Developing the index of social resilience for Republic of Moldova

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Abstract. *In a context marked by socioeconomic instability, public health crises, environmental pressures, and global uncertainty, resilience has emerged as a vital component of sustainable development. For the Republic of Moldova - undergoing structural reforms and aspiring toward European integration - strengthening social resilience is key to reducing vulnerability and fostering inclusive growth. This study develops a multidimensional Index of Social Resilience (IRS) to assess regional capacities to respond to and recover from adverse shocks. The IRS serves as a practical tool for policymakers to monitor trends, identify disparities, and prioritize interventions aligned with European standards. The index is built on six core dimensions: economic stability, educational capacity, social welfare, living standards and infrastructure, food security, and community safety. Each dimension includes selected indicators, normalized using the min-max method to ensure comparability. An equal weighting scheme was used to calculate the aggregated index, which was applied at the regional level using data from 2019 and 2023. Findings reveal a moderate and uneven national improvement in social resilience between 2019 and 2023. Chișinău consistently scored highest, increasing from 0.293 to 0.318, reflecting stable socio-economic performance and institutional capacity. The Center region recorded the most significant growth, while the North saw a slight decline and the South remained relatively stable. Despite improvements in infrastructure, food consumption, and youth employment in some areas, persistent regional disparities remain, particularly due to poverty, weak social protection, and limited institutional support in rural districts. The IRS provides an innovative, evidence-based framework that integrates socioeconomic and infrastructural indicators, enabling dynamic monitoring and cross-regional comparison. Adaptable to other contexts, it aligns with EU policy goals and supports Moldova's strategic efforts to enhance resilience and target development more effectively.*

Keywords*: resilience, Moldova, index, economic, social*
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1. Introduction

In recent decades, the concept of social resilience has gained substantial traction in both scientific discourse and public policy-making, reflecting the growing need to understand and strengthen the capacity of individuals, communities, and societies to respond effectively to various disruptions. Social resilience broadly refers to the ability to withstand shocks, absorb disturbances, adapt to new conditions, and recover to a functional or improved state of social equilibrium. This concept has moved beyond its origins in ecological and psychological studies to become a cross-disciplinary analytical tool for exploring complex social dynamics in the face of crises. From natural disasters and economic downturns to pandemics, political instability, mass migration, and technological disruptions, societies around the world are increasingly confronted with systemic challenges that test the strength and

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adaptability of their institutions, communities, and citizens. In this context, social resilience is now seen not only as a reactive capacity but also as a proactive and transformative potential, central to ensuring long-term sustainability, social cohesion, and inclusive development. Internationally, numerous frameworks and measurement tools have been developed to assess social resilience using multidimensional approaches. These efforts typically encompass indicators across domains such as economic security, education, institutional trust, community engagement, cultural cohesion, and social capital. The development of composite indices and data visualization tools has made it possible to map resilience at various spatial scales - from local communities to entire nations - providing policymakers with evidence-based insights into vulnerability, adaptability, and response capacities. Despite these advances, many countries, particularly those undergoing transition or facing structural vulnerabilities, lack tailored instruments that can capture the nuanced realities of their populations. The Republic of Moldova, situated at the intersection of Eastern Europe and the post-Soviet geopolitical space, represents a case in point. Over the past three decades, the country has experienced significant political transformations, economic instability, demographic decline, high emigration rates, and pronounced territorial inequalities. These factors have not only deepened existing vulnerabilities but have also reshaped the social fabric in ways that challenge conventional policy approaches. Yet, in Moldova, efforts to operationalize and measure social resilience remain fragmented or underdeveloped. The absence of a context-specific analytical framework limits the ability of national and local authorities to anticipate shocks, target interventions, and mobilize resources in a timely and effective manner. As a result, vulnerable populations - including children, the elderly, rural communities, and return migrants - are often left without adequate support, and long-term development strategies risk being undermined by short-term crisis management. In this regard, the present article seeks to fill a critical gap by developing a multidimensional index of social resilience specifically tailored to the Moldovan context. Building on international best practices, but grounded in local data, policy priorities, and institutional capacities, the proposed index aims to reflect Moldova's structural specificities, regional disparities, and socioeconomic challenges. It is designed not only as a diagnostic tool but also as a practical instrument for strategic planning, resource allocation, and monitoring the impact of social policies. Ultimately, this initiative aspires to support a more resilient, equitable, and cohesive society in the Republic of Moldova - one capable of navigating uncertainty and building a sustainable future.

2. Literature review

Although the concept of resilience is modern, its roots extend deep into human history. Prehistoric societies depended on collective adaptability and social cooperation to survive environmental threats and resource scarcity, laying the foundation for early ecological and social resilience. When resources in a territory were depleted, tribes sought new food sources, invented new tools, or migrated, these being early signs of ecological and economic resilience. During the Palaeolithic period, human communities developed survival strategies based on dietary diversification, efficient resource use, and role distribution within the group, reflecting an early form of organizational resilience. Tribes that failed to cooperate or adapt simply disappeared. Moreover, archaeological evidence shows that prehistoric groups cared for their sick or elderly members, a clear indicator that mutual support was essential for group continuity. In this sense, we can speak of the beginnings of social resilience as a mechanism for protecting the vulnerable and preserving cohesion (Tilley, 2016). Hoover & Hudson (2016) highlight that in response to the socio-ecological changes brought by the advent of agriculture, the Jōmon hunter-gatherers on Japan's Kyūshū island demonstrated cultural resilience by maintaining their maritime lifestyle. In antiquity, resilience was expressed through myths, proverbs, and collective behavior, reflecting a shared understanding of the need to adapt and endure. Stories about the Phoenix and proverbs such as "[f]or though the righteous fall seven times, they rise again" (Proverbs 24:16, Bible, New International Version, 2011) illustrate moral and spiritual resilience across cultures. Philosophical traditions, from Stoicism to the teachings of the Bhagavad Gita and Taoism, emphasized self-mastery, acceptance, and adaptive strength in the face of adversity. They argued that true resilience does not lie in controlling external circumstances but in one's conscious ability to choose how to respond to them. Aristotle, in his work "Politics" emphasized economic balance and diversification as essential to avoiding overdependence and promoting long-term stability (Aristotle, 1905). Roman

thinkers like Cicero built on these ideas, linking prosperity to institutional stability and adaptability (Cicero, 1913). The strategic use of reserves and diversification across the Roman Empire reflected early principles of economic resilience. In the Middle Ages, resilience was seen as a Christian virtue. Saint Augustine, influenced by Stoicism and Platonism, describes spiritual resilience in his Confessions as an inner struggle against sin and submission to divine will (Augustine of Hippo, 2001). Thomas Aquinas, in his Summa Theologiae, integrates the Stoic virtue of fortitude (fortitudo) into Christian morality (Thomas Aquinas, 1920-42). During the Renaissance (14^{th}–16^{th} centuries), the idea of resilience was revalorized through a renewed emphasis on human dignity and potential. Thinkers like Michel de Montaigne reinterpreted Stoic principles in a humanist framework, emphasizing habit and self-knowledge as key to enduring and thriving amid life's hardships (Montaigne, 2003). In the 17^{th} century, Baruch Spinoza and later Immanuel Kant emphasized reason and moral autonomy as foundations for resilience (Spinoza, 1981; Kant, 1964). Echoing Stoic ideas, they argued that understanding necessity and acting according to duty enable individuals to endure hardship through rational self-mastery. The mercantilist period (16^{th} to 18^{th} centuries) marked the first systematic approach to economic resilience. Thomas Mun introduced concepts of autarky and the accumulation of precious metals as the foundation of national resilience (Mun, 1959). He argued that maintaining a trade surplus and developing national industry increased a nation's resilience. The 18^{th} century witnessed a revolution in economic thought through the Classical School. Adam Smith introduced the revolutionary concept of the "invisible hand" proposing that free markets possess intrinsic capacities for self-regulation and adaptation (Smith, 1776). Smith observed that diversification and specialization could enhance both efficiency and resilience. David Ricardo expanded this idea, asserting that international specialization could paradoxically boost resilience through improved efficiency, even if it introduced short-term vulnerabilities (Ricardo, 1819). This tension between efficiency and resilience remains central in current economic debates. Thomas Malthus highlighted growth limits and economic cycles, stressing the importance of reserves and planning for crises (Malthus, 2023). Malthusian thinking introduced demographic concerns into economic resilience analysis, which has become increasingly relevant in the modern global context. The Neoclassical School brought unprecedented mathematical and theoretical rigor to economic resilience analysis. Vilfredo Pareto contributed with the concept of Pareto efficiency and studied income distribution, warning that extreme inequality can undermine social and economic resilience (Pareto, 1935). The Great Depression of the 1930s challenged many classical and neoclassical assumptions about self-regulating markets. John Maynard Keynes revolutionized economic resilience thinking by demonstrating that economies can remain stuck in underemployment equilibria and require government intervention to return to full employment (Keynes, 2009). His emphasis on expectations and psychological factors shifted the focus toward active fiscal and monetary policies as tools for enhancing resilience. In parallel, the Austrian School offered an alternative view. Friedrich Hayek argued that decentralized systems were more resilient than centrally planned ones due to superior information processing (Hayek, 2007). Ludwig von Mises detailed how individual decision-making contributes to system adaptability (Von Mises, 2007). From the 1970s onward, economic thought began integrating concepts from systems theory and other disciplines. Crawford Stanley Holling introduced the concept of "ecological resilience" (Holling, 2013). Holling distinguished between stability and resilience, arguing that ecosystems could be resilient without being stable, and vice versa. This distinction became foundational in modern ecology and inspired the application of the concept across other disciplines. Brian Walker and others refined the concept by introducing the idea of "social-ecological resilience", recognizing the inseparable interconnection between human and natural systems (Walker et al., 2004). This integrated perspective has become central to modern natural resource management and sustainability planning. Brian Arthur and others explored network effects and path dependence, explaining why economies can become locked in suboptimal equilibria (Arthur, 1994). Nicholas Stern incorporated ecological considerations, highlighting sustainability as a key dimension of economic resilience, arguing that a truly resilient economy cannot ignore the planet's natural limits and must promote regenerative, circular, and sustainable models, where well-being does not rely solely on growth, but on balance and harmony with the environment (Stern, 2008). This integrative vision has also taken shape in global economic practice. International organizations like the UN, IMF, and World Bank increasingly promote concepts such as "resilient economic development" encouraging countries to build economies that are not only productive but also capable of resisting and

recovering from crises. In the same spirit, governments are developing strategies for supply chain resilience, reducing external dependencies, supporting SMEs, and strengthening social protection, precisely to enhance cohesion and the economy's response capacity.

Nowadays, economic resilience is understood as a multidimensional concept encompassing macroeconomic stability, structural adaptability, institutional capacity, social capital, and innovation. Paul Krugman (1999) emphasized the need for integrated responses to modern crises. Ben Bernanke (2000) showed how monetary policy can shape resilience in contemporary economic downturns. The current perspective acknowledges that resilience is not just a technical property of economic systems but the outcome of complex interactions among economic, social, political, and institutional factors. This holistic vision reflects the evolution of economic thought from simple equilibrium models to complex adaptive systems capable of continuous learning and transformation.

Social resilience refers to the ability of communities and societies to cope with and adapt to change and disruption while maintaining essential functions and identity. Émile Durkheim laid the groundwork for understanding social cohesion and how societies adapt to structural changes (Durkheim, 2014). His concept of social solidarity became fundamental in understanding resilience at the collective level. Robert Putnam revitalized interest in social resilience, analyzing the decline of social capital in America and its impact on community capacity to cope with challenges (Putnam, 2000). He demonstrated that dense social networks and mutual trust are essential for community resilience. Elinor Ostrom, Nobel Prize laureate in Economics, studied how communities manage common resources, identifying principles contributing to long-term institutional resilience (Ostrom, 1990). Her research demonstrated that communities can develop resilient governance systems without external intervention. Amartya Sen introduced the capabilities approach, arguing that social resilience depends on the ability of individuals and communities to exercise fundamental freedoms (Sen, 1999). His perspective influenced development policies and expanded the understanding of resilience beyond purely economic factors.

Today's perspective acknowledges that various types of resilience - social, economic, psychological, ecological are interconnected and mutually influential. The COVID-19 crisis dramatically revealed these interconnections, showing how health shocks can trigger cascading effects across economic, social, and psychological systems. This reality has accelerated the development of integrative approaches that recognize the complexity and interdependence of resilience in the modern world.

Resilience is commonly understood as the ability to recover quickly after something unpleasant, be it shock, injury, or adversity, as defined by Oxford (2025). Yet, beneath this general notion lies a rich tapestry of meanings shaped by context and discipline. In social terms, resilience refers to the capacity of groups or communities to cope with external stresses and disturbances, particularly those arising from social, political, or environmental changes (Adger, 2000). In the economic domain, it is defined as the set of inherent and adaptive responses that allow individuals and communities to avoid or minimize potential losses during disasters (Rose, 2004). At the community level, resilience is not a fixed trait but a process, one that links adaptive capacities, such as accessible resources and flexible institutions, to the ability to adapt after disruption (Norris et al., 2008). From an ecological perspective, resilience is the ability of ecosystems to absorb shocks and adapt to change without collapsing into a fundamentally different state, maintaining function despite disturbance (Holling, 2013). Meanwhile, psychological resilience highlights the personal dimension: it is the internal process of adapting well in the face of trauma, tragedy, or stress, whether from health, family, or financial challenges (American Psychological Association, 2020). Together, these definitions portray resilience not just as recovery, but as a dynamic, context-dependent capacity for adaptation, transformation, and persistence across individual, communal, economic, and environmental domains.

Moldova is confronted with a range of persistent socioeconomic challenges, including widespread poverty, high rates of migration, and institutional fragility. In this context of ongoing vulnerability, there is an increasing need to evaluate the population's capacity to withstand and recover from various shocks - whether economic, social, or demographic in nature. The concept of social resilience becomes particularly relevant, as it encompasses both the ability to resist crises and the capacity to recover and adapt in their aftermath. In response to this need, the primary objective of this study is to develop a composite Index of Social Resilience (IRS) specifically tailored to Moldova's

national and regional contexts. This index is built upon a multidimensional framework, integrating a variety of indicators that reflect key dimensions of resilience, including economic stability, educational capacity, social protection, and infrastructural development. The resulting index is designed not merely as a statistical construct but as a practical diagnostic tool. It enables policymakers to identify critical vulnerabilities across regions, monitor trends over time, and guide targeted interventions aimed at strengthening the adaptive capacity of communities. In doing so, the IRS contributes to building a more inclusive, stable, and resilient Moldovan society.

3. Methodology and data

The concept of resilience has gained increasing recognition across various disciplines, and its definition and measurement have expanded significantly due to interdisciplinary research. Although initially seen as an abstract notion, resilience is now understood in concrete, measurable ways that differ according to the field in which it is applied. Resilience is not an uniform concept but one that adapts to the framework of each discipline. In recent years, the measurement and analysis of resilience have become increasingly sophisticated, especially in fields such as social sciences, economics, and ecology. In psychology, it is measured through individual emotional and behavioral responses; in ecology, through the recovery dynamics of natural systems; in economics, through structural adaptation and performance indicators; and in sociology and politics, through institutional and social robustness. Far from being merely theoretical, resilience can be clearly measured, compared, and applied in policy-making and strategy development, reflecting its growing importance in addressing the uncertainties of today's world. A key tool in this process is the composite index - a synthetic indicator that brings together multiple variables into a single, comprehensive score. These indices are designed to capture the complex, multidimensional nature of resilience, offering a clearer picture of how individuals, communities, economies, or ecosystems are prepared to face and recover from shocks. A composite index is, by definition, a statistical construct that combines several standardized indicators reflecting different aspects of a complex phenomenon.

Several well-known composite indices have been developed to evaluate resilience in specific contexts. Psychologically, resilience is often quantified through the use of questionnaires and psychometric tools like the Connor-Davidson Resilience Scale (CD-RISC) (Burns & Anstey, 2010) and the Brief Resilience Scale (BRS) (Smith et al., 2023). These instruments evaluate key indicators such as emotional recovery capacity, self-regulation, perceived social support, and optimism. For example, the CD-RISC produces scores ranging from 0 to 100, with higher scores reflecting stronger resilience in an individual. In the field of ecology, resilience takes on a different meaning, centered around the ability of ecosystems to recover from disturbances such as wildfires, floods, or droughts. For instance, the Community Resilience Index (CRI) is commonly used in sociology and public policy to assess the ability of municipalities or vulnerable regions to cope with crises (Thompson, Sempier & Swann, 2014). It includes dimensions such as social capital (trust, cooperation), access to essential infrastructure (water, transport, services), institutional readiness (emergency response), and economic diversification.

Another example is the Resilience Capacity Index (RCI) (Wu et al., 2020). It incorporates economic indicators like GDP per capita and employment rates, demographic factors such as education and diversity, and infrastructure metrics like internet access and public health services. A country that rebounds and returns to economic growth within two years after a financial downturn is considered more resilient than one that requires five or six years. In social and political sciences, resilience is understood in relation to a society's or institution's ability to maintain function and cohesion during times of stress. Here, resilience is quantified using indicators like the degree of social cohesion (such as trust in institutions), levels of civic participation, access to essential social and healthcare services, and the responsiveness of public institutions.

The construction of such indices involves several steps: selecting relevant indicators (such as income, education, or institutional performance), normalizing data to a common scale (usually from 0 to 1), assigning weights to indicators (equally or based on expert judgment), and aggregating them into a single score, using methods like arithmetic or geometric means. These composite indices allow for diagnosing vulnerabilities, monitoring adaptive capacity, strategic planning, risk communication, and allocating resources based on evidence. This brings us to the case of the Republic of Moldova, where

the need for a national composite index of resilience is particularly pressing. Moldova faces a complex mix of systemic challenges: mass migration of the working-age population, stark regional development gaps, social vulnerability among disadvantaged groups, high economic dependence on remittances, institutional fragility, and growing climate risks. In such a context, building the country's resilience, its ability to withstand, adapt to, and grow from crises, should be a top national priority. However, without a coherent and comprehensive tool for measurement, resilience in Moldova remains an abstract concept, often invoked in strategies and speeches but rarely translated into operational action. This is why the development of a custom composite resilience index tailored to Moldova's realities is essential. Such an index would support evidence-based policymaking, help prioritize investments, and ensure that resources are directed where they are needed most. With a well-designed index, Moldova could identify its most vulnerable regions and monitor how they are coping with economic, social, and climate-related shocks. It would facilitate strategic planning in areas such as social protection, regional development, education, health, and green transition. It could also serve as a communication tool, making resilience visible and accessible to citizens and stakeholders. Moreover, it would enhance Moldova's capacity to attract and manage external funding, particularly from European programs, by offering clear and comparable data on its resilience gaps.

To construct the Index of Social Resilience (IRS) for the Republic of Moldova, this study adopted a multidimensional approach that reflects the complexity and interdependence of the factors contributing to a society's capacity to withstand shocks. The methodological process was structured into four main stages: selection of dimensions, choice of indicators, data normalization, and value aggregation. The index is based on six key dimensions identified in the literature as essential for social resilience: economic stability (4 indicators); educational capacity (1 indicator); social protection (2 indicators); living standards and infrastructure (2 indicators); food security (1 indicator); community safety (1 indicator). Indicators were selected based on analytical relevance, data availability, regional comparability, and their ability to directly or indirectly reflect social resilience. Data source is the National Bureau of Statistics of Moldova (NBS) (2025). Each dimension includes quantifiable indicators, classified as having either a positive impact ("+") or negative impact ("–") on social resilience:

1) Economic stability, which is capturing the robustness of the labour market and the population's ability to generate income. The included indicators are:

- Employment Rate of Population (ERP) contributes positively to resilience ("+");
- Proportion of NEET youth (15–29 years) in the population (NEET) signals social vulnerability and has a negative impact ("–");
- Average Gross Monthly Salary (AGMS), considered a positive factor ("+");
- Average Monthly Disposable Income relative to Average Monthly Consumption Expenditures (MDCE), an indicator of household financial sustainability ("+").

2) Educational capacity. Education is a fundamental pillar of social resilience. The focus here is on:

- Average Number of Children per Teacher (CPT), a negatively impactful indicator on education quality and, therefore, on resilience ("–").

3) Social protection, that reflects the level of support offered to vulnerable individuals:

- Average Pension relative to the Minimum Subsistence Level for Pensioners (APMSL): indicates support provided to the elderly ("+");
- Absolute Poverty Rate (APR) has a negative impact on resilience ("–").

4) Living standards and infrastructure. Social resilience is closely linked to material conditions and access to infrastructure. This dimension includes:

- Household Ownership of Durable Goods (HODG) - positive impact ("+");
- Housing Equipment Level (HEL), also positive ("+").

5) Food security. This reflects the population's ability to access sufficient food resources:

- Average Consumption of Food per Person (ACFPP): has a positive effect on resilience ("+").

6) Community safety. A stable and safe social environment is essential for resilience. This dimension is represented by:

- Crime incidence (CI), that has a negative effect on social resilience ("–").

The classification of indicators with negative influence (e.g., Proportion of NEET youth, Absolute Poverty Rate, Crime Incidence, and Average Number of Children per Teacher) is based on theoretical and empirical evidence showing their adverse impact on social protection, educational capacity, economic stability and community safety. There is scientific literature showing the growth of these indicators is correlated to lower resilience (Nurius, LaValley & Kim, 2019) (Hassan, Mahmoud & Ellingwood, 2020) (Kapitsinis et al, 2022) (Wickes et al, 2022). These indicators were normalized using the reversed min-max method, where a higher raw value implies lower resilience, to maintain interpretive consistency.

This balanced approach, which combines both positive and negative directional indicators, allows for a more realistic and nuanced assessment of regional resilience capacity. The structure provides a solid basis for territorial and comparative analysis of social vulnerabilities and can guide public policies aimed at strengthening resilience in the most affected areas.

While the total number of indicators is 11, these are unevenly distributed across dimensions, which could potentially bias the aggregate score in favour of dimensions with more indicators (e.g., economic stability). To address this, separate sub-indexes for each dimension are computed, followed by the aggregation of these sub-indexes using an equal weighting scheme across dimensions, ensuring balanced representation.

At the second phase in order to allow the aggregation of indicators with different measurement units, the min-max normalization method was applied, transforming the values of each indicator into a score between 0 and 1, where 1 represents the most favourable level of resilience. The formula used is (1):

$$X_i^{norm} = \frac{X_i - X_{min}}{X_{max} - X_{min}} \qquad (1)$$

For indicators with a negative influence on resilience (e.g., crime incidence), the formula was reversed to ensure interpretive consistency (2).

$$X_i^{norm} = \frac{X_{max} - X_i}{X_{max} - X_{min}} \qquad (2)$$

The third phase involved aggregating the index. After normalization, the indicator scores were aggregated using an equal weighting scheme both at the dimension level and at the overall index level, thus avoiding the excessive influence of any particular component on the results. This methodological choice reflects the exploratory and balanced nature of the study and allows for comparability between regions without introducing structural biases. The final formula obtained was as follows (3):

$$IRS_i = \frac{1}{11} * \left(\frac{1}{4} * \left(\frac{ERP_i - ERP_{min}}{ERP_{max} - ERP_{min}} + \frac{NEET_{max} - NEET_i}{NEET_{max} - NEET_{min}} + \frac{AGMS_i - AGMS_{min}}{AGMS_{max} - AGMS_{min}} + \frac{MDCE_i - MDCE_{min}}{MDCE_{max} - MDCE_{min}} \right) + \frac{CPT_{max} - CPT_i}{CPT_{max} - CPT_{min}} + \frac{1}{2} * \left(\frac{APMSL_i - APMSL_{min}}{APMSL_{max} - APMSL_{min}} + \frac{APR_{max} - APR_i}{APR_{max} - APR_{min}} \right) + \frac{1}{2} * \left(\frac{HODG_i - HODG_{min}}{HODG_{max} - HODG_{min}} + \frac{HEL_i - HEL_{min}}{HEL_{max} - HEL_{min}} \right) + \frac{ACFPP_i - ACFPP_{min}}{ACFPP_{max} - ACFPP_{min}} + \frac{CI_{max} - CI_i}{CI_{max} - CI_{min}} \right) \qquad (3)$$

In the final phase, the spatial and comparative analysis, the index was calculated at the regional level, allowing for a territorial analysis of resilience and the identification of internal imbalances. A comparative analysis was also conducted between the reference years 2019 and 2023 to highlight the dynamics of social resilience in the context of reforms and recent events (the COVID-19 pandemic, energy crises). Temporal comparability was ensured by applying the same methodology and using indicators available for both periods. This methodological structure provides a solid foundation for the continuous monitoring of social resilience in Moldova and enables the future integration of additional dimensions, depending on socioeconomic developments or the requirements of European policies on cohesion and sustainability.

4. Research results and comments

The comparative analysis of the Index of Social Resilience (IRS) in the Republic of Moldova between 2019 and 2023 shows a modest and uneven evolution in resilience across regions (***Annexes 1-3***). Chișinău Municipality maintained the highest resilience levels in both years, improving from 0.293 in 2019 to 0.318 in 2023, reflecting consistent socio-economic stability and institutional robustness. The North Region experienced a slight decline in resilience, from 0.291 to 0.287, with decreases in key indicators such as AGMS (Average Gross Monthly Salary) and MDCE (Disposable Income relative to

Consumption). Despite strong improvements in ERP (Employment Rate of Population: from 0.526 to 0.842) and NEET (from 0.071 to 0.600), these gains were offset by worsening values in CI (Crime Incidence) and APMSL (Average Pension relative to the Minimum Subsistence Level for Pensioners). This points to a growing divergence between labour market indicators and social safety dynamics and increasing interregional inequality in labour remuneration. Here it should be taken into consideration that the North region also has an older population. The Center Region recorded a substantial increase, from 0.168 in 2019 to 0.255 in 2023, representing the most significant regional improvement. This positive trend appears to be driven by increases in ERP, NEET, MDCE, HODG and HEL, indicating broader access to services and possibly the impact of targeted development initiatives. The South Region saw a marginal increase in its IRS value, from 0.234 to 0.237. Although some indicators improved (HEL, ACFPP, HODG), others remained at lowest level compared to other regions (like ERP; NEET declined slightly), signaling persistent systemic vulnerabilities, particularly in labour market integration and youth engagement. In 2019, the map showed distinct regional polarization. The Centre was marked by lower IRS scores, represented by red shades, indicating reduced resilience. The North and South had moderate values, shown in orange shades. Chișinău Municipality had the highest resilience level (orange tone). By 2023, this contrast became less pronounced. The red zones diminished significantly, suggesting an improvement in previously underperforming districts. Most of the territory now appears in orange hues, with values in the 0.2–0.3 range, indicating greater territorial convergence and fewer extreme disparities. Only Chișinău municipality is in the higher range - 0.3-0.4. However, certain pockets still reflect systemic challenges, particularly in the labour market and poverty indicators. This moderate convergence points to a gradual equalization in access to services and socio-economic opportunities, though the underlying causes - such as structural reforms, demographic shifts, or external shocks like the COVID-19 pandemic and energy crises - require further analysis.

Several factors may explain the observed trends. Decentralized investments and targeted development interventions in central Moldova may have contributed to resilience gains in that region. Continued centralization of services in Chisinau might explain its persistent leadership in resilience levels, especially in access to education, healthcare, and economic opportunities. Migration and demographic shifts, particularly in the North, might have hindered resilience growth due to a reduced working-age population and weakened local institutions. The COVID-19 pandemic and external shocks (e.g., energy crisis, refugee influx) may have tested and revealed the resilience capacity of institutions, pushing reforms or exposing vulnerabilities. The observed progress, especially in the Center, suggests that targeted and region-specific interventions can significantly improve resilience outcomes. However, the stagnation in the North and uneven development elsewhere signal the need for enhanced coordination between national and local levels, sustainable infrastructure investments in lagging areas, strengthened community-level institutional capacities, and better monitoring and evaluation frameworks for resilience-building programs.

In the context of a post-Soviet Moldovan society marked by institutional fragility, pronounced social inequality, and growing territorial disparities, social resilience in the Republic of Moldova emerges as a structural tension between informal adaptive capacities and the chronic weakness of formal state mechanisms. On one hand, Moldovan society demonstrates remarkable adaptability at the micro level through strong family networks, community solidarity, and external support from the diaspora. These informal mechanisms, largely fuelled by social capital and remittances, which have accounted for over 25% of GDP (NBS, 2025) have enabled many households to withstand systemic crises such as the economic collapse of the 2000s, the 2021 energy crisis, and the consequences of the ongoing war in Ukraine. On the other hand, such forms of self-organization cannot substitute for the role of public institutions, especially in a country where trust in central authorities is severely eroded. According to the 2024 Public Opinion Barometer, circa 70% of respondents reported having "little" or "no" trust in the Government and Parliament, with even lower levels of trust in the judicial system (Institutul de Politici Publice, 2024).

This legitimacy deficit is compounded by multidimensional poverty and persistent inequalities. According to NBS (2025), approximately 25.6% of the population lives in multidimensional poverty, with significantly higher incidence in rural areas (37.6%) compared to urban settings (10.0%). These deprivations go beyond income poverty, encompassing limited access to essential services such as education, healthcare, sanitation, and adequate housing. Households with children are

disproportionately affected, generating a high risk of intergenerational poverty and social immobility. Simultaneously, Moldova is facing a severe demographic crisis: birth rates are declining, emigration is increasing, and the economically active population is shrinking. Official data indicate that the resident population decreased to 2.38 million as of early 2025, with a net migration of over -32,000 people (NBS, 2025). This depopulation accelerates societal aging, increases pressure on pension and healthcare systems, and weakens the labour market structure.

In recent years, Moldova's internal vulnerabilities have been amplified by external shocks such as the war in Ukraine and the associated energy crisis, triggering a cascading effect across the social and economic systems. The influx of refugees, energy supply disruptions, and waves of disinformation have tested the administrative capacity of the state, which has proven unprepared to handle interconnected and overlapping threats. In this context, resilience can no longer be understood as passive adaptation, but rather as an active process of institutional and societal transformation. The recently adopted Moldova Europeană 2030 National Development Strategy articulates such a vision, focusing on quality of life, human capital investment, and European integration as a framework for stability and modernization (Ministerul Mediului, 2025). However, the success of this strategy depends on the political will to implement deep structural reforms, on combating corruption, and on the state's ability to regenerate the social contract in an equitable and participatory way. Only through such a systemic and inclusive approach can Moldova transform its survival-driven resilience into sustainable, development-oriented resilience.

Limits of the index. Each indicator is normalized using min-max scaling, assuming linear contribution to resilience, but social phenomena are often nonlinear, small changes in poverty or crime can have disproportionate effects. Sub-indicators contribute equally, but in reality, some indicators (e.g., access to food or safety) may matter more for resilience than others. The index is static, it captures only a snapshot in time, but resilience is inherently dynamic, the ability to adapt or recover is temporal and involves trends, not just levels. Scores are relative to observed min and max values in the dataset. This makes results highly context-dependent and sensitive to outliers or small data ranges. Indicators are treated as independent, additive components. Resilience often depends on interactions (e.g., education influences income, which influences access to infrastructure). Indicators are chosen pragmatically, but the framework lacks a clear theoretical model of social resilience (e.g., from systems theory, ecology, or psychology). It does not capture latent variables like trust, coping strategies, or social cohesion. Indicators are marked as either positive (+) or negative (–) in relation to resilience. This ignores contextual reversals, e.g., higher income might not mean higher resilience if inequality rises or if costs of living spike. The reliability of the IRS depends on accurate, up-to-date statistics for all components. Missing, outdated, or inconsistent data can significantly distort the index. Nevertheless, despite these constraints, the IRS serves as a valuable starting point for operationalizing a complex and multidimensional concept. It brings together diverse indicators into a coherent structure, encourages evidence-based discussion, and provides actionable insights for policy design and comparative assessment. With ongoing refinement - such as the incorporation of dynamic modelling, weighted indicators based on expert judgment, and integration of qualitative dimensions - the IRS holds strong potential as a monitoring and diagnostic tool in the evolving field of social resilience analysis.

5. Conclusion

The results obtained through the application of the Index of Social Resilience (IRS) for the Republic of Moldova in 2019 and 2023 confirm a moderately positive national trajectory in resilience capacity, alongside persistent regional disparities. Chișinău continues to register the highest resilience levels, supported by stable socio-economic indicators. The Center region showed the most notable improvement, while the North experienced a slight decline, and the South remained relatively stable. Despite progress in areas such as youth employment and food consumption, critical challenges related to poverty, social protection, and institutional capacity remain insufficiently addressed, particularly in rural areas. The findings highlight the complex and multidimensional nature of social resilience, which cannot be captured solely through economic indicators or infrastructure investments. Instead, they underscore the importance of a holistic approach that integrates institutional strength, community engagement, and social inclusion. The resilience-building process must be grounded in territorial equity

and supported by context-specific interventions tailored to local vulnerabilities. A differentiated, data-informed approach is needed to target underperforming districts, particularly those facing demographic decline, youth emigration, or institutional stagnation. In such contexts, investments should prioritize the expansion of social services, the modernization of public infrastructure, and the professionalization of local governance structures to increase the absorptive and adaptive capacities of communities. In addition, the adequacy and effectiveness of social protection systems must be reassessed, especially in terms of their responsiveness to emerging risks and their coverage of vulnerable populations such as the elderly, low-income families with children, and NEET youth. Active labour market policies, combined with local-level vocational training and community-based employment initiatives, could mitigate social exclusion and enhance local resilience through the development of human capital. Equally important is the need to strengthen civic trust and participation, which are foundational to social cohesion and collective resilience. Encouraging democratic engagement, participatory budgeting, and transparent local governance can transform passive communities into active stakeholders in their own development and security. Furthermore, the development and application of the IRS also reveal important methodological insights. As a composite index, the IRS simplifies a complex social phenomenon into an operational and comparative framework. However, it remains constrained by its assumptions: equal weighting of indicators, linearity in contributions, and a static temporal structure. Future refinements should consider integrating dynamic modelling approaches, time-series data, and interaction effects among variables (e.g., how education influences income, which in turn affects housing or health outcomes). The inclusion of latent variables such as trust, coping mechanisms, and social cohesion would add depth and explanatory power, allowing for a more comprehensive understanding of resilience. Similarly, efforts should be made to adopt a theoretical foundation for the index grounded in systems thinking, ecological models, or social psychology, aligning it with international best practices. In policy terms, the IRS should not remain a purely academic construct. Its inclusion in planning, budgeting, and evaluation cycles could enable evidence-based governance and enhance Moldova's capacity to align with EU standards on social cohesion and territorial development. Making the IRS publicly accessible, via open data platforms and regular reports, would foster transparency, enable real-time tracking of resilience trends, and support civil society and academia in monitoring and contributing to the country's development agenda. Thus, the IRS offers a powerful, adaptable tool for diagnosing vulnerability, guiding policy interventions, and supporting the long-term goal of building a more cohesive, equitable, and resilient Moldova. While challenges remain, this index provides a valuable starting point for operationalizing the concept of resilience in a systematic, measurable, and actionable manner. It reflects not only where Moldova stands today, but also where it can go, with the right strategies, investments, and commitment to inclusive and sustainable development.

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References

Adger, W. N. (2000). Social and ecological resilience: are they related? *Progress in human geography*, 24(3), 347-364.

American Psychological Association. (2020). *The Publication Manual of the American Psychological Association, Seventh Edition.*

Aristotle. (1905). *Aristotle's Politics*. Oxford: Clarendon Press.

Arthur, B. (1994). *Increasing returns and path dependence in the economy*. Ann Arbor.

Augustine of Hippo, S. (2001). *The confessions of Saint Augustine*. New York: Signet Classic.

Bernanke, B. (2000). *Essays on the great depression*. Princeton, NJ: Princeton University Press.

Bible. (2011). *The Holy Bible: New International Version*. Zondervan.

Burns, R. A., & Anstey, K. J. (2010). The Connor–Davidson Resilience Scale (CD-RISC): Testing the invariance of a uni-dimensional resilience measure that is independent of positive and negative affect. *Personality and Individual differences*, 48(5), 527-531.

Cicero, M. T. (1913). *Cicero De officiis*. London: New York: W. Heinemann; The Macmillan Co.
Durkheim, É. (2014). *The division of labor in society*. New York, N.Y.: Free Press.
Hassan, E. M., Mahmoud, H. N., & Ellingwood, B. R. (2020). Resilience of school systems following severe earthquakes. *Earth's Future*, 8, e2020EF001518. https://doi.org/10.1029/2020EF001518
Hayek, F. A. von. (2007). *The road to serfdom: text and documents*. [Chicago]: University of Chicago Press.
Holling, C. (2013). *Resilience and Stability of Ecological Systems (1973).* In L. Robin, S. Sörlin & P. Warde (Ed.), The Future of Nature: Documents of Global Change (pp. 245-260). New Haven: Yale University Press. https://doi.org/10.12987/9780300188479-023
Hoover, K. C., & Hudson, M. J. (2016). *Resilience in prehistoric persistent hunter–gatherers in northwest Kyushu, Japan as assessed by population health and archaeological evidence.* Quaternary International, 405, 22-33.
Institutul de Politici Publice. (2024). *Barometrul Opiniei Publice*, *2024*
Kant, I. (1964). *Groundwork of the metaphysics of morals*: translated by H.J. Paton. Harper & Row.
Kapitsinis, N., Poulimas, M., Emmanouil, E., & Gialis, S. (2022). Spatialities of being a young NEET in an era of turbulence: a critical account of regional resilience across the Mediterranean EU South. *Journal of Youth Studies*, 27(1), 35–56. https://doi.org/10.1080/13676261.2022.2101355
Keynes, J. M. (2009). *The general theory of employment, interest, and money*. Kissimmee, FL: Signalman Pub.
Krugman, P.R. (1999). *The return of depression economics*. New York: W.W. Norton.
Malthus, T. (2023). *An essay on the principle of population*. In British Politics and the Environment in the Long Nineteenth Century (pp. 77-84). Routledge.
Ministerul Mediului. (2025). *Strategia Națională de Dezvoltare „Moldova Europeană 2030”*. Chișinău.
Montaigne, M. de. (2003). *The complete Essays*. London, England; New York, N.Y., USA: Penguin Books.
Mun, T. (1959). *England's treasure by forraign trade.* Oxford: Blackwell.
National Bureau of Statistics of the Republic of Moldova (NBS). (2025). *Statbank.* Retrieved July 10, 2025, from https://statistica.gov.md
Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). *Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness.*
Nurius, P., LaValley, K. & Kim, M.H. (2019). Victimization, Poverty, and Resilience Resources: Stress Process Considerations for Adolescent Mental Health. *School Ment Health.* 2020 Mar;12(1):124-135. doi: 10.1007/s12310-019-09335-z. Epub 2019 Jun 28. PMID: 32431758; PMCID: PMC7236761.
Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action.* Cambridge; New York: Cambridge University Press.
Oxford English Dictionary. (2025). *Resilience*. In Oxford English Dictionary. Retrieved on July 10, 2025, from https://www.oed.com/
Pareto, V. (1935). *The mind and society <Trattato di sociologia generale>*. New York: Harcourt, Brace and Company.
Putnam, R.D. (2000). *Bowling alone: the collapse and revival of American community*. New York: Simon & Schuster
Ricardo, D. (1819). *On the principles of political economy & taxation*. Second edition. London: John Murray.
Rose, A. (2004). Defining and measuring economic resilience to disasters. *Disaster Prevention and Management: An International Journal*, 13(4), 307-314.
Sen, A. (1999). *Development as freedom*. New York: Knopf.
Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations*. London: [New York]: Printed for W. Strahan and T. Cadell, A. M. Kelley

Smith, B. W., deCruz-Dixon, N., Schodt, K., & Torres, F. (2023). Brief resilience scale (BRS). In *Handbook of assessment in mindfulness research* (pp. 1-19). Cham: Springer International Publishing.

Spinoza, Benedictus de. (1981). *Sittenlehre. Hildesheim*; New York: Olms.

Stern, N. (2008). The economics of climate change. *American economic review*, 98(2), 1-37.

Thomas Aquinas, S., 1225?-1274. (192042). The "Summa theologica" of St. Thomas Aquinas ... London: Burns, Oates & Washburne, ltd.

Thompson, J., Sempier, T., & Swann, L. (2014). Evaluation of the community resilience index: A community planning tool.

Tilley, C. (2016). *Interpreting landscapes: geologies, topographies, identities; explorations in landscape phenomenology 3*. Routledge.

Von Mises, L. (2007). *Human action a treatise on economics*. Indianapolis: Liberty Fund

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social–ecological systems. *Ecology and society*, 9(2).

Wickes, R., Zahnow, R., Corcoran, J., Kimpton, A. (2022). Community resilience to crime: A study of the 2011 Brisbane flood. *Am J Community Psychol.* 2022 Dec;70(3-4):379-393. doi: 10.1002/ajcp.12610. Epub 2022 Jun 28. PMID: 35762883; PMCID: PMC10084218.

Wu, Y., Que, W., Liu, Y. G., Cao, L., Liu, S. B., & Zhang, J. (2020). Is resilience capacity index of Chinese region performing well? Evidence from 26 provinces. *Ecological Indicators*, 112, 106088.

Annexes

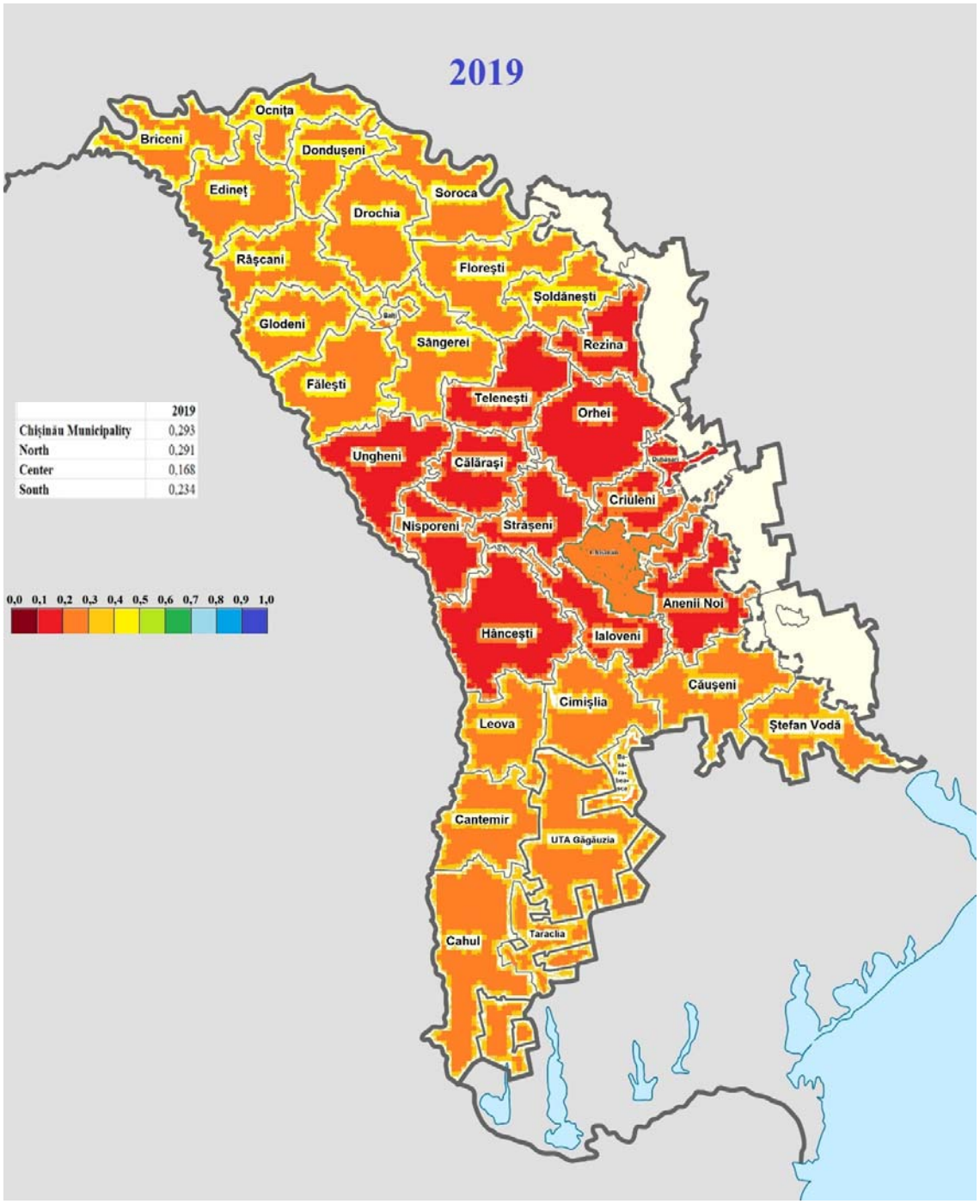
Annex 1. Index of Social Resilience and it's sub-indices by regions in the Republic of Moldova, 2019 and 2023

	NORTH REGION		CENTER REGION		SOUTH REGION		CHIŞINĂU MUNICIPALITY	
	2019	**2023**	**2019**	**2023**	**2019**	**2023**	**2019**	**2023**
ERP	0,526	0,842	0,108	0,180	0,000	0,000	1,000	1,000
NEET	0,071	0,600	0,000	0,200	0,048	0,000	1,000	1,000
AGMS	0,110	0,000	0,109	0,038	0,000	0,001	1,000	1,000
MDCE	0,329	0,000	0,000	0,511	1,000	1,000	0,384	0,599
CPT	1,000	1,000	0,000	1,000	1,000	1,000	0,000	0,000
APMSL	0,100	0,073	0,027	0,036	0,000	0,000	1,000	1,000
APR	0,353	0,445	0,294	0,260	0,000	0,000	1,000	1,000
HODG	0,379	0,400	0,392	0,412	0,398	0,423	0,475	0,485
HEL	0,432	0,464	0,460	0,499	0,478	0,522	0,593	0,584
ACFPP	0,574	0,595	0,558	0,399	0,449	0,554	0,473	0,440
CI	0,739	0,509	0,651	0,575	0,421	0,325	0,375	0,625
IRS	0,291	0,287	0,168	0,255	0,234	0,237	0,293	0,318

Source: Author's calculations based on regional data.

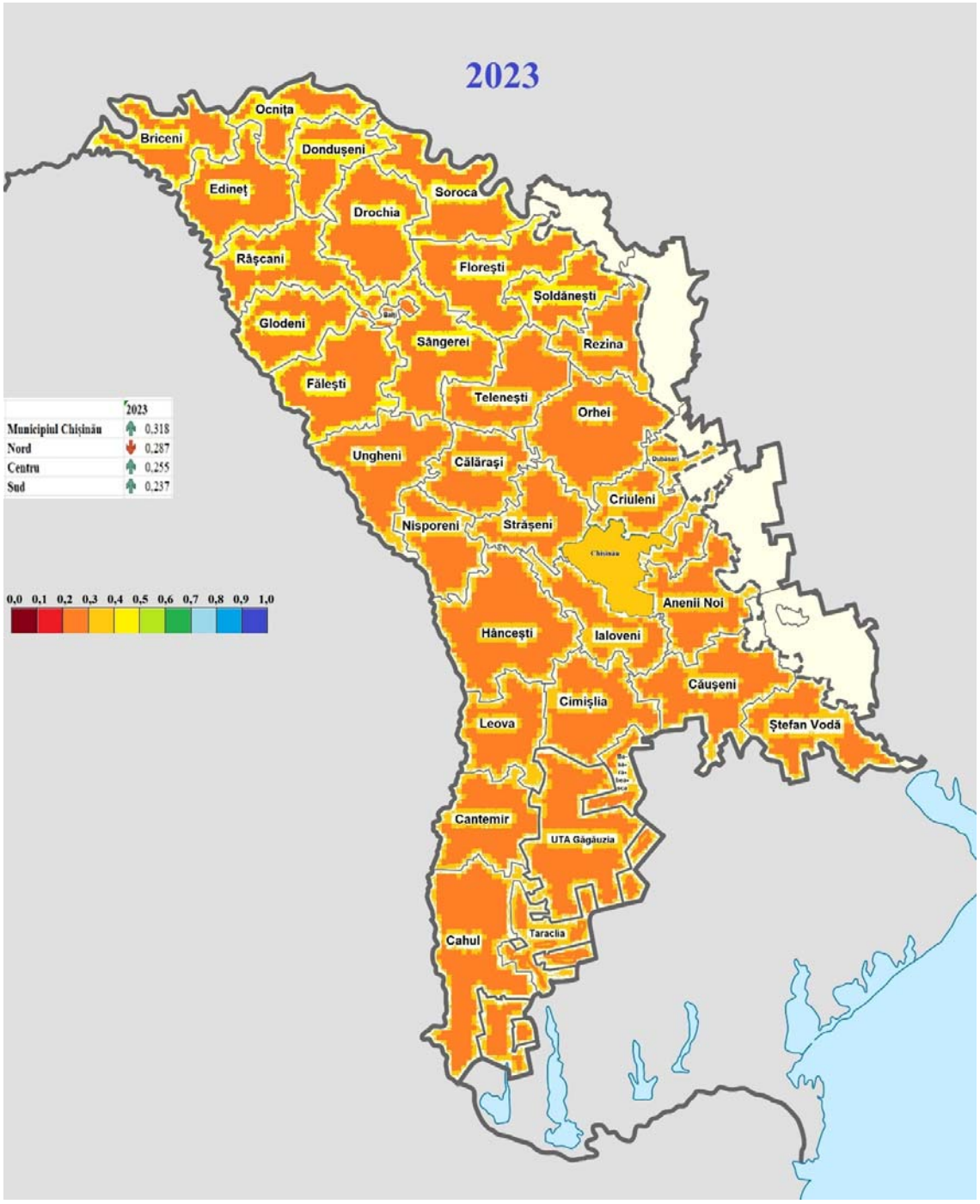
Note:
- *Employment Rate of Population (ERP)*
- *Proportion of NEET youth (15–29 years) (NEET)*
- *Average Gross Monthly Salary (AGMS)*
- *Average Monthly Disposable Income relative to Average Monthly Consumption Expenditures (MDCE)*
- *Average Number of Children per Teacher (CPT)*
- *Average Pension relative to the Minimum Subsistence Level for Pensioners (APMSL)*
- *Absolute Poverty Rate (APR)*
- *Household Ownership of Durable Goods (HODG)*
- *Housing Equipment Level (HEL)*
- *Average Consumption of Food per Person (ACFPP)*
- *Crime incidence (CI)*
- *Index of Social Resilience (IRS)*

Annex 2. Index of Social Resilience by regions in the Republic of Moldova, 2019



Source: Author's calculations based on regional data.

Annex 3. Index of Social Resilience by regions in the Republic of Moldova, 2023



Source: Author's calculations based on regional data.