HUMAN DEVELOPMENT UNDER GLOBAL UNCERTAINTY THROUGH THE LENS OF THE 4R FRAMEWORK

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SUMMARY

Human development is typically assessed through achievements in health, education and living standards. These outcomes are essential, yet they do not fully capture the capacity of individuals, households and institutions to preserve opportunities amid economic, demographic, technological and geopolitical disruptions. This article applies a conceptual framework of four complementary analytical dimensions resilience, rights, readiness and redistribution (4R) to the Republic of Moldova. Drawing on foundational human-development literature, international measurement frameworks and publicly available secondary statistics, it distinguishes achieved development outcomes from the conditions required to maintain them. Moldova illustrates the analytical value of this distinction: according to the 2025 Human Development Report, its Human Development Index was 0.785 in 2023, while national statistics reveal pronounced rural–urban poverty disparities, rapid population ageing, depopulation, and uneven labour-market participation. The 4R framework serves as an organising lens, not as a new composite indicator or a tested causal model. The article identifies observable vulnerabilities, clarifies the links between dimensions and proposes priorities for more inclusive, shock-responsive policies. Its contribution is a context-sensitive interpretation of human development that supplements, rather than replaces, established indices.

Keywords: *human development, human capital, resilience, inequality, 4R framework, Republic of Moldova*

INTRODUCTION

Human development has long been understood as the expansion of people's substantive opportunities to lead lives they value, rather than the simple growth of national output (UNDP, 1990; Sen, 1999). Health, education and an adequate standard of living remain fundamental to this perspective. Yet recent disruptions—including the COVID-19 pandemic, geopolitical insecurity, energy price shocks, climate-related risks and the rapid diffusion of artificial intelligence—raise a further question: not only what people have achieved, but whether they can retain and extend those achievements when circumstances change. A capability-based assessment must therefore distinguish resources and observed outcomes from substantive freedoms and the institutional conditions that enable them (Alkire, 2002; Robeyns, 2005).

Human development occurs when healthy, educated, safe individuals with a decent quality of life contribute more effectively to economic and social progress. Human capital is, therefore, a resource, whereas human development is a broader goal of societal development. This means that human development is not limited to a person being educated and productive.

This distinction is particularly relevant to the Republic of Moldova. The country has recorded improvements in aggregate human-development outcomes, yet these coexist with depopulation, outward migration, population ageing and substantial differences in living conditions between urban and rural areas. National averages may obscure the exposure of some households and communities to income loss, reduced family support, limited access to services and uncertainty about employment. Therefore, an assessment restricted to an aggregate index provides only a partial picture of development opportunities. Research on Moldova identifies persistent emigration and depopulation as structural processes rather than short-lived responses to individual shocks (Gagauz, Tabac, & Pahomii, 2023; Tabac & Gagauz, 2020).

Despite the extensive literature on human development and human capital, these concepts are often examined through different analytical lenses.

The article asks: How can assessments of human development in Moldova be enriched by considering people's capacity to preserve and expand opportunities amid economic, demographic and technological uncertainty? Its objective is to formulate and apply an interpretative four-dimensional framework comprising resilience, rights, readiness and redistribution (4R). These dimensions draw on established debates in development and resilience; the article does not claim to originate the individual concepts or to demonstrate that the specific combination has been formally adopted as a single UNDP index.

The contribution is threefold. First, the article clarifies the distinction between human-development outcomes, human capital and the institutional conditions that sustain capabilities. Second, it specifies four dimensions and the questions through which they may be examined. Third, it illustrates their usefulness using secondary evidence on Moldova, while explicitly recognising the limits of a descriptive and conceptual study. This framing aligns with research showing that a multidimensional conception of human development requires transparent choices about the dimensions assessed rather than an unexamined expansion of indicator lists (Alkire, 2002; Alkire and Foster, 2011).

THEORETICAL FRAMEWORK

HUMAN DEVELOPMENT, HUMAN CAPITAL AND WELL-BEING

Human capital comprises the health, knowledge and skills that contribute to individual productivity and earning capacity. Human development is broader: it assesses whether people have meaningful freedoms and opportunities, including the ability to participate in society, to enjoy dignity and to obtain essential services. Investment in human capital can advance human development, but the relationship is not automatic. Education or skills do not guarantee desirable outcomes where decent work is unavailable, rights are weakly protected, or opportunities vary by place of residence (Sen, 1999; Alkire, 2010). The distinction between capabilities and achieved functionings is central to the capability approach and helps avoid equating a person's available choices with realised economic output (Robeyns, 2005; Alkire, 2005).

Thus, human capital transforms people into valuable economic resources, and human development ensures that this value translates into a better, more dignified life for them. The outcome of processes, from the micro to the macro level, depends on the capacity, potential and skills of the human factor.

The 1990 Human Development Report gave the clear and fundamental articulation of the concept of human development.

In all his work, he emphasises the importance of investing in human capital from the earliest stages of life for societal progress.

The UNDP Human Development Index (HDI) summarises outcomes in longevity, schooling and income. It provides a comparable measure, but cannot, by itself, describe every aspect of insecurity, social exclusion or local vulnerability. The OECD well-being approach considers a wider set of life-quality dimensions and inequalities, while the World Bank's Human Capital Index (HCI) and Human Capital Index Plus (HCI+) address the accumulation and productive use of health, education and work-related capabilities. The latest HCI+ extends the earlier emphasis on childhood outcomes into adulthood, incorporating employment and learning at work (World Bank, 2026). These approaches answer related but distinct questions and should not be treated as interchangeable. Measures of multidimensional deprivation provide complementary evidence, but their dimensions, thresholds and aggregation rules require explicit justification (Alkire and Foster, 2011).

The focus on human development is centred on four criteria: equity, which ensures equal opportunities for all; sustainability, which means meeting current needs without compromising the ability of future generations to meet their own needs; emancipation and empowerment, enabling people to participate in decision-making processes and to benefit from them; and productivity, an essential element driven by human effort that contributes to economic growth.

In essence, human development is not just about investing in early childhood education, but is examined from a much broader perspective, which encompasses human mental and physical health, levels of education beyond compulsory education, lifelong learning, and, last but not least, soft skills, communication, engagement, creativity, and digital competencies.

Recent methodological research further supports treating the HDI as a necessary but incomplete summary of human development. Pinar et al. (2022) examine the implications of incorporating institutional quality alongside conventional HDI dimensions, while Martori and Hirai (2026) demonstrate that the relative sensitivity of HDI components changed after 2020, notably through the increased salience of life expectancy. These studies do not invalidate the HDI; rather, they underline the importance of institutional context and sensitivity to shocks when interpreting national averages.

Another prominent economist, Manfred Max-Neef, developed the approach of human-scale development, focusing on fundamental human needs and satisfaction factors that remain constant across time and culture. He believed that the human factor can be effective and provide real value only when people are motivated and certain needs are met, such as subsistence, protection, affection, understanding, participation, leisure or recreation, creativity, identity, and freedom. The interests of future generations regarding resources and the environment must receive the same attention as those of the present generation.

The capability perspective advanced by Sen (1999), work on sustainable human development (Anand and Sen, 1994), and research on human-scale development (Max-Neef, 1991) suggest that successful development depends on both achieved well-being and the conditions that allow people to exercise their capabilities over time. Resilience and inclusive institutions are especially important when shocks threaten to reverse progress. The United Nations guidance on building resilient societies stresses anticipation, absorption, adaptation and transformation, rather than reliance solely on emergency relief (United Nations, 2020). For Moldova, recent research on rural–urban economic inequality among older people shows why aggregate development achievements must be examined alongside age-specific and territorial distributions of resources (Gagauz & Prohnițchi, 2026).

THE ANALYTICAL LOGIC OF THE 4R FRAMEWORK

The framework proposed here integrates four established policy concerns for interpretative analysis. Resilience is the capacity to absorb and recover from shocks without losing essential capabilities. Rights concerns the effective, rather than merely formal, availability of education, health care, decent work, social protection and participation. Readiness denotes the capacity to anticipate and respond to structural change through skills, information, institutional preparedness and lifelong learning. Redistribution addresses the extent to which resources and public provision reduce avoidable inequalities in opportunities and exposure to risk. In this sense, resilience draws on the concept of social capacity to cope with external disturbances and institutional change (Adger, 2000). The four components used here are a synthesis, not an empirically attributed 4R framework to any one of these authors.

The second R stands for Rights. A person should not be valued only for their productivity or as part of the workforce, but also as a holder of rights and freedom.

The categories are analytically distinct yet mutually reinforcing. Rights to services may be formally recognised yet ineffectual without financing or proximity; redistribution can help translate formal rights into practical access. Readiness can reduce exposure to labour-market disruptions, whereas resilience describes what happens when a shock occurs. Their overlaps therefore represent pathways of interaction, not four separately measured causes of human development. Existing research also cautions against treating accessibility as an automatic consequence of population size: local service availability and actual travel-time access can diverge (Christiaanse, 2020).

The third R, Readiness (Preparedness), is essential for supporting human development during crises or other unpredictable situations. For example, anyone who acquires digital skills and retrain is better prepared for the changes brought about by automation and artificial intelligence, or for any other unexpected situations.

A careful definition of resilience is especially important. Regarding the sustainable-development scholarship, Park (2024) cautions against using the term as a loosely defined label. Accordingly, resilience in this article denotes the ability to absorb, adapt to, and recover from shocks while maintaining substantive capabilities; it is distinguished from readiness, which refers principally to anticipatory preparation for foreseeable transitions.

The fourth important aspect is R, for redistribution. Redistribution refers to the more equitable distribution of resources, income, and opportunities.

Recent research on demographic resilience offers a particularly relevant extension of this conceptual discussion. Gagauz and Buciuceanu-Vrabie (2026) define demographic resilience in shrinking and ageing societies as the capacity of socio-demographic systems to sustain essential economic, social, and institutional functions. Their framework highlights economic adaptation, social and care provision, human capital formation and retention, and anticipatory institutional governance. Although these dimensions are not identical to the 4R categories employed here, they clarify how resilience depends on the interaction of demographic structures, capabilities and public institutions.

Table 1. Analytical Dimensions of the 4R Framework for Human Development

Dimension	Core analytical question	Illustrative evidence
Resilience	Can households and institutions withstand and recover from shocks?	Income insecurity; exposure to energy and labour-market shocks; access to safety nets
Rights	Are basic capabilities accessible in practice and across territories?	Differences in education, health care, decent work and social services
Readiness	Are people and institutions equipped for foreseeable change?	Skills, lifelong learning, employment opportunities and demographic preparedness
Redistribution	Do taxes, transfers and service provision narrow capability gaps?	Poverty by residence and age; targeting and territorial distribution of services

Source: Developed by the author

Note: The categories are an analytical synthesis used in this article. They are not presented as a validated index, and the table does not establish causality.

DATA AND METHODS

This study uses a conceptual, descriptive design based on published literature, international institutional frameworks, and selected official statistical sources. It is not a mixed-methods study: no original interviews, surveys, econometric estimates or composite-index calculations were undertaken. The literature defines the conceptual boundaries of human development and human capital, while national and international reports show how the four dimensions apply to Moldova.

Sources were selected for their direct relevance to (a) accepted definitions and measurement approaches, (b) publicly documented human-development outcomes in Moldova and (c) demographic, labour-market or distributional vulnerabilities. Priority was given to UNDP and the National Bureau of Statistics of the Republic of Moldova, including the final results of the 2024 Population and Housing Census and official poverty and labour-force statistics. The empirical illustrations refer to the year specified for each source and are not combined into a synthetic score. They are treated as descriptive contextual evidence, rather than as a systematic representative set of indicators for every component. Peer-reviewed studies were selected where they directly informed the operational meaning of capabilities, resilience, migration-related family outcomes, rural service access or demographic adaptation. The review is purposive rather than systematic and does not claim exhaustive coverage. Moldova-specific studies were incorporated when they provided direct evidence on emigration and depopulation, age-related economic inequality, social vulnerability or demographic projections (Gagauz et al., 2023; Gailey et al., 2025; Gagauz et al., 2024).

In drafting this article, the author analysed and synthesised existing academic literature and official sources on human and economic development. The author focused on systemic and comparative analysis to identify the specific characteristics of approaches to human capital within various reports and countries.

The analysis follows four steps: (1) distinguish outcome measures from capabilities and exposure to risks; (2) define the scope of each 4R dimension; (3) map available evidence from Moldova onto the corresponding dimension; and (4) assess what additional questions arise beyond the national-average HDI. Because the evidence is selective and, in several instances, cross-sectional, neither causal effects nor the effectiveness of particular programmes can be inferred.

MAIN RESULTS

Following the proposed analytical framework, the analysis examines human development in the Republic of Moldova, focusing on the vulnerabilities and institutional conditions that shape its sustainability under uncertainty.

The UNDP Human Development Report 2025 reports an HDI of 0.785 for Moldova in 2023, placing the country 86th among 193 countries and territories in the high human-development category. Its HDI increased by 11.8% between 2005 and 2023 (UNDP Moldova, 2025). The inequality-adjusted HDI was 0.719 in 2023, compared with the conventional HDI of 0.785. This difference shows that aggregate achievements and their distribution are not the same thing.

Such aggregate progress is meaningful, but it does not indicate whether rural residents can reach a medical facility, whether an older person can obtain long-term support, or whether families have sufficient income security during price shocks. The 4R framework highlights these questions without replacing conventional human-development metrics. The 2024 Population and Housing Census provides complementary evidence on the demographic and territorial conditions within which these capabilities are exercised. As argued in the capability literature, comparing achievements alone can conceal differences in how resources are converted into effective opportunities (Robeyns, 2005).

Depopulation, population ageing and the geography of capabilities

The final results of Moldova's 2024 Population and Housing Census recorded 2,409,200 usual residents, approximately 13.6% fewer than in the 2014 census. The share of the population residing in urban areas increased from 38.5% to 46.4%, and the share living in Chișinău municipality rose from 22.1% to 29.9%. These changes suggest that the territorial distribution of population and potential demand for public services has become increasingly uneven. Census coverage excludes localities outside the effective control of the constitutional authorities, a boundary to consider when interpreting the totals (NBS, 2025c). The longer-term character of this decline and the role of sustained emigration have been documented in demographic research on Moldova (Gagauz, Tabac, & Pahomii, 2023; Tabac & Gagauz, 2020).

Age structure changed markedly. Between the 2014 and 2024 censuses, the share aged 65 and over rose from 11.3% to 18.1%, while the share aged 15–64 declined from 70.8% to 62.7%. Rural populations were older on average than urban populations (42.0 versus 39.1 years), and the share aged 65 and over was 3.2 percentage points higher in rural areas (NBS, 2025d). These observations do not, by themselves, quantify care shortages; they identify demographic conditions that make local health care, mobility, social assistance and long-term support

important dimensions of effective human-development opportunities. Population projections to 2040 indicate that ageing and population contraction will remain relevant planning constraints, although their magnitude depends on each scenario's assumptions (Gagauz et al., 2024).

Comparative European research reinforces the relevance of a territorial perspective, while cautioning against treating European findings as direct evidence for Moldova. Deimantas et al. (2024) examine population dynamics and policy responses at national and subnational levels, showing how aggregate demographic trajectories can obscure local differences. Nicolini and Roig (2024) find that the relationship between population ageing and regional growth depends on labour-market adjustment and service demand, rather than being mechanically negative. For Moldova, these findings support examining local labour supply, care provision and transport accessibility alongside population counts.

Migration and demographic decline have ambiguous implications for human development. Remittances may improve household consumption and provide resources for education or health care, whereas the departure of working-age relatives can reduce locally available informal care and weaken the human resource base of small communities. The balance depends on household composition, destination, remittance continuity and the availability of formal services. The census identifies a reduced population and a changing spatial structure, but cannot, by itself, attribute each local change to external migration or estimate effects on family support. This distinction is particularly important in a conceptual assessment of resilience. Evidence from Moldova illustrates why these mechanisms should not be treated as unidirectional. Böhme, Persian and Stöhr (2015) found improvements in several physical health outcomes among older parents with migrant children, partly linked to income and altered time use, but found no corresponding effect on depression or cognitive capacity. Vanore, Mazzucato and Siegel (2015) likewise found that parental migration did not correspond to uniformly adverse psychosocial outcomes for children; associations varied with family circumstances and gender. More recent qualitative work on economically disadvantaged non-migrants in Moldova also demonstrates that the ability to migrate cannot be assumed to be equally available to all households (Bogdan, 2024). These mechanisms are consistent with the broader analysis of migration trajectories and their implications for communities of origin (Tabac & Gagauz, 2020).

In the 4R analysis, demographic change cuts across the four dimensions: a smaller, older population may heighten household exposure to care and income shocks (resilience); longer distances or reduced local provision can constrain the realisation of rights; adapting schools, training systems and care infrastructure requires institutional readiness; and ensuring comparable access in shrinking localities raises questions about territorial redistribution. Consequently, demographic variables should not be treated merely as background controls but as part of the context in which opportunities are maintained or lost. The comparative literature on migration and time allocation also suggests that the effects of departures on remaining household members may vary by age and gender, underscoring the need for disaggregated analysis rather than simple remittance-based conclusions (Chang, Dong and MacPhail, 2011).

This interpretation aligns with Gagauz and Buciuceanu-Vrabie (2026), who argue that persistent depopulation should be treated as a structural condition requiring adaptive governance, rather than merely a demographic trend to be reversed. For Moldova, this perspective highlights the capacity of local institutions to maintain accessible services, care arrangements and economic participation as settlement populations shrink and age. These propositions offer a conceptual interpretation of observed demographic changes; they do not constitute a quantitative test of policy effectiveness.

Viewed through the lens of risks, the Republic of Moldova has consistently faced a series of challenges in human development.

Resilience: shocks and household security

Moldova's exposure to energy and inflation shocks, geopolitical uncertainty and migration-related changes makes resilience an important aspect of human development. Vulnerability is shaped not only by the magnitude of a shock but also by employment stability, savings, social transfers, access to essential services and informal support networks. Outward migration may provide income through remittances while simultaneously reducing the availability of care and support within some communities. The resulting implications are context-dependent and cannot be inferred from migration totals alone. Census evidence of a smaller share of the working-age population and comparatively older rural communities reinforces the need to distinguish households' financial buffers from the availability of nearby informal assistance (NBS, 2025c, 2025d).

The descriptive evidence indicates a substantial baseline vulnerability: official statistics estimate an absolute poverty rate of 33.6% in 2024 (NBS, 2025a). A population with limited material buffers may have greater difficulty maintaining consumption or accessing essential care during a crisis. This is an analytical implication, not an estimate of the causal effect of any particular shock.

To be resilient in the face of risk, the country must focus on effective strategic policies, diversify energy sources, clearly shift toward alternatives, and identify opportunities for people through access to quality education, affordable healthcare, and a sustainable opportunities within the country. In the Republic of Moldova, resilience must mean shifting from temporary crisis responses to anticipation, prevention, and structural adaptation, especially given the country's constantly uncertain environment.

Rights: effective access and territorial inequalities.

From a human-development perspective, rights are meaningful when they correspond to real opportunities. The location of public services, affordability, transportation and administrative accessibility influence whether residents can exercise formally recognised entitlements. Moldova provides an instructive example of territorial inequalities: in 2024, absolute poverty was 42.9% in rural areas and 21.6% in urban areas (NBS, 2025a). This 21.3-percentage-point gap makes territorial inequality a central consideration in evaluating access to capabilities. In other European contexts, longitudinal research indicates that declining settlement population does not consistently predict the loss of facilities; the spatial distribution of services and residents' mobility are critical mediators (Christiaanse, 2020). This evidence is not a Moldova-specific estimate, but it motivates examination of access below the national and district level.

These poverty figures do not directly measure health-care or education accessibility. They nonetheless identify populations for whom the affordability and availability of services deserve investigation. More granular evidence—travel time to facilities, unmet medical needs, access to social workers and school attendance—would be required to quantify gaps in effective rights. Spatial concentration adds another dimension: when population and service demand change at different speeds across localities, effective access may depend on transport, mobile delivery, and coordination across municipalities. These are plausible policy issues, not measured changes in service availability in the census. Recent comparative work on demographic change and rural service provision also emphasises the distinction between nominal service coverage and actual accessibility (OECD, 2024). Evidence from National Transfer Accounts points to substantial rural–urban differences in older people's economic circumstances, providing a distribution-sensitive complement to national averages (Gagauz & Prohnițchi, 2026).

Readiness: demographic and technological transitions.

Readiness concerns adaptation to foreseeable changes before they become crises. For Moldova, major challenges include technological transformation, changing demand for occupational skills and the reorganisation of public services in response to population ageing and territorial depopulation. Training opportunities for adults, digital access, adaptable public institutions and the availability of local employment are relevant considerations. Labour-market inclusion challenges also concern young people at risk of becoming neither employed nor in education or training (NEET); Moldova-specific research examines the determinants of this vulnerability (Gagauz & Crișmaru, 2024).

The National Bureau of Statistics reported an employment rate of 40.2% for the population aged 15 and over in 2025 and an unemployment rate of 3.8% (NBS, 2026). These denominators matter: a low unemployment rate among economically active persons can coexist with limited overall employment. Thus, readiness should be analysed through labour-market participation and opportunities to use skills, not unemployment alone. These indicators do not independently measure the adequacy of qualifications or digital preparedness.

Population ageing also changes the meaning of readiness: education and workplace skills matter, but so do accessible health and social services, support for older workers and local care capacity. These areas deserve explicit attention in national development strategies. The 2024 census documented that the population aged 65 and over represented 18.1% of usual residents, up by 6.8 percentage points from 2014, while the working-age share declined. This makes lifelong learning, older-worker inclusion, continuity of primary care, social-service staffing and accessible transportation relevant areas for future evidence collection (NBS, 2025d). The question is not simply whether people possess digital skills but whether their local labour markets and care systems provide opportunities to use those skills and obtain support; the capability approach is useful for analysing this conversion of resources into opportunities (Alkire, 2005; Robeyns, 2005).

For Moldova, preparedness does not merely mean adapting to change, but transforming that change into a source of modernisation and European convergence.

Redistribution: inequality and the reach of public provision.

Redistribution can help preserve human-development opportunities through income support and equitable public services. Official poverty statistics suggest that household circumstances and geographical location remain significant. In 2024, absolute poverty among people aged 60 and over reached 43.4% (NBS, 2025a), underscoring the importance of considering age alongside residence in vulnerability assessments. For older residents in rural areas, age and place of residence may intersect; however, the cited aggregate statistics do not identify their joint poverty rate, so their combined exposure should be tested using microdata rather than assumed. From a multidimensional perspective, income poverty alone should not be assumed to capture simultaneous shortfalls in health, education and living conditions; a coherent assessment requires explicit measures of deprivation (Alkire and Foster, 2011). Age profiles of income and consumption add a further intergenerational dimension: the national poverty rate alone cannot capture differences between older and younger populations (Gagauz & Prohnițchi, 2026).

Transfers and energy compensation may mitigate income shocks, but their distributional effects need programme-level evaluation before quantitative claims about beneficiaries or poverty reduction are possible. The relevant question from the 4R perspective is whether fiscal and service-delivery arrangements sufficiently protect exposed groups and reduce territorial disparities—not merely whether programmes formally

exist. Territorial redistribution also encompasses the organisation of services: in depopulating localities, equal formal entitlements may require different delivery arrangements, such as intermunicipal provision or outreach, rather than identical facilities in every settlement.

The final "R," Redistribution, refers to how the state and society reduce excessive disparities and ensure that vulnerable groups have access to resources and opportunities.

Table 2. Application of the 4R Framework to Human Development in Moldova

4R dimension	Supported observation	What still needs to be measured
Resilience	Absolute poverty: 33.6% (2024); population fell approximately 13.6% (2014–2024)	Household coping, remittances, informal care and local support networks
Rights	Rural poverty 42.9% vs urban 21.6% (2024)	Actual service access, affordability, transport and unmet needs
Readiness	Population aged 65+: 18.1% (2024 census); 15+ employment rate: 40.2% (2025)	Lifelong learning, local care capacity, digital inclusion and access to work
Redistribution	Poverty among people aged 60+: 43.4% (2024)	Transfer incidence, poverty reduction effects, local spending equity

Sources: UNDP Moldova (2025); NBS (2025a, 2025c, 2025d, 2026). The indicators describe different populations, years and concepts; none should be read as a comparable score for an individual 4R component.

DISCUSSION

The Moldova case shows why it is useful to distinguish human-development achievements from the conditions that maintain them. The HDI summarises national performance across core dimensions, while the 4R lens asks how opportunities are distributed, whether households face setbacks, and whether institutions can anticipate change. These approaches are complementary rather than competing. Indeed, the inequality-adjusted HDI already addresses distributional losses in selected dimensions; the 4R framework extends the discussion towards crisis preparedness and the practical capacity to use rights and services. Census evidence adds a territorial and demographic dimension: shrinking populations and ageing communities can change the conditions under which access to basic services and informal support are sustained. This aligns with capability scholarship, which distinguishes opportunities from observed attainments, and with resilience research that foregrounds capacity to manage disturbance rather than only pre-shock status (Alkire, 2002; Adger, 2000). In the Moldova literature, demographic change is as a challenge for resilience planning and policy development (Gagauz & Buciuceanu-Vrabie, 2026).

The proposed 4R reading also responds to recent debates about composite measurement and development under shocks. Institutional augmentation of HDI (Pinar et al., 2022) and the post-2020 shift in component sensitivity (Martori & Hirai, 2026) suggest that aggregate scores require contextual interpretation. Park (2024) also cautions against overextending the language of resilience: the 4R categories should be regarded as a structured diagnostic framework, not as evidence that resilience has been measured or that specific policy measures have proven effective.

The central interpretative finding is that progress and vulnerability can coexist. Moldova's high human-development classification does not negate its rural–urban poverty gap or the particular exposure of some older people. Conversely, evidence of poverty does not prove that all aspects of resilience or readiness are weak. The framework is valuable precisely when it prevents a single score from leading to an overly broad conclusion about people's daily opportunities. The simultaneous rise in the share of older people and the concentration of the population in the capital provide a concrete reason to complement national aggregates with age- and place-specific measures of capabilities. The Moldovan migration literature adds further nuance: outcomes for people left behind can vary by health dimension, age and household characteristics, so neither universal gains nor universal losses should be inferred from emigration alone (Böhme et al., 2015; Vanore et al., 2015). In particular, analyses of older people using National Transfer Accounts suggest that rural–urban inequalities should be considered when assessing economic security at older ages (Gagauz & Prohnițchi, 2026).

The demographic-resilience perspective of Gagauz and Buciuceanu-Vrabie (2026) further suggests that successful adaptation should not be judged solely by whether population decline is halted. It should also be

assessed by whether societies maintain basic functions and equitable access to opportunities despite a changing population structure. In the present 4R framework, this insight links resilience with rights, readiness and redistribution, while leaving their empirical relationships for future research.

The European analyses by Deimantas et al. (2024) and Nicolini and Roig (2024) further highlight that adaptation to demographic change depends on subnational circumstances and the availability of labour and services. These insights are analytically relevant to Moldova, although their empirical estimates cannot be directly transferred to the Moldovan setting.

In the case of the Republic of Moldova, the 4R framework offers a multidimensional perspective on human development under uncertainty. These elements integrate and complement one another.

There are several policy implications. First, resilience and redistribution should be considered together: emergency measures can protect purchasing power, while longer-term investments in employment, care and essential infrastructure may reduce repeated exposure to shocks. Second, effective rights require territorially sensitive delivery, not uniform formal entitlements alone. Third, readiness should be considered across the life course: adult retraining, skill utilisation and responses to ageing need to be incorporated alongside early education. Finally, disaggregated measurement should guide policy priorities. Rural–urban, age and gender differences can reveal vulnerabilities obscured by national averages. In depopulating settlements, policies should be assessed not only by aggregate expenditure but also by travel time, outreach coverage and the continuity of health and social care provision. Migration-related remittances and family care arrangements should be examined jointly, avoiding the assumption that migration is uniformly harmful or beneficial. Territorial policy should therefore be informed by detailed measurements of service location and travel accessibility, rather than assuming that every shrinking locality experiences the same loss of services (Christiaanse, 2020; OECD, 2024). Demographic projections provide a useful forward-looking basis for planning the geographic distribution and age profile of services, but should be interpreted as scenarios rather than forecasts of inevitable outcomes (Gagauz et al., 2024).

In the global economy, the most important factor remains the human being, the key to sustainable economic development.

The framework has limitations. It is not statistically validated, its dimensions partially overlap, and the available evidence is too limited to rank Moldova on any 4R scale. The analysis does not establish causality or identify which policy yields the highest return. Future work could construct a transparent indicator dashboard for each dimension, explicitly address overlaps and data gaps, and assess change over time using household surveys, administrative service data and spatial indicators. Any composite measure would require separate decisions on normalisation, weighting and validation. In particular, census comparisons do not isolate the causal contribution of migration to population loss, and aggregate poverty indicators cannot establish unmet service needs or the effectiveness of specific interventions. The study also does not undertake a systematic literature review; the selection of peer-reviewed sources is theory-guided and cannot substitute for a formal evidence synthesis.

CONCLUSIONS

Human development is more than improved average health, education and income outcomes. It also depends on whether people can exercise rights, cope with shocks, prepare for structural changes and benefit from institutions that reduce avoidable inequalities. For Moldova, the 2023 HDI of 0.785 coexists with marked poverty disparities in 2024 and a pronounced demographic transformation. The 2024 census recorded a roughly 13.6% population decline relative to 2014, an increase in the share aged 65+ from 11.3% to 18.1%, and greater population concentration in Chișinău. These facts underscore the need to consider territorial access to services, local support networks, labour-market opportunities and age-specific vulnerability alongside national averages. Their interaction should be examined empirically rather than inferred from aggregate figures alone.

The value of 4R is therefore diagnostic: it helps identify what standard outcome measures leave unexplained and directs research towards actual opportunities under uncertainty. A next step is to operationalise the dimensions through clearly defined indicators and to evaluate policy interventions using appropriate longitudinal and programme-level evidence. Priority data needs include geographical measures of travel time and unmet care needs, migration and remittance patterns by household type, age-specific labour-market participation, and the distribution of social-service provision across shrinking and growing settlements. The four dimensions of the framework dimensions are interconnected. Redistribution can strengthen household resilience by reducing economic insecurity, while effective rights depend on the availability and accessibility of public services. Readiness can mitigate future vulnerabilities through investment in human capabilities and institutional adaptation. In the context of depopulation and population ageing, the interaction between these dimensions becomes particularly important for sustaining human development.

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