentare.

Lucrarea *UTILAJE ȘI INSTALAȚII PENTRU INDUSTRIA PRODUSELOR AGROALIMENTARE*, prin structura și amploarea sa, aduce contribuții importante la cunoașterea și dezvoltarea liniilor tehnologice de prelucrare a produselor agroalimentare, ca cerință a diversificării și creșterii calității acestora, iar prin fundamentarea științifică a bazelor teoretice și a cunoașterii proceselor de lucru cu o complexitate din ce în ce mai mare, cartea reprezintă un instrument util în conceperea, proiectarea, fabricarea și exploatarea utilajelor, mașinilor și instalațiilor specifice. Deoarece piața din domeniul industriei agroalimentare solicită creșterea capacităților de producție și eficientizarea proceselor tehnologice, lucrarea scoate foarte bine în evidență aspectele privind necesitatea dezvoltării într-o dinamică accelerată a liniilor tehnologice complexe și automatizate, care includ echipamente performante care satisfac toate cerințele tehnice și standardele internaționale privind siguranța alimentară, fiabilitate și durabilitatea acestora, concomitent cu creșterea productivității muncii și reducerea consumurilor specifice și a costurilor de producție.

Necesitatea publicării cărții "*Utilaje și instalații în industria produselor agroalimentare*" este de actualitate, deoarece la ora actuală atât în țară cât și în străinătate nu există un manual sau monografie care să integreze cele mai valoroase și actuale utilaje și instalații din industria agroalimentară, specifice tehnologiilor din această industrie. În plus valoarea cărții este adusă și prin corelarea realizată între tehnologiile agroalimentare și liniile tehnologice, iar construcția utilajelor și instalațiilor de ultimă generație fabricate de diverse companii din domeniul industriei alimentare este schematizată într-o grafică deosebită, astfel încât să poată fi înțeleasă cu ușurință procesele de lucru complexe care se desfășoară în timpul exploatarea acestora. Personal, consider ca aceasta carte nu trebuie să lipsească din bibliotecile studenților, masteranzilor, doctoranzilor, cadrelor didactice, cercetătorilor științifici și specialiștilor din industria agroalimentară.

Tematica lucrării abordează un domeniu actual și oportun pentru dezvoltarea sectorului agroalimentar, respectiv utilajele și instalațiile din componența liniilor tehnologice folosite pentru industrializarea diverselor materii prime agricole, în vederea obținerii produselor alimentare, cum ar fi: prelucrarea legumelor și fructelor; procesarea strugurilor și condiționarea vinului; condiționarea, depozitarea și măcinarea semințelor de cereale; fabricarea produselor de panificație; procesarea laptelui și a brânzeturilor; abatorizarea animalelor și păsărilor, și de prelucrare a cărnii; fabricarea băuturilor alcoolice; producerea malțului și a berii; prelucrarea semințelor oleaginoase pentru obținerea uleiului și fabricarea zahărului.

Cartea este extinsă și include 11 capitole, pe 1172 pagini, în care sunt prezentate numeroase scheme tehnologice și procese de lucru ale utilajelor și instalațiilor pentru prelucrarea materiilor prime agricole și a subproduselor din industria alimentară, folosind o grafică pe înțelesul cititorilor, în mare parte originală, concepută și realizată de autor.

Tematica abordată de către autor în conținutul cărții este bine definită și structurată, la fiecare capitol sunt prezentate mai întâi noțiuni generale, după care sunt descrise liniile tehnologice specifice tehnologiilor de prelucrare a produselor agroalimentare luate în studiu,

apoi sunt descrise pe larg și în detaliu construcția, procesul de lucru și condițiile de exploatare ale utilajelor și instalațiilor folosite în cadrul fiecărui sector de activitate.

În capitolul I – *Utilaje pentru transportul produselor agroalimentare* sunt abordate utilajele pentru transportul produselor solide, lichide și gaze, cu schemele cele mai reprezentative, care se regăsesc în componența liniilor tehnologice abordate în următoarele capitole. Practic, este un capitol prin care sunt prezentate echipamentele folosite pentru efectuarea operațiilor unitare auxiliare de transfer a materiilor prime, subproduselor și produselor finite în cadrul liniilor tehnologice din industria agroalimentară.

Capitolul II – *Utilaje și instalații pentru prelucrarea legumelor și fructelor* prezintă mai întâi principalele linii tehnologice pentru obținerea sucurilor, conservelor, produselor congelate, deshidratate și concentrate, după care sunt analizate principalele grupe de utilaje și instalații, prin care sunt efectuate operațiile unitare de spălare, curățare, condiționare, mărunțire, amestecare, tratamente termice cu și fără transfer de masă etc. Pentru fiecare grupă de utilaje luate în studiu este prezentată atât construcția și funcționarea acestora, cât și bazele teoretice ale proceselor de lucru. De remarcat că grafica concepută de autor este relevantă pentru explicarea modului de lucru a tuturor utilajelor și instalațiilor specifice acestui domeniu.

Capitolul III – *Utilaje și instalații pentru prelucrarea strugurilor* tratează atât liniile tehnologice clasice de vinificație și de obținere a sucurilor, cât și a celor moderne, echipate cu sisteme de automatizare bazate pe *software* și calculatoare, în concordanță cu cerințele conceptului de Industria 4.0. De asemenea, sunt descrise și explicate din punct de vedere constructiv și funcțional cele mai relevante utilaje și instalații utilizate în prelucrarea strugurilor, inclusiv cele de ultimă generație, cum ar fi: presa pneumatică de extracție a mustului, de tip închisă și cu două membrane; instalația de limpezire a mustului prin flotație, instalația de stabilizare a vinului prin filtrarea cu filtre tangențiale, echipate cu membrane etc.

În capitolul al IV-lea, cu titlul *Utilaje și instalații pentru măcinarea semințelor de cereale*, au fost prezentate mai întâi aspecte privind istoria industriei morăritului, după care sunt descrise liniile tehnologice pentru curățarea și depozitarea semințelor de cereale, apoi liniile tehnologice pentru curățarea și măcinarea boabelor de grâu și porumb. În ultima parte a acestui capitol sunt prezentate pe larg toate utilajele și instalațiile folosite în industria morăritului, punând accent pe echipamentele performante de ultimă generație. Întrucât linii tehnologice și utilajele din industria morăritului, sunt de complexitate ridicată, autorul acordă o atenție specială explicării proceselor de lucru, inclusiv a noțiunilor de calcul teoretic care să ajute, în practică, specialiștii pentru o exploatare optimă a mașinilor specifice și pentru a obține produse finite de calitate, cu extracții ridicate și consumuri energetice reduse.

Capitolul V – *Utilaje și instalații pentru fabricarea produselor de panificație* tratează mai întâi aspecte generale privind fabricarea pâinii în etapa preistorică, după care sunt descrise liniile tehnologice pentru fabricarea produselor de panificație, fiind apoi descrise în detaliu utilajele și instalațiile pentru depozitare și condiționarea materiilor prime, prepararea aluatului, fermentarea aluatului, divizarea bucăților de aluat, modelarea bucăților de aluat, dospirea finală, coacerea pâinii etc. Ținând cont că procesul tehnologic de coacere a pâinii este o operație tehnologică complexă, autorul a insistat pe descrierea tuturor tipurilor de cuptoare pentru coacerea pâinii, insistând cu explicații detaliate asupra celor mai noi tipuri de utilaje folosite la nivel mondial.

Capitolul VI – *Utilaje și instalații pentru prelucrarea laptelui* este destinat prezentării

diverselor linii tehnologice pentru prelucrarea laptelui în vederea obținerii următoarelor produse: lapte de consum, iaurturi, lapte praf, smântână de consum, unt, înghețată, caș proaspăt, diferite tipuri de brânzeturi (telemea, brânză proaspătă din lapte de vacă, brânză frământată, brânzeturi topite etc). De subliniat, că în acest capitol autorul se axează pe cele mai noi și relevante linii tehnologice realizate pe plan mondial pentru fabricarea produselor din lapte și derivate din lapte, folosind atât procedee termice cât și nontermice. De asemenea, în partea a III-a a acestui capitol sunt prezentate în detaliu construcția, procesele de lucru și exploatarea tuturor utilajelor și instalațiilor specifice pentru prelucrarea laptelui și a produselor derivate.

Capitolul VII – *Utilaje și instalații pentru industria cărnii* prezintă mai întâi liniile tehnologice pentru abatorizarea animalelor și păsărilor, specificând în detaliu particularitățile tehnologice pentru fiecare specie, după care sunt abordate diverse exemple de linii tehnologice folosite pentru prelucrarea cărnii și a preparatelor din carne. În continuare, autorul tratează pe larg construcția, funcționarea și exploatarea următoarelor grupe de utilaje și instalații specifice acestui sector economic, și anume pentru: abatorizarea animalelor și păsărilor; tăierea în bucăți mari; mărunțirea și separarea cărnii; sărarea, masarea și malaxarea cărnii; umplerea membranelor; tratarea termică și afumarea produselor din carne etc. Toate informațiile sunt actualizate și aduse la zi, cu cele mai noi dezvoltări ale tehnicii, cum ar fi echiparea mașinilor cu mecatronică specifică conceptului de inteligență artificială, sau chiar prin utilizarea roboților industriali, cu scopul de a crește capacitățile de producție și siguranța alimentară, de a reduce costurile de producție și consumurile specifice de energie și materii prime.

Capitolul VIII – *Utilaje și instalații pentru fabricarea băuturilor alcoolice* tratează liniile tehnologice pentru fabricarea produselor alcoolice, cu accent pe utilajele și instalațiile pentru prepararea plămezilor și fermentarea acestora, precum și a utilajelor și instalațiilor pentru distilarea și rafinarea alcoolului etilic. Având în vedere că operațiile tehnologice de distilare și rectificare sunt complexe, autorul dezvoltă în detaliu bazele teoretice și de calcul ale coloanelor de distilare și rectificare, cu scopul de a optimiza transferul de masă și căldură. Schemele și procesele de lucru sunt explicate de către autor foarte clar, ceea ce face ca materialul să fie ușor de înțeles, deși fenomenele care se petrec în aceste instalații au o complexitate ridicată.

În cadrul capitolului al IX-lea, *Utilaje și instalații pentru fabricarea malțului și a berii*, sunt analizate, în prima parte, liniile tehnologice de fabricare a malțului și a berii, în care sunt evaluate analitic diverse variante în funcție de capacitatea de lucru, iar în continuare este prezentată în detaliu o paletă largă de utilaje și instalații specifice acestui sector din industria alimentară. Pentru a explica în amănunt construcția și procesul de lucru, pentru fiecare echipament, autorul a conceput și realizat o grafică originală, ușor de înțeles și de reținut de către specialiștii din domeniu, cu scopul de a realiza o exploatare științifică și optimă a tuturor utilajelor și instalațiilor folosite pentru fabricarea malțului și a berii.

Capitolul X – *Utilaje și instalații pentru fabricarea uleiurilor vegetale* tratează liniile tehnologice pentru fabricarea uleiului din materii prime oleaginoase, precum și utilajele și instalațiile cu care sunt efectuate operațiile unitare din componența tehnologiei de fabricare a acestor produse. Utilajele și instalațiile prezentate în detaliu sunt grupate în următoarele categorii: pentru curățarea și condiționarea semințelor oleaginoase în vederea conservării; pentru extracția și curățarea uleiului brut; pentru rafinarea uleiului brut.

În capitolul al XI-lea, *Utilaje și instalații pentru fabricarea zahărului*, sunt prezentate mai întâi liniile tehnologice pentru fabricarea zahărului din sfeclă de zahăr și din trestie de zahăr,

după care sunt analizate în detaliu o paletă largă de utilaje din această ramură extractivă, făcându-se o descriere și o schematizare originală și inovativă de către autor, pornind de la operațiile de curățare și spălare a materiilor prime, tăiere-mărunțire în vederea extracției sucului de zahăr, extracție și purificare a sucului crud, concentrarea sucului crud, iar la final sunt explicate clar, instalațiile pentru cristalizarea zahărului, uscarea zahărului cristal, și respectiv condiționarea produsului finit.

Prin aceste unsprezece capitole, autorul trece în revistă diversitatea de utilaje și instalații din industria produselor agroalimentare, cu accent pe descrierea procesului de lucru al acestora ce facilitează înțelegerea funcționării lor.

Cartea conține 287 referințe bibliografice, dintre care 178 referințe bibliografice din literatura internațională, scoțând în evidență ultimele noutăți în domeniul utilajelor și instalațiilor din industria agroalimentară.

Stilul de scriere și de abordare a problematicii de către autor este de a transmite informații științifice și tehnice bazate pe raționamente logice, deductive și argumentate, accesibile și ușor de înțeles de către cititorii care se pregătesc sau lucrează în domeniul procesării produselor agroalimentare.

Lucrarea analizată are o deosebită relevanță științifică, aducând contribuții originale și substanțiale în domeniul abordat. De aceea, consider că această carte nu ar trebui să lipsească din bibliotecile universităților care au programe de studii în domeniul ingineria produselor alimentare.

Având în vedere aspectele și argumentele prezentate, publicarea cărții cu titlul "*Utilaje și instalații în industria produselor agroalimentare*" în Editura Academiei Române recunoscută ca o editură de prestigiu, de către domnul Prof.univ.dr. ing. Ioan Țenu, consider că prin acest demers științific se va pune la dispoziție o lucrare valoroasă din punct de vedere tehnic, extrem de utilă în formarea competențelor studenților, masteranzilor și doctoranzilor, precum și un manual util pentru cadrele didactice și specialiștii din domeniul industriei agroalimentare.

Bibliografie:

Ioan Țenu. Utilaje și instalații pentru industria produselor agroalimentare. Editura Academiei Române; 2025; Nr. pagini: 1172 pagini ; ISBN: 9789732738771.

Citation: Petru Marian Cârlescu. Review of the book "Equipment and installations in the agri-food products industry". Journal of Social Sciences, 8 (3), pp. 172-176. [https://doi.org/10.52326/jss.utm.2025.8\(3\).13](https://doi.org/10.52326/jss.utm.2025.8(3).13).

Publisher's Note: JSS stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Submission of manuscripts:

jes@meridian.utm.md