

TRANSFORMATION OF THE EDUCATIONAL SYSTEM IN THE REPUBLIC OF MOLDOVA IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract

Purpose of the article: To analyze the transformation of the Moldovan educational system from 2004 to 2023 in the context of demographic change, institutional reforms and the transition toward sustainable development.

Methodology: The research combines SWOT and PESTL analyses with a quantitative assessment of statistical data from the National Bureau of Statistics. The approach identifies key strengths, such as a modern legal framework and digitalization initiatives, as well as weaknesses, including infrastructure gaps, teacher shortages and limited inclusion practices.

Conclusions: Moldova's education system has evolved through gradual modernization and external support; however, it continues to face demographic pressure, regional disparities and underfunding. Sustainable development in education requires coherent policy coordination, equitable resource allocation, digital equity and strengthened institutional governance.

Originality: The paper offers an integrated strategic and demographic perspective by linking systemic transformation with sustainability objectives. It provides a comprehensive framework for evaluating educational resilience in emerging economies.

Keywords: education system, educational sustainability, digital transformation, demographic transition, inclusive education.

TRANSFORMAREA SISTEMULUI EDUCAȚIONAL ÎN REPUBLICA MOLDOVA ÎN CONTEXTEL DEZVOLTĂRII DURABILE

Rezumat

Scopul articolului: Analizarea transformării sistemului educațional din Republica Moldova în perioada 2004–2023 în contextul schimbărilor demografice, reformelor instituționale și tranziției către dezvoltare durabilă.

Metodologie: Cercetarea îmbină analize SWOT și PESTL cu o evaluare cantitativă a datelor statistice furnizate de Biroul Național de Statistică. Abordarea identifică puncte forte precum cadrul legal modern și inițiativele de digitalizare, de asemenea, și puncte slabe legate de deficiențele infrastructurale, lipsa cadrelor didactice și practicile limitate de incluziune.

Concluzii: Sistemul educațional din Republica Moldova a evoluat prin modernizare treptată și sprijin extern, însă continuă să se confrunte cu presiuni demografice, disparități regionale și subfinanțare. Dezvoltarea durabilă în educație necesită coordonare coerentă a politicilor, distribuirea echitabilă a resurselor, echitate digitală și o guvernanta instituțională mai solidă.

Originalitate: Lucrarea oferă o perspectivă integrată strategică și demografică, conectând transformarea sistemică cu obiectivele de durabilitate și propunând un cadru cuprinzător pentru evaluarea rezilienței educaționale în economiile emergente.

Cuvinte-cheie: sistem educațional, sustenabilitate educațională, transformare digitală, tranziție demografică, incluziune.

Introduction

The transformation of the educational system in the Republic of Moldova represents a complex and long-term process, marked by the interdependence of the country's economic, demographic, political and institutional developments. Over the past two decades, national education has undergone a comprehensive modernization process, driven by the transition to a market economy, the strategic orientation toward European integration and the imperatives of sustainable development. In this context, education is no longer perceived merely as a sectoral domain but as a fundamental pillar of societal progress, social cohesion and economic competitiveness.

The educational system of the Republic of Moldova has evolved from a rigid structure inherited from the post-Soviet period to a model oriented toward competencies, quality and inclusion. Reforms initiated in the 2000s focused on strengthening the legislative framework, decentralizing school governance, diversifying educational offerings and developing

digital competencies. At the same time, the process of alignment with the European Education Area required the adaptation of curricula, the modernization of teaching methodologies and compliance with the European Qualifications Framework. These processes have been supported by international partnerships and national initiatives aimed at modernizing the education system. They have also faced considerable challenges stemming from demographic decline, chronic underfunding and territorial disparities [1, 2].

From a demographic perspective, the Republic of Moldova has been experiencing a significant reduction in its school-age population, a phenomenon determined by declining birth rates and external migration. According to data from the National Bureau of Statistics, between 2004 and 2023 the total number of pupils and students decreased by approximately one-third, from over 819 thousand to 566 thousand. This decline has had a direct impact on the institutional network, per capita funding levels and the dynamics of the teaching workforce. The reduction in demand for education has led to the merging, restructuring and rationalization of institutions, particularly in rural areas, where depopulation has reached alarming levels.

At the same time, national education policy has evolved within a complex strategic framework defined by key documents such as the Education Strategy 2030, the Education Code (2014). The reforms have been supported by programs financed by international partners, including the European Union, UNICEF, USAID and UNDP [3–8]. These initiatives have advanced reform priorities centered on inclusion, digitalization, the development of green competencies and sustainability-oriented education. However, the implementation of these policies has frequently been constrained by governmental instability, a lack of administrative continuity, as well as insufficient financial, human and technical resources.

The need for a comprehensive scientific approach to the transformation of the educational system arises from the asymmetric nature of the reforms implemented and the necessity to align them with the objectives of sustainable development. Despite progress in modernizing the regulatory framework and digitalizing educational processes, discrepancies persist between declared policies and institutional realities. Inadequate infrastructure, shortages of qualified teaching staff, unequal access to education and the inconsistent implementation of inclusive education principles continue to affect the system's performance and equity [9, p. 48].

From a theoretical perspective, educational transformation can be understood as a process of continuous institutional adaptation to societal change and the demands of a knowledge-based economy. Within the paradigm of sustainable development, education serves as a catalyst for social, economic and environmental progress by shaping competencies relevant to the future economy and by ensuring social cohesion [2, p. 286]. Accordingly, educational policies must integrate economic, social and environmental dimensions to ensure both equity and sustainability within the system.

The analysis of the evolution of the educational system over the past two decades reveals distinct trends across different levels of education. Early childhood education has experienced moderate growth, supported by the expansion of kindergarten networks and the implementation of inclusion policies. Primary and general secondary education, however, have recorded a substantial decline, reflecting the direct impact of demographic contraction and external migration. In contrast, postsecondary technical and vocational education has demonstrated steady growth. This trend suggests a reorientation of public policies toward the development of applied skills demanded by the labor market. Higher education has been the most affected segment, losing more than half of its student population – an outcome that underscores the need to restructure university offerings and reinforce academic quality. These transformations have generated a process of structural recalibration within the institutional network, evident in the decline in the student-to-institution ratio. Although this trend reflects infrastructure rationalization, it also raises concerns regarding access, equity and efficiency, particularly in rural areas. Consequently, educational policies must balance network optimization with the maintenance of the inclusive character of education.

Education constitutes one of the fundamental dimensions of the 2030 Agenda for Sustainable Development through Goal 4 – “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.” As a state pursuing European integration, the Republic of Moldova aligns its educational strategies with these global standards. Implementing the principles of sustainable development within the educational system requires more than just curricular changes. It also demands reforms in governance, financing and institutional performance evaluation mechanisms. The scientific significance of the present research de-

rives from its contribution to understanding the process of educational transformation from a systemic and sustainability-oriented perspective. By integrating strategic analysis with statistical and contextual evaluation, the study provides a comprehensive view of the adaptability and resilience of the educational system. The findings can inform the development of effective public policies capable of ensuring a balance between quality, accessibility and educational relevance.

The transformation of the educational system in the Republic of Moldova is not a linear process but an adaptive one, shaped by the interaction of internal and external factors. This transformation reflects the sustained efforts of the state, educational institutions and international partners. Together, they aim to build a competitive, equitable and sustainable educational system capable of responding to the challenges of the digital era and the demands of a knowledge-based economy. Education, regarded as a driver of sustainable development, thus constitutes a central element in the social and institutional restructuring of the Republic of Moldova.

Materials and methods

The analysis of the transformation of the educational system in the Republic of Moldova within the context of sustainable development is based on a comprehensive methodological approach that combines quantitative and qualitative methods. This offers an integrated perspective on institutional reform processes, demographic dynamics and the adaptability of educational policies to evolving economic and social conditions. The scientific foundation of the research relies on the application of SWOT and PESTL analytical tools, complemented by a longitudinal statistical analysis of educational indicators for the period 2004–2023. This combination enables a broad, coherent and multidimensional interpretation of transformations within the national education sector.

The empirical basis of the study comprises official sources, including data published by the National Bureau of Statistics of the Republic of Moldova, reports from the Ministry of Education and Research and governmental strategic documents such as the Education Code (2014), the Education Strategy 2030 and the National Program for the Development of Technical and Vocational Education. In addition, the study uses international reports prepared by organizations such as UNESCO, OECD,

UNICEF and Eurostat. These provide a comparative perspective on educational trends across Central and Eastern European countries. Together, these sources ensure both the factual reliability of the analysis and the possibility of correlating national educational policies with those promoted at the European level.

Methodologically, the research is grounded in three main approaches: SWOT analysis, PESTL analysis and descriptive and comparative statistical analysis. The SWOT analysis was employed to identify internal and external factors influencing the performance and sustainability of the educational system. Four core dimensions were delineated: strengths, weaknesses, opportunities and threats. Strengths include the modernization of the regulatory framework, digitalization of educational processes, expanded access to early childhood education and enhanced international cooperation. Weaknesses encompass demographic decline, underdeveloped educational infrastructure, shortages of qualified teaching staff and persistent regional disparities. Opportunities emerge from deeper integration with the European Education Area, access to external funding and an emphasis on digital and green competencies. The primary threats relate to political instability, economic vulnerabilities, population outflow and the accelerated pace of technological change. By integrating these dimensions, the SWOT analysis helped construct a strategic profile of the educational system and the identification of priority directions for its institutional strengthening.

The PESTL analysis complements the SWOT assessment by examining macrostructural factors affecting educational performance at the national level. The political dimension considers governance stability, educational priorities outlined in national strategies and the degree of system decentralization. The economic dimension addresses budgetary allocations for education, resource utilization efficiency and dependence on external funding. The social dimension assesses the effects of migration, demographic decline and the equity of access to education. The technological dimension evaluates the level of digitalization within educational processes and the digital competencies of students and teaching staff. The legal dimension examines the coherence and relevance of the regulatory framework, alignment with European standards and the effectiveness of quality assurance mechanisms. This analysis integrates political, economic, social, technological and legal factors into a systemic vision of

the educational environment, emphasizing their interdependencies and cumulative influence on educational reform.

In addition to these qualitative approaches, the study incorporates a longitudinal statistical analysis of key educational indicators. This approach captures evolutionary trends in the system during the period 2004–2023, highlighting structural transformations and the dynamics of the institutional network. The analysis examined several key developments: changes in the total number of educational institutions, their distribution across educational levels (preschool, primary, lower secondary, upper secondary, vocational and higher education), the composition of the student population by gender and area of residence. It also considered participation rates in technical and vocational education as well as changes in teaching staff by age and qualification. The comparative examination of these data enabled the identification of developmental trends, territorial imbalances and correlations between demographic dynamics and institutional transformations.

The validity of the results is reinforced through the application of methodological triangulation, which integrates quantitative, strategic and contextual analyses. Statistical data were interpreted in conjunction with the findings of the SWOT and PESTL analyses. This enabled verification of the coherence of conclusions and the mitigation of potential interpretation errors. This approach ensures equilibrium between the empirical and theoretical dimensions of the research, thereby enhancing the scientific rigor of the formulated recommendations.

The analysis period 2004–2023 was selected for its strategic significance. It encompasses the transition from post-transition educational reforms to the consolidation of the modern institutional framework. During this interval, key policies were implemented, including the adoption of the Education Code, the restructuring of technical and vocational education and the accelerated digitalization prompted by the COVID-19 pandemic. This timeframe allows for a comprehensive assessment of the cumulative effects of reforms, providing a coherent representation of the educational system's adaptation to European standards.

In summary, the adopted methodology provides an integrated approach designed to ensure a rigorous and balanced analysis of transformations within the educational system. By correlating strategic methods with statistical and contextual evaluation, the research facilitates the formulation

of evidence-based conclusions regarding the evolution and sustainability of education in the Republic of Moldova. This methodological framework provides a robust foundation for interpreting educational processes. It also serves as a practical instrument for informing public policy and defining future directions for the sustainable development of the education system.

Results and discussion

The evolution of the school-age population in the Republic of Moldova between 2004 and 2023 represents a critical indicator for understanding the demographic, economic and institutional transformations shaping the national education system. Analyzing this evolution helps us understand how declining birth rates, increased external migration and structural changes within the educational network have influenced the numerical dynamics of pupils and students.

Furthermore, the study allows the identification of trends in educational reconversion. It highlights sectors that have experienced significant growth, such as early childhood education and postsecondary vocational training, while also noting declines observed in other educational levels. In this context, examining statistical indicators for this period provides an objective basis for evaluating the impact of educational policies and for outlining future directions for system adaptation to prevailing socio-demographic realities.

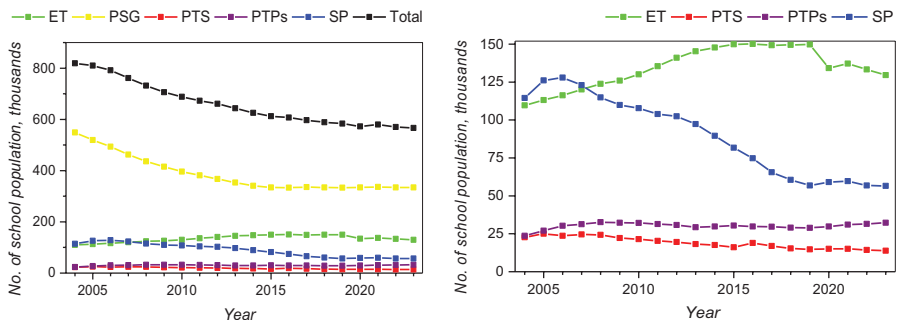


Figure 1. Evolution of the school-age population in the Republic of Moldova, 2004-2023

Source: Author's calculations based on data from the National Bureau of Statistics [10].

The comparative analysis of data concerning different types of institutions – early childhood education institutions (ET), primary and general secondary education institutions (PSG), secondary technical and vocational education institutions (PTS), postsecondary technical and vocational education institutions (PTPs) and higher education institutions (SP) – for the period 2004–2023 (Figure 1) reveals a clear trend of contraction within the educational base, accompanied by processes of institutional and curricular adaptation and modernization.

The evolution across educational levels demonstrates that early childhood education was among the few segments to display positive growth. The number of children enrolled in preschool institutions increasing from 109,692 in 2004 to 129,592 in 2023, representing an 18.14% rise. This growth confirms the efforts of public authorities to expand kindergarten networks, promote early inclusion and support parental participation in the labor market. Moreover, the implementation of quality standards and modern educational programs has reinforced this level as a foundational basis for early childhood development.

In contrast, primary and general secondary education recorded the most pronounced decline. The number of pupils fell by 39.04%, from 548,527 in 2004 to 334,404 in 2023. This downward trend reflects the cumulative impact of demographic decline, large-scale migration and the optimization of the school network, particularly in rural areas. The closure or consolidation of small institutions has become an inevitable consequence of the shrinking school-age population and the need to enhance resource efficiency.

Regarding secondary technical and vocational education, the student population decreased from 22,696 in 2004 to 13,860 in 2023, representing a decline of 38.93%. This negative trend highlights the decreasing attractiveness of vocational programs for lower secondary school graduates. It is largely driven by the lower social perception of technical professions and the preference of young people to pursue theoretical or university studies instead.

Conversely, postsecondary technical and vocational education registered a significant increase of 36.65%, rising from 23,618 students in 2004 to 32,273 in 2023. This growth reflects the reorientation of educational policies toward the development of applied technical competencies

aligned with labor market demands. It also reflects the enhanced role of colleges as providers of high-quality professional training.

The higher education segment was the most affected by demographic and social processes, experiencing a reduction of 50.65%, from 114,552 students in 2004 to 56,527 in 2023. This sharp decline in student numbers reflects multiple factors: academic migration to foreign universities, a shrinking admission base, the misalignment between educational offerings and labor market demands and the perceived lack of competitiveness of the domestic higher education system.

Overall, the total school-age population decreased from 819,085 individuals in 2004 to 566,656 in 2023, corresponding to a 30.82% decline. This downward trend has direct implications for the structuring of the institutional network, resource allocation and strategic educational planning. The dynamics of these indicators confirm the interdependence between demographic evolution, external migration, economic transformations and educational reforms. They also demonstrate that adapting the education system to evolving socio-economic conditions is essential for ensuring the sustainability of education in the Republic of Moldova.

To illustrate the structural transformations within the educational system, Table 1 presents the percentage dynamics of the school-age population across the main educational levels during the period 2004–2023. Comparing these data helps identify growth and decline trends specific to each educational segment, providing a clear overview of the evolution of the institutional network. The values displayed in the table constitute a relevant empirical foundation for interpreting demographic and institutional changes and for formulating educational policies aligned with current realities.

Table 1 provides a comprehensive perspective on the structural evolution of the Moldovan educational system by comparing student population changes across institution types for the period 2004–2023. It highlights significant variations among educational levels, revealing both expanding domains and those affected by demographic decline and migration. The results presented serve as a critical reference point for assessing the effectiveness of educational reforms and for calibrating public policies in accordance with observed trends.

Table 1. Comparative analysis of changes in the number of students by type of educational institution, 2004–2023

Type of institution	Number of students by academic year, persons			Percentage change in student population, %		
	2004/ 2005	2019/ 2020	2023/ 2024	2004/05 2019/20	2019/20 2023/24	2004/05 2023/24
Early childhood education	109692	149702	129592	+36,47	-13,43	+18,14
Primary and general secondary education	548527	333144	334404	-39,27	+0,38	-39,04
Secondary technical and vocational education	22696	14673	13860	-35,35	-5,54	-38,93
Postsecondary technical and vocational education	23618	28891	32273	+22,33	+11,71	+36,65
Higher education	114552	56840	56527	-50,38	-0,55	-50,65
Total institutions	819085	583250	566656	-28,79	-2,85	-30,82

Source: Author's calculations based on data from the National Bureau of Statistics [10].

The analysis of the dynamics of the school-age population in the Republic of Moldova for the period 2004–2023 highlights a profound transformation in the structure of the educational system. This is reflected in a 30.82% reduction in the total school population between the academic years 2004/05 and 2023/24. In the more recent period (2019/20–2023/24), the decline moderated slightly (-2.85%), which may suggest a trend toward demographic stabilization.

Early childhood education represents the only educational level that has demonstrated long-term positive growth, with an 18.14% increase over the analyzed period, despite a temporary decrease of 13.43% after 2019/20. Its share rose significantly, from approximately 13% to 23% of the total school population. This confirms the positive effects of policies aimed at expanding the preschool network, promoting early inclusion as well as supporting parental participation in the labor market.

Conversely, primary and general secondary education experienced a substantial decline of 39.04%, from 548,527 to 334,404 pupils, largely

due to declining birth rates and external migration. Between 2019/20 and 2023/24, a slight stabilization (+0.38%) can be observed, possibly resulting from a more efficient reorganization of the school network and the implementation of policies designed to retain children within the educational system.

Secondary technical and vocational education continues to follow a downward trend, with a long-term reduction of 38.93%. This reflects the low attractiveness of secondary-level vocational training, largely associated with an unfavorable social perception of technical professions.

In contrast, postsecondary technical and vocational education has emerged as a dynamic sector, recording a 36.65% increase between 2004/05 and 2023/24, including an additional growth of 11.71% in recent years. This outcome highlights the effectiveness of policies aimed at developing technical skills and aligning educational offerings with labor market demands.

Higher education has been the most affected by demographic processes and academic migration, showing a reduction of 50.65%. In recent years, the decline has stabilized (-0.55%), which may indicate a gradual adaptation of higher education institutions to new demographic and economic realities.

Overall, these developments indicate a structural reconfiguration of the educational system. It is characterized by an increasing share of early childhood and postsecondary vocational education, accompanied by a contraction in general and higher education. This process reflects a strategic orientation toward developing applied competencies and investing early in human capital – key factors for ensuring the sustainability of education.

From a public policy perspective, several priorities emerge: strengthening educational continuity across levels, revitalizing secondary vocational education through modern curricula and dual partnerships, recalibrating university programs to meet labor market needs, ensuring equitable funding – particularly in rural areas – and maintaining continuous monitoring of educational and employment indicators. In conclusion, the educational system of the Republic of Moldova is undergoing a transition toward a more efficient, relevant and adaptive model aligned with contemporary socio-economic realities. The success of this transformation, however, depends on the coherence and continuity of the policies implemented.

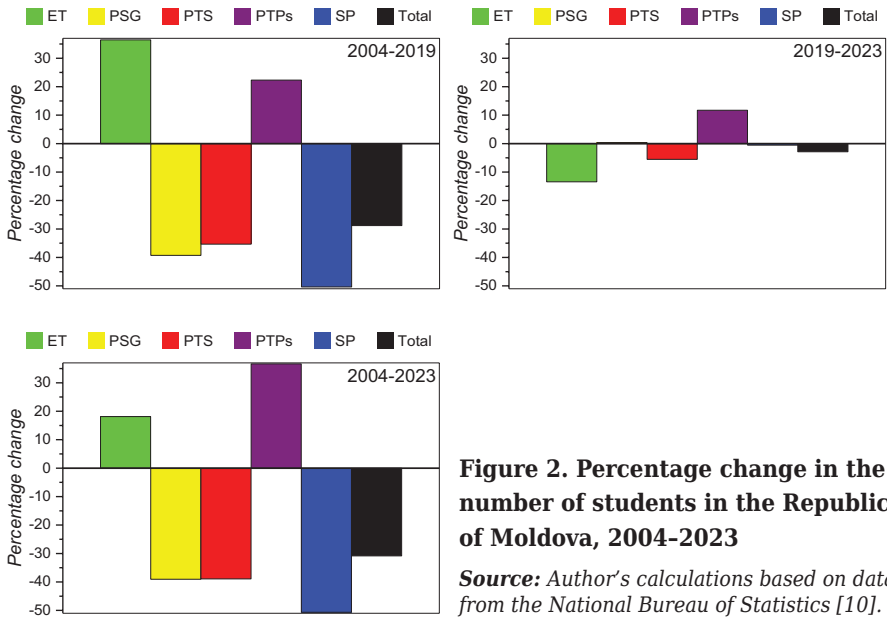


Figure 2. Percentage change in the number of students in the Republic of Moldova, 2004-2023

Source: Author's calculations based on data from the National Bureau of Statistics [10].

The analysis of the dynamics of the school-age population in the Republic of Moldova for the period 2004-2023 reveals a general trend of continuous decline, driven by demographic, economic, and social factors. This decline has profoundly influenced the structure and functionality of the national education system.

Between 2004 and 2009, the total number of children, pupils and students decreased from 819,085 to 705,745 individuals, representing a reduction of 13.84%. It stems primarily from extensive external migration, declining birth rates and the reduced attractiveness of the domestic education system. During the 2009-2014 period, the downward trend continued, reaching 625,557 individuals, a further decrease of 11.36%. The pace of reduction slowed but remained consistent. The impact of this evolution became increasingly evident in the institutional network through mergers and restructuring of educational units, particularly in rural areas.

From 2014 to 2019, the rate of decline slowed to 6.76%, coinciding with the onset of structural reforms and policies aimed at demographic and institutional stabilization. In the 2019-2023 period, the decrease

was significantly lower (2.85%), pointing to a possible trend toward stabilization of the school-age population. This may be due to expanded access to early childhood education, post-pandemic recovery measures and the implementation of vocational guidance programs within technical education.

This downward evolution has complex implications for the functioning of the educational system. The reduction in the total number of pupils and students directly affects per capita funding levels and the economic efficiency of educational institutions. In parallel, the decline in educational demand has led to organizational restructuring, institutional mergers and the redistribution of teaching staff, particularly in areas with low population density. Furthermore, it underscores the need to revise human resource policies and optimize budget allocations to maintain the system's functionality within a shifting demographic context.

In the light of these transformations, a strategic reorientation of educational policies becomes necessary. This requires focusing on attracting and retaining young people within the national education system through the diversification of educational offerings, the adaptation of curricula to labor market needs and the promotion of the internationalization of study programs. At the same time, emphasis should be placed on strengthening postsecondary vocational education as a viable and competitive alternative to university studies, as well as on developing early childhood education, which is the foundation of educational equity and inclusion.

The analysis of the overall evolution of the school-age population confirms the demographic pressure on the educational system of the Republic of Moldova, highlighting the need for its structural and functional adaptation to new socio-economic realities. Strategic reform based on efficiency, equity and the development is essential for maintaining the relevance and sustainability of the educational system in the face of contemporary challenges.

The analysis of the distribution of the school-age population by type of educational institution during 2004–2023 reveals significant structural transformations within the educational system (Figure 3). The evolution of the proportions corresponding to different educational levels reflects the system's gradual adaptation to new demographic, social and economic realities. This has led to a reconfiguration of educational priorities and a stronger orientation toward inclusion and applied vocational training.

In the 2004/2005 academic year, the educational system was dominated by primary and general secondary education, which accounted for approximately two-thirds of the total school population (66.97%). This predominance reflected the central role of general education in providing basic training for young people, while also indicating limited reliance on vocational education. Higher education held a considerable share (13.99%), demonstrating strong interest in university studies. Early childhood education was modestly represented (13.39%) due to insufficient coverage of the preschool network, particularly in rural areas. Secondary (2.77%) and postsecondary (2.88%) technical and vocational education had relatively small shares, being largely perceived as lower-tier alternatives to theoretical studies.

In the 2009/2010 academic year, the share of general education declined to 58.87%, reflecting demographic decline and extensive migration. Early childhood education, by contrast, gained ground (17.85%) as a result of the expansion of preschool infrastructure and the promotion of early inclusion policies. Postsecondary vocational education registered a visible increase (4.57%), strengthening its role as a viable and practical alternative for young people oriented toward applied training.

By the 2014/2015 academic year, the distribution of the school population became more balanced. The share of general education decreased to 54.51%, while early childhood education reached a record level of 23.62%. This was supported by local and international investments in the expansion and modernization of preschool institutions. Postsecondary vocational education continued to strengthen (4.95%), confirming growing interest in technical qualifications. Higher education, however, experienced a notable reduction in its share (14.31%) due to a shrinking admission base and academic migration to universities abroad.

In the 2019/2020 academic year, early childhood education accounted for almost one quarter of the total school population (25.67%). This reflects the effects of national policies aimed at expanding access to preschool education. Postsecondary vocational education remained stable at 4.95%, consolidating the system's transition toward technical training. Higher education continued its downward trend (9.75%), signaling the need for reform and modernization of university programs.

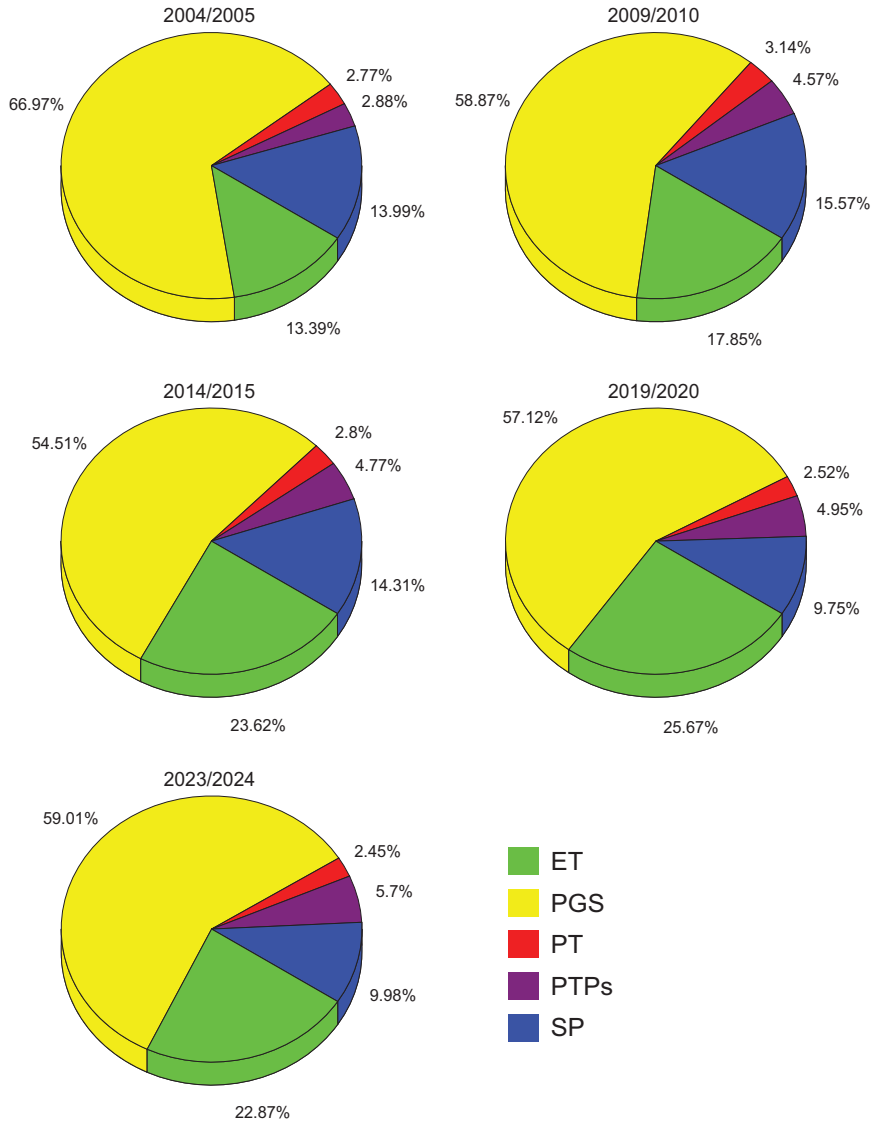


Figure 3. Distribution of the school-age population by type of educational institution in the Republic of Moldova, 2004-2024

Source: Author's calculations based on data from the National Bureau of Statistics [10].

In the 2023/2024 academic year, primary and general secondary education remains the largest segment of the system (59.01%), although it has declined from 66.97% in 2004. Early childhood education remains at a high level (22.87%), confirming the consolidation of the institutional network and the increased participation rate. Postsecondary vocational education has reached its highest share within the analyzed period (5.70%). This reflects the strategic focus on developing practical competencies and aligning training with labor market demands. Meanwhile, higher education maintains a relatively low proportion (9.98%), indicating an urgent need for reform, curricular modernization and enhanced academic attractiveness.

The analysis shows a clear upward trend in the share of early childhood education and a gradual decline in higher education, alongside the consolidation of the postsecondary technical and vocational segment. These changes reflect not only demographic shifts but also the adaptation of educational policies to the requirements of the modern economy. This adaptation is driven by the need to foster applied competencies and promote educational equity from the earliest years of life. Consequently, the Moldovan educational system is undergoing a functional reorientation toward an integrated model focused on inclusion, efficiency and sustainable development.

The efficiency and organization of the institutional network can be assessed through the ratio of the school-age population to the total number of educational institutions. It is expressed as the average number of pupils or students per institution. This indicator provides insight into the utilization of educational infrastructure and helps identify imbalances between institutional capacity and educational demand. Analyzing this ratio highlights areas of underutilization – typically rural localities affected by demographic decline – as well as overburdened institutions, often located in urban centers with high student concentrations. Correct interpretation of this ratio is therefore essential for optimizing the school network, strategically allocating resources and ensuring equity in access to education. This is particularly important given the broader context of demographic and structural transformations of the national educational system.

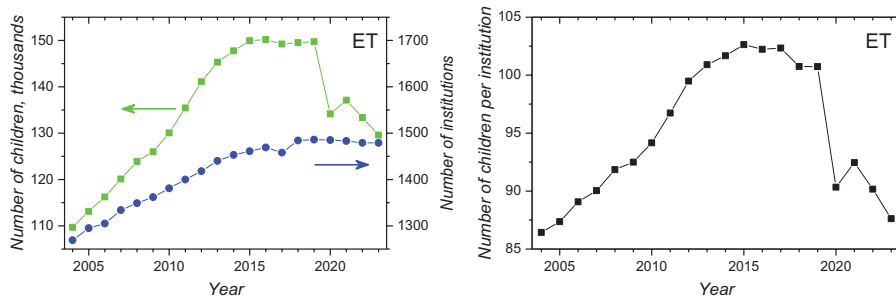


Figure 4. Correlation between the school-age population and the number of early childhood education institutions

Source: Author's calculations based on data from the National Bureau of Statistics [10].

Throughout the analyzed period, early childhood education maintained a relatively stable balance, reflecting efficient use of preschool infrastructure at the national level. The average ratio of children per institution remained around 95, indicating satisfactory community coverage and a balanced territorial distribution of educational services for this age group. Between the 2004/2005 and 2015/2016 academic years, the ratio increased by 18.73%, from 86.44 to 102.63 children per kindergarten, illustrating higher participation and a strengthening of the institutional network.

During the 2013/2014–2019/2020 period, the indicator remained consistently above 100 children per institution. This suggests optimal utilization of existing capacities and effective adaptation to growing demand for early childhood education services. Between 2019 and 2023, however, the ratio decreased to 87.62 children per institution, a reduction of 13.02% compared to the previous period, approaching the level recorded in 2004.

This evolution highlights two complementary trends: the consolidation of functional institutions through modernization and efficiency improvements and the rationalization of the preschool network in areas affected by depopulation. Overall, the early childhood education system in the Republic of Moldova has evolved toward a more balanced and efficient structure. It is focused on maintaining the quality and accessibility of educational services without a significant expansion in the number of institutions.

For primary and general secondary education, the analysis of the ratio between the number of pupils and the number of educational institutions reveals a notable structural evolution of the educational network. Over the entire analyzed period, the average ratio was approximately 279 pupils per institution, reflecting moderate utilization of educational infrastructure. In the 2004/2005 academic year, the ratio was 347.83 pupils per institution, decreasing to 278.44 in 2023/2024, a decline of about 20%. This downward trend results from the combined effects of a declining school-age population and the optimization of the school network through the closure and merger of institutions, particularly in rural areas.

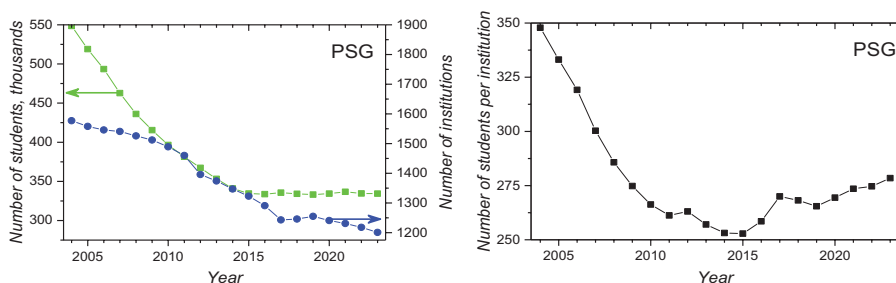


Figure 5. Correlation between the school-age population and the number of primary and general secondary education institutions

Source: Author's calculations based on data from the National Bureau of Statistics [10].

For the period 2019–2023, a slight reversal of the trend can be observed: the ratio increased from 265.45 to 278.44 pupils per institution, representing a growth of 4.9%. This change may indicate a temporary stabilization in the number of pupils, correlated with a modest reduction in the number of institutions due to administrative optimization. The increase in pupil density per school reflects a more efficient use of existing infrastructure. At the same time, it highlights the need for balanced territorial planning to avoid overburdening urban institutions and to ensure equitable access to education in rural areas.

Overall, the dynamics of the pupil-to-institution ratio indicate a transition toward greater efficiency within the school network. This aligns with the system's adaptation to current demographic conditions and ongoing efforts to strengthen the quality of educational services.

Within secondary technical and vocational education institutions, the ratio between the number of students and the number of institutions exhibited a notable increase over the analyzed period. Specifically, this indicator rose from 280.2 students per institution in 2004/2005 to 346.5 in 2023/2024, representing a 23.6% growth. Rather than signaling higher demand, the increase results from a reduction in the number of institutions through structural optimization, while the student population has remained largely unchanged.

During the 2019/2020–2023/2024 period, the ratio further increased from 333.48 to 346.5 students per institution, a 3.9% rise, reinforcing the trend of network rationalization. Although these values are comparable to those observed in general education, they conceal a structural vulnerability: many secondary technical and vocational institutions continue to operate primarily due to administrative mergers rather than a stable and sufficient inflow of students.

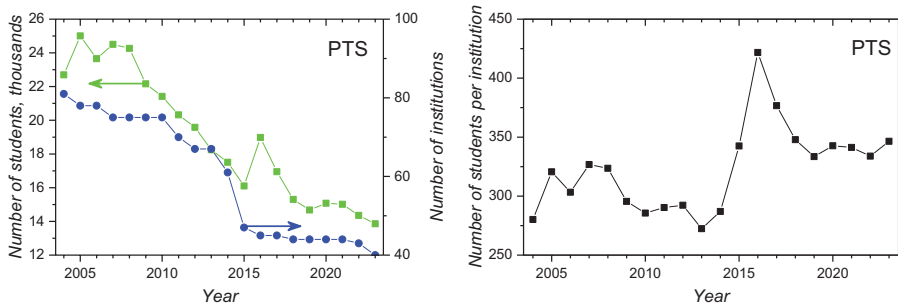


Figure 6. Correlation between the school-age population and the number of secondary technical and vocational education institutions

Source: Author's calculations based on data from the National Bureau of Statistics [10].

Overall, this evolution reflects an apparent yet fragile efficiency within the institutional network, driven more by structural adjustments than by a genuine increase in educational demand. To ensure the sustainability of secondary technical and vocational education, several measures are needed: recalibrating curricula, developing partnerships with the economic sector and promoting an attractive image of vocational training. This would help stimulate young people's interest in technical professions and reduces the system's long-term vulnerability.

Postsecondary technical and vocational education institutions have shown a significant increase in the student-to-institution ratio, reflecting a consolidation of this educational segment (Figure 7). The indicator rose from 421.75 students per institution in 2004/2005 to 672.35 in 2023/2024, representing a growth of 59.4%. This positive development indicates efficient use of educational resources rather than an overload of capacities, confirming the functional adaptation of the institutional network to labor market requirements.

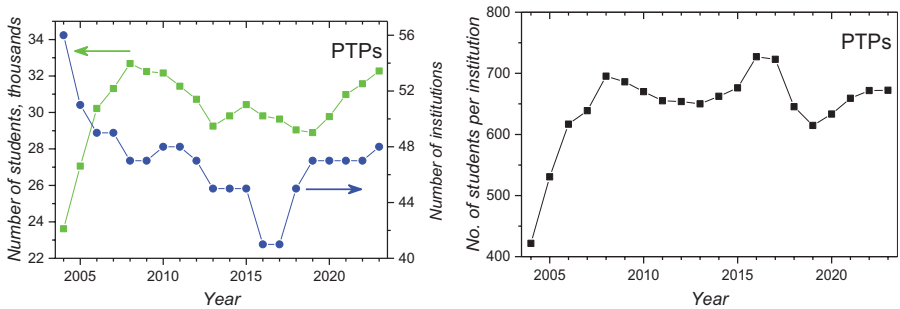


Figure 7. Correlation between the school-age population and the number of postsecondary technical and vocational education institutions

Source: Author’s calculations based on data from the National Bureau of Statistics [10].

During 2019/2020–2023/2024, the ratio increased further from 614.7 to 672.35 students per institution, a growth of 9.3%. This trend reflects the rising interest of young people in applied technical training. It also shows that colleges are able to attract students from across the country, thereby strengthening their role as regional centers of professional competence.

Unlike other levels, where a higher student-to-institution ratio may indicate pressure on infrastructure, in postsecondary technical and vocational education this evolution is functional and sustainable. It demonstrates organizational efficiency, the increased attractiveness of programs and alignment with sustainable development objectives.

Higher education institutions have experienced a decline in the student-to-institution ratio, reflecting restructuring and institutional consoli-

dition. In 2004/2005, universities had an average of 3,272 students each, declining to 2,692 in 2023/2024, a decrease of 17.7%. This trend is primarily driven by demographic decline, external academic migration and partial misalignment between program offerings and labor market needs.

Between 2019 and 2023, the ratio increased from 2,105 to 2,692 students per institution, a 27.8% rise. However, this increase does not indicate an actual growth in student numbers. Instead, it results from a reduction in the number of universities from 27 to 21 (-22.2%), as shown in Figure 8. The rise in the ratio therefore reflects the concentration of students in larger universities, while smaller institutions, particularly regional ones, have been absorbed or closed.

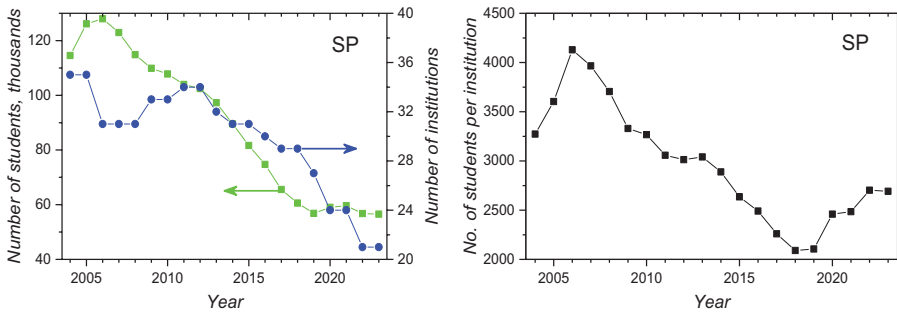


Figure 8. Correlation between the student population and the number of higher education institutions

Source: Author's calculations based on data from the National Bureau of Statistics [10].

This institutional polarization has multiple effects on higher education. On one hand, it increases administrative efficiency and optimizes resource use; on the other hand, it limits territorial access to university education, particularly for young people from rural and peripheral regions. Overall, the evolution of the student-to-institution ratio reflects a trend toward concentration and restructuring within Moldovan higher education. Although this process enhances efficiency, it also requires balancing measures to prevent regional inequalities and preserve academic diversity.

The ratio between the total student population and the total number of educational institutions is a particularly relevant indicator for assessing the utilization and efficiency of the national education network (Figure 9).

High values of this ratio indicate intensive infrastructure use, associated with institutional efficiency but also with the risk of overburdening. Low values, conversely, suggest underutilization or excessive network fragmentation, both of which affect quality and sustainability.

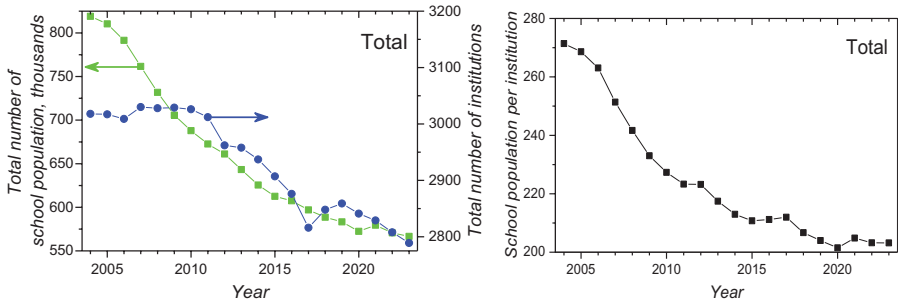


Figure 9. Correlation between the school-age population and the total number of educational institutions

Source: Author’s calculations based on data from the National Bureau of Statistics [10].

Between 2004/2005 and 2023/2024, this indicator shows a general downward trend. It reflects the transition of the educational system from an extensive and densely populated structure to a more balanced but narrower network. In 2004/2005, the ratio was 271.4 pupils and students per institution, indicating a relatively high yet functional utilization typical of that period. Over the next two decades, it decreased steadily to 203.18 pupils and students per institution in 2023/2024, a decline of 25.2%.

This decrease occurred gradually, reflecting structural adjustments influenced by demographic, economic and institutional factors. Several factors explain this trend. First, the school-age population has declined due to low birth rates and external migration. Second, the institutional network has been partially maintained even where underutilized. Third, universities and vocational schools have undergone moderate rationalization, whereas kindergartens and general education institutions have been reduced to a lesser extent.

From 2019/2020 onward, the ratio stabilized around 200 pupils per institution, maintaining this level over the past five years. This relative stability indicates functional balance, where the decline in the school-

age population has been offset by institutional optimization. The current value, the lowest in the analyzed period, does not imply a decrease in efficiency. Instead, it reflects a network closer to local communities, a more balanced distribution of students across educational levels and reduced pressure on large institutions.

In the long term, the educational system of the Republic of Moldova has experienced a significant decrease in student-to-institution density, from 271.4 to 203.18 (-25.2%). This trend does not indicate a functional crisis but rather a gradual structural adaptation to new demographic realities.

In recent years, the stabilization of values around the 200 threshold suggests the attainment of a relatively balanced stage. At the same time, it highlights the potential risk of underutilization in sparsely populated areas. In this context, future educational policies must carefully monitor the population-to-institution ratio to prevent both excessive concentration in urban centers and inefficiency in rural areas, thereby ensuring equitable and sustainable educational development nationwide.

The analysis of the 2004-2023 period reveals an educational network undergoing broad structural readjustment, in which the balance between demand and capacity varies by level of education. Early childhood education and postsecondary technical and vocational education have maintained a stable or moderately upward trajectory, confirming their functionality and viability within the current context of educational reforms. These segments demonstrate the capacity to meet labor market requirements and inclusion objectives, contributing to the strengthening of human capital from the earliest stages of development.

General education, by contrast, is in a fragile equilibrium, oscillating between stabilization and the risk of depopulation. This situation requires close monitoring and continuous adaptation of public policies to maintain equitable access and quality, particularly in rural areas. Meanwhile, secondary technical and vocational education faces a persistent challenge, characterized by declining program attractiveness and a high student-to-institution ratio that reflects network contraction rather than genuine efficiency.

In higher education, profound internal restructuring is evident, aimed at resource optimization and institutional consolidation. However, this process risks diminishing regional access and reducing the diversity of academic offerings, thereby limiting opportunities for young people from peripheral areas.

The interpretation of the results highlights relevant correlations between internal dimensions of the educational system and external influencing factors. The empirical analysis revealed structural imbalances between educational levels, territorial disparities and significant differences in the utilization of resources. These findings provide a deeper understanding of how educational policies, demographic dynamics and economic conditions affect the performance and sustainability of institutions. The results also confirm the need to strengthen administrative capacity and educational management to ensure that reforms generate measurable improvements in quality, equity and efficiency. Subsequently, the SWOT analysis offers an integrative framework for assessing the main strengths, weaknesses, opportunities and risks of the educational system. This enables the development of a strategic profile grounded in the current realities of education in the Republic of Moldova.

The SWOT analysis helps identify internal and external factors that shape the performance and sustainability of the educational system in the Republic of Moldova. Through this method, it is possible to distinguish between elements that strengthen institutional capacities and those that limit the effectiveness and coherence of educational reforms. The evaluation focused on four key areas: emphasizing the system's strengths, recognizing structural vulnerabilities, capitalizing on opportunities in the socio-economic and political environment and anticipating risks that could affect the continuity of modernization efforts. In this respect, the SWOT analysis provides a comprehensive overview of the educational system's development potential and its alignment with the principles of sustainable education.

The SWOT analysis of the education system in the Republic of Moldova revealed a complex set of internal and external factors shaping the direction and pace of educational development. Among the strengths, a modern and coherent regulatory framework harmonized with European standards stands out, providing a solid foundation for strengthening the quality of education. In addition, the openness of public authorities to international cooperation and strategic partnerships with organizations such as UNICEF, USAID and the European Union contributes to the successful implementation of systemic reforms. Recent digitalization initiatives further promote the integration of information technologies into the teaching process and stimulate pedagogical innovation. Moreover, the non-governmental sector plays an active role in developing inclusive

practices, offering models of community intervention and social partnership that can be scaled at the national level.

Table 1. SWOT analysis of the educational system of the Republic of Moldova in the context of reforms and sustainable development

Strengths	Weaknesses
<ul style="list-style-type: none"> • A modernized legal framework aligned with European standards. Moldova has adopted legislation and educational policies that reflect European best practices, including in inclusive education. • Strong political commitment and international support, with partnerships with organizations such as UNICEF, USAID and the European Union. • Digitalization initiatives in education, such as “Tekwill in Every School”, promoting integration of IT into the learning process. • Positive inclusive practices developed by the non-governmental sector. NGOs have implemented successful models that could be scaled nationally. 	<ul style="list-style-type: none"> • Lack of a clear mechanism for collecting data on children with special educational needs (SEN), which hinders effective planning and implementation of inclusive education policies. • Persistent stereotypes and reluctance toward human diversity. Society and local communities sometimes resist inclusion of children with disabilities in mainstream schools. • Underdeveloped infrastructure for inclusive education; many institutions lack adequate facilities for all learners. • Shortage of qualified teachers in inclusive education. Continuous professional development is needed to manage classroom diversity effectively.
Opportunities	Threats
<ul style="list-style-type: none"> • Availability of international support for implementing inclusive education, including financial assistance and technical expertise from UNICEF and USAID. • Political interest and commitment to achieving inclusive education. • Development and strengthening of competencies of stakeholders involved in inclusive education, including professional training for teachers and other educational actors. • Existing educational infrastructure can be adapted to meet the requirements of inclusive education with adequate investment. 	<ul style="list-style-type: none"> • Societal and community stereotypes and reluctance toward human diversity, hindering integration of children with SEN. • Insufficiently developed infrastructure and inadequate equipment of general education institutions, limiting the effective implementation of inclusion policies. • Absence of a clear, systemic mechanism for data collection at the local, district and national levels regarding children with SEN. Without precise data, it is difficult to plan and monitor progress in inclusive education.

Source: *Elaborated by the authors.*

However, the education system continues to face several structural weaknesses that limit the effectiveness of implemented policies. These include inadequate infrastructure for inclusive education, the absence of a unified mechanism for collecting and analyzing data on children with special educational needs, a shortage of qualified teachers in the field of inclusion and persistent resistance to diversity within communities. Such deficiencies undermine the system's ability to ensure equitable access to education and perpetuate regional and social disparities.

At the same time, the external environment offers significant opportunities for the development of inclusive education and the strengthening of system sustainability. International partners provide financial and methodological support, political will is favorable and existing infrastructure can be adapted. These factors create important conditions for accelerating the modernization process. Nevertheless, these advances may be limited by persistent threats such as social stereotypes, community resistance to change, chronic underfunding and the lack of a systematic database necessary for effective monitoring and evaluation of educational interventions.

The sustainable development of the educational system in the Republic of Moldova depends on the capacity of authorities to balance multiple priorities. This requires them to capitalize on internal strengths and external opportunities, while also addressing internal vulnerabilities and managing systemic risks. Strengthening equity, quality and inclusion in education requires coherent public policies, sustainable investments and effective cooperation among state institutions, academia, the non-governmental sector and international partners. Together, these measures can contribute to building a resilient and competitive educational system.

To examine the complex set of external factors influencing the development and functioning of the educational system, a PESTL analysis was applied. This strategic method provides a broad and coherent perspective on the political, economic, social, technological and legal context in which national education evolves. It facilitates understanding of the interdependence between the external environment and internal reform processes. The PESTL analysis identifies key trends and external conditions that can either support or constrain the implementation of educational policies and institutional modernization strategies. By addressing these dimen-

sions, the research not only delineates opportunities for strengthening the sustainability of the educational system but also anticipates external risks that may affect the efficiency, equity and coherence of reform processes. In this context, the PESTL analysis emerges as an indispensable tool for guiding strategic decisions and promoting a resilient, inclusive education model aligned with European and global sustainable development objectives.

The application of the PESTL analysis allowed for a detailed examination of the main external factors influencing the evolution and sustainability of the educational system in the Republic of Moldova. This analysis provides a strategic perspective on the political, economic, social, technological and legal contexts in which educational reforms unfold, highlighting the interdependence between the external environment and institutional performance.

Political Factors (P) - The political sphere significantly influences the direction and coherence of educational reforms. The Republic of Moldova demonstrates a clear strategic commitment to modernizing education, as reflected in policy documents such as the Education 2030 Strategy, which sets objectives for adapting the system to the requirements of a knowledge- and innovation-based economy. The development of these policies in partnership with international organizations (EU, UNICEF, UNDP) ensures legitimacy and fosters a shared vision of educational transformation. However, political instability and frequent leadership changes within the Ministry of Education affect the continuity of reforms and may generate implementation challenges. Moreover, the regional geopolitical context, influenced by the war in Ukraine, creates budgetary uncertainty and leads to the reallocation of public funds toward emergency sectors such as security and energy. Conversely, the European integration process serves as a major catalyst for reform, promoting alignment with EQF, ESG and Bologna Process standards. This opportunity, however, requires additional administrative and financial adaptation, as well as strengthened institutional capacity at all levels of the education system.

Economic Factors (E) - Economic factors largely determine the efficiency and sustainability of educational reforms. Insufficient funding

for the education sector remains a structural challenge. Budget allocations do not fully cover the needs for school infrastructure modernization, equitable distribution of digital equipment, or the improvement of teachers' salaries to increase the profession's attractiveness. At the same time, reliance on external funding through programs such as EU-4Skills, Tekwill in Every School, or the Moldova 2030 Project significantly supports reform implementation. However, this reliance also creates vulnerabilities if domestic financing mechanisms are not secured. Pronounced economic disparities between urban and rural areas generate major inequalities in access to quality education. These are reflected in the lack of school transportation, deteriorated infrastructure, a shortage of qualified teachers and limited teaching resources. Consequently, the economic efficiency of the educational system depends directly on stable funding and the state's ability to ensure equitable distribution of resources.

Social Factors (S) - The social context exerts a profound influence on educational performance. External and internal migration has created a concerning phenomenon: children left behind by migrating parents. These children often face emotional difficulties and lower academic achievement due to the absence of consistent parental support. At the same time, the transformation of educational values reflects the growing demands of the labor market for transversal skills, critical thinking, innovation and digital literacy. This requires curriculum reform and modernization of teaching methods. Inclusive education has become a major priority; however, its implementation faces significant obstacles, including the lack of educational assistants, school psychologists and adequately trained teachers. Moreover, limited engagement of communities and parents in educational decision-making reduces the effectiveness of reform initiatives. Nevertheless, projects such as *My School* have begun to stimulate civic participation and social responsibility toward education.

Technological Factors (T) - Technology represents one of the most dynamic and influential components of the educational environment. Digitalization has become a strategic priority, accelerated by the pandemic, which revealed both the potential of online learning and existing infra-

structural weaknesses. Insufficient equipment, poor internet connectivity and uneven digital competencies among teachers have exposed significant disparities between urban and rural areas. Initiatives such as *Tekwill*, robotics courses and programming programs mark an important step toward modernization, though implementation remains uneven nationwide. Furthermore, insufficient investment in digital infrastructure limits the effective use of modern educational resources. This underscores the need to upgrade computer laboratories, educational management platforms and online assessment tools.

Legal Factors (L) - The legal framework of education in the Republic of Moldova is robust but relatively rigid. The Education Code provides a solid foundation for the regulation and organization of the system. However, its practical implementation encounters challenge due to rapid social and technological change. Continuous legislative adaptation is essential. This applies particularly to the recognition of non-formal and informal learning, the certification of digital competencies and quality assurance in technical and higher education. Additionally, insufficient implementation at the local level - caused by limited resources and resistance to change - undermines policy effectiveness. Strengthening monitoring mechanisms, enhancing managerial training for school leaders and ensuring the uniform application of European standards are essential for improving the efficiency of legislative reforms.

The PESTL analysis demonstrates that the external environment offers a favorable framework for the strategic development of education in the Republic of Moldova. This framework is supported by European integration, international partnerships and the dynamics of digitalization. However, the effectiveness of this process depends on the state's ability to ensure political continuity, financial stability, social equity and legislative adaptability. Key vulnerabilities include underfunding, territorial disparities and uneven implementation of reforms. These challenges can be addressed through a coherent approach based on sustainable investment, equitable digitalization and continuous teacher training. Only by integrating these priority directions can the Moldovan educational system achieve greater resilience, quality and competitiveness, in line with sustainable development objectives.

The overall results indicate that, after five years of reforms and rationalization, the educational system of the Republic of Moldova has reached a relatively balanced but still fragile state. It requires further restructuring and adaptation. To ensure genuine alignment between the education system and labor market demands, it is essential to implement coherent educational policies focused on efficiency, economic relevance and long-term sustainability.

International indicators measuring a country's education level provide a comparative perspective on the performance of the educational system and the accumulation of human capital. Within the methodology used by the United Nations and the World Bank, two indicators are considered essential: Mean Years of Schooling (MYS) and Expected Years of Schooling (EYS).

Mean Years of Schooling represents the average number of completed years of formal education among the adult population aged 25 and older, reflecting the accumulated level of education in society. Expected Years of Schooling measures the average number of years a child of school-entry age is expected to spend in education if current enrollment rates remain constant. These indicators are integral components of the Human Development Index (HDI). They reflect not only the quality of the educational system but also its long-term development potential.

In the case of the Republic of Moldova, the most recent available data (2022) indicate a value of 11.8 years for MYS and 14.9 years for EYS. Compared to 2012 values - when MYS was approximately 11.2 years and EYS 12.4 years - a gradual and consistent increase can be observed. This positive trend reflects the expansion of access to education and the strengthening of school participation, particularly at the pre-university and post-secondary levels.

Trends over the past decade reveal a dual dynamic: the slow stabilization of the average education level among the adult population and the progressive expansion of educational opportunities for younger generations. These developments reflect the cumulative effects of curricular reforms, digitalization and investment in early childhood education. The persistence of a moderate gap between the mean and expected years of schooling suggests that the Republic of Moldova is in a transitional stage. Access to education is improving more rapidly than the educational capital accumulated by the adult population.

Therefore, the global indicators MYS and EYS confirm an upward trajectory in the level of education in the Republic of Moldova. They also emphasize the need to continue reforms focused on equity, quality and the alignment of educational supply with labor market demands.

Conclusion

The results of the analysis indicate a complex and coherent process of transformation within the educational system of the Republic of Moldova, oriented toward modernization, equity and sustainability. The research highlights significant progress in recent years – particularly in early childhood education, digitalization and regulatory reform. However, the educational system continues to face persistent structural challenges: demographic decline, territorial inequalities and a shortage of qualified human resources.

The empirical analysis confirms a structural reconfiguration of the system: an increase in the share of early childhood and postsecondary vocational education, accompanied by a decline in general and higher education. This evolution reflects the gradual adaptation of public policies to current economic and social realities, as well as to labor market requirements increasingly oriented toward practical and technical competencies. Moreover, since 2019, there has been a tendency towards stabilization within the educational network. This results from institutional rationalization and optimization processes, signaling an emerging balance between educational demand and infrastructural capacity.

To consolidate the progress achieved and ensure sustainable development, the implementation of the following strategic measures is recommended: increasing public investment in educational infrastructure – particularly in rural areas – with an emphasis on modernizing learning spaces and equipping them with digital tools; reforming human resource management through continuous professional training, salary incentives and policies aimed at attracting young specialists into the education sector; strengthening partnerships between the educational system and the economic environment by expanding dual education and aligning curricula with real labor market needs; diversifying the university and postgraduate educational offer by emphasizing interdisciplinary programs, digital competencies and internationalization; and improving monitoring and

performance evaluation mechanisms to establish a solid data foundation for evidence-based policymaking.

Overall, the research demonstrates that the national educational system is undergoing an evolutionary transition toward a more efficient, equitable and knowledge-driven model. The success of this process depends on the continuity of reforms, the coherence of government policies and the institutional commitment to ensuring educational quality and inclusion.

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