

## HIGHER EDUCATION AND R&D SYSTEM IN THE REPUBLIC OF MOLDOVA: CHALLENGES AND POTENTIAL FOR GROWTH

Levitskaia Alla,  
Ianioglo Nadejda

**Purpose of the study** – and critical assessment of the quality assurance system of higher education in the Republic of Moldova in the context of European integration process. The objectives of this study: analysis of the current state of the higher education system in the Republic of Moldova; comparative analysis of quality assurance of higher education in Moldova and EU countries. Research methods includes system approach, analysis and synthesis, logical generalization and analogies and foreign scientists and leading experts, analytical materials on the research problem. The analysis of recent studies and publications despite the existing scientific research, the issues of quality assurance of higher education do not lose their relevance and require further study. The results of this study can be used by stakeholders to promote the development and improvement of the quality assurance system for higher education and research in the context of the country's European integration, as well as for the formation of quality assurance strategies in the universities of the Republic of Moldova.

**Keywords:** higher education; quality of higher education; research quality; quality assurance; assessment of the quality of education; European integration.

**JEL Classification:** A22; I23; I25; I26.

## СИСТЕМА ВИЩОЇ ОСВІТИ ТА НАУКОВО-ДОСЛІДНОЇ ДІЯЛЬНОСТІ В РЕСПУБЛІЦІ МОЛDOVA: ВИКЛИКИ ТА ПОТЕНЦІАЛ ДЛЯ ЗРОСТАННЯ

Левітська Алла,  
Яніогло Надія

**Мета дослідження** – критична оцінка системи забезпечення якості вищої освіти в Республіці Молдова в контексті євроінтеграційних процесів. Завдання дослідження: аналіз сучасного стану системи вищої освіти в Республіці Молдова; порівняльний аналіз забезпечення якості вищої освіти в Молдові та країнах ЄС. Методи дослідження включають системний підхід, аналіз і синтез, логічне узагальнення та аналогії, а також праці зарубіжних вчених і провідних експертів, аналітичні матеріали з досліджуваної проблеми. Аналіз останніх досліджень і публікацій. Незважаючи на існуючі наукові дослідження, питання забезпечення якості вищої освіти не втрачають своєї актуальності і потребують подальшого вивчення. Результати даного дослідження можуть бути використані зацікавленими сторонами для сприяння розвитку та вдосконалення системи забезпечення якості вищої освіти і наукових досліджень в контексті європейської інтеграції країни, а також для формування стратегій забезпечення якості в університетах Республіки Молдова.

**Ключові слова:** вища освіта; якість вищої освіти; якість досліджень; забезпечення якості; оцінка якості освіти; європейська інтеграція.

### Formulation of the problem.

The intensive processes of European integration that are taking place in the Republic of Moldova contributed to the accession of the country's higher education system to the Bologna Process, the implementation of the draft Intergovernmental Framework Agreement on the recognition of diplomas, academic qualifications, skills and competencies with European countries.

Republic of Moldova is preparing to sign the Global Convention on the Recognition of Qualifications concerning Higher Education which was adopted on November 25, 2019 in Paris [5]. Therefore, in order to deepen the integration processes of the system of higher education of the Republic of Moldova into the European educational space, it is necessary to subject the existing databases and empirical studies in this field to a comparative analysis.

**Analysis of recent research and publications.** Quality of teaching processes has become a major strategic issue in tertiary education systems across the globe (Harvey and Williams 2010; Enders and Westerheijden 2014). The processes taking place in the system for assessing the quality of the educational process in Europe and in the Republic of Moldova as integrated into the Bologna process accelerate the processes of their unification and standardization.

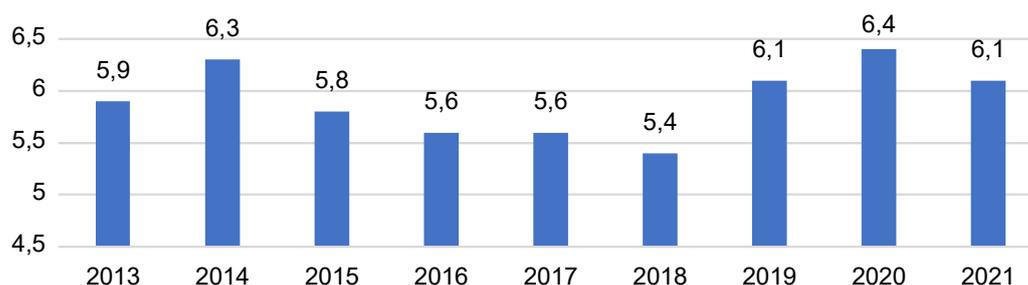
Quality management tools are based on the comparison of educational outcomes and the development of university rankings and the work of managers (Broucker and de Witt 2015; van Vught and de Boer 2015). Under these conditions, it is important to develop tools for international cooperation, including student and teacher mobility programs across European higher education institutions (Teichler 2012), as well as joint research and development.

Studies of issues related to the analysis of the quality and evaluation of higher education in the Republic of Moldova were devoted to the work of such Moldovan researchers as: Cotelnic A., Codrunianu I., Stratan A., Bordian E., Guslicova N., Belostehnik G., Petrov E. et al. However, despite the existing scientific research, the issues of quality assurance of higher education in the Republic of Moldova do not lose their relevance and require further study.

**The purpose of this study** is to analyze and critically evaluate the challenges and potential for growth of higher education and R&D system in the Republic of Moldova in the context of European integration processes. Objectives includes analysis of the current state of the higher education and R&D system in the Republic of Moldova; comparative analysis of quality assurance of higher education in Moldova and EU countries; justification of the relevance of ERASMUS+ projects in ensuring the quality of higher education and research in Moldova.

**Scientific methods** used in the research process includes system approach, methods of studying economic phenomena and processes, analysis and synthesis, logical generalization and analogies and foreign scientists and leading experts, analytical materials on the research problem.

**Presentation of the main material.** On March 7, 2023, the Government of the Republic of Moldova approved the Education 2030 Strategy. According to the plans of the Ministry of Education and Research, the implementation of this Strategy will contribute to the achievement of the goals of European integration in the field of education. Through this strategic document, the Ministry intends to ensure the quality of education and training, as well as to establish a link between the education sector and the labor market, which is constantly evolving. The Strategy plans to improve the quality of research, the effectiveness of inventions and innovations, which will ensure that the national educational system is linked to European requirements and values.



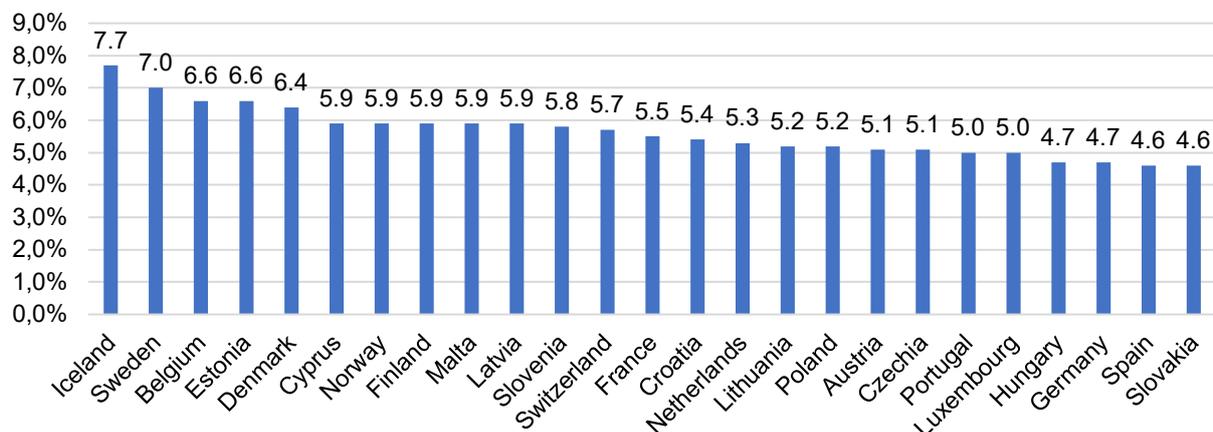
**Figure 1. The dynamics of education spending as a share of gross domestic product (GDP) in Moldova in period 2013-2021, %**

Source: *Moldova: Education spending, percent of GDP*. URL: [www.theglobaleconomy.com](http://www.theglobaleconomy.com)

Education is one of the most important factors in the sustainable development of society, competitiveness and national security of the state. According to the theory of endogenous growth, the formation and build-up of human capital allow for a more efficient use of physical capital, which in turn leads to an increase in GDP per capita [10]. The average indicator of spending on education in the GDP of the Republic of Moldova is 5.92% (Fig. 1). The lowest value of this indicator for the analysis period of 2013-2021 is observed in 2018 – 5.44%, the largest in 2020 – 6.39%. In 2021, spending on education amounted to 13.5 billion lei, which is 6.1% of the country's GDP [13].

In the structure of public expenditures for education, in 2020 the highest share was held by secondary education: 5,9 billion lei or 49%, followed by early education and primary education: 3590 million MDL (30%), professional technical education: 1,1 billion lei or 9%, higher education: 1,07 billion lei or 8% [13]. One of the most important indicators of the state's participation in the development of the educational sector is the percentage of education expenditures in the country's GDP.

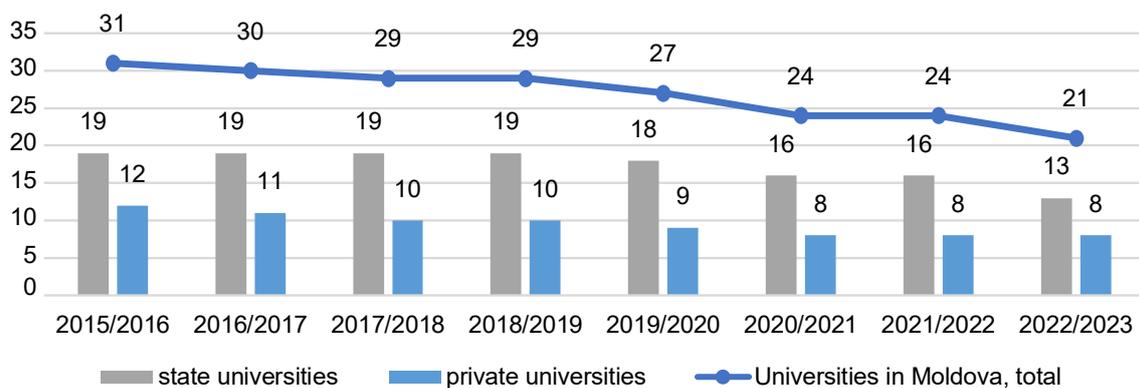
A comparative analysis of this indicator with the EU countries illustrates that, on average, in European countries, expenditures on education in the country's GDP amount to 5%. The largest share of spending on education in the GDP of Iceland is 7.7%, the smallest share of spending on education in the GDP of Bulgaria is 4%, neighboring Romania is 3.7% and Ireland is 3.1% (Fig. 2.).



**Figure 2. Education spending as a share of gross domestic product (GDP) in Europe in 2020, %**

Source: Education spending as a share of gross domestic product (GDP) in Europe in 2020. URL: <https://www.statista.com/statistics>

It should be noted that the Republic of Moldova, in terms of the share of expenditures on education in the country's GDP, exceeds the average European indicators, which made it possible to the Republic of Moldova ranks 13th among the 132 economies featured in the Global Innovation Index 2022 on contributions to education [5].

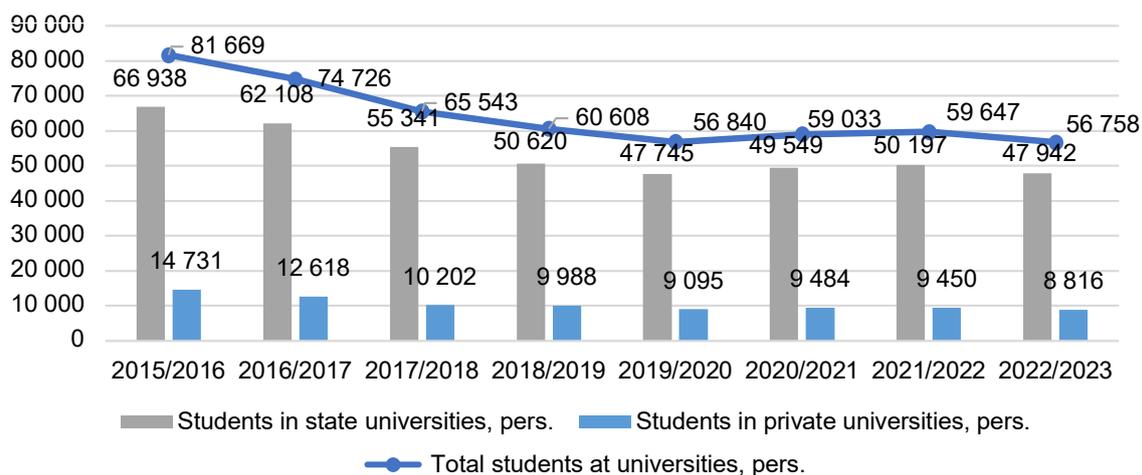


**Figure 3. The dynamics of HEI's in Moldova in period 2015-2023**

Source: Research and development activity in 2021. URL: <https://www.statistica.gov.md>

The number of higher education institutions in the 2022/2023 academic year is 21 units, which is 10 institutions or 32.2% less than in the 2015/2023 academic year. 2020 and 3 fewer institutions compared to 2021/22, as a result of the reorganization of a number of public higher education institutions (fig. 3).

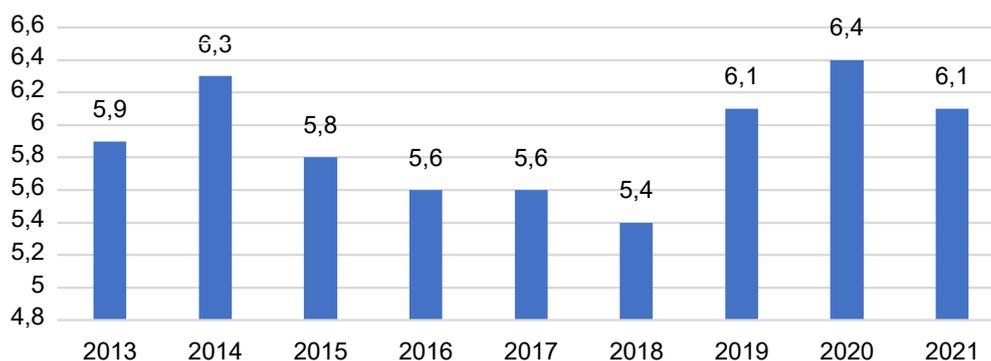
At the beginning of the 2022/23 academic year, 56.7 thousand students studied in higher education institutions, which is 4.8% less than in the previous academic year and 24.9 thousand students or 30.5% less than in 2015 – 16 accounts year. Of the total number of students, 62.7% were full-time students, and 37.3% were part-time students (fig. 4).



**Figure 4. The dynamics of students in Moldova in period 2015-2023**

Source: Research and development activity in 2021. URL: <https://www.statistica.gov.md>

The functioning of universities includes not only the training of educational personnel, but also employees for R&D work. However, research and development funding in the Republic of Moldova is low. The data presented in Figure 5 illustrate the share of spending on research and development in the country's GDP over the past 10 years at the level of 0.24%.



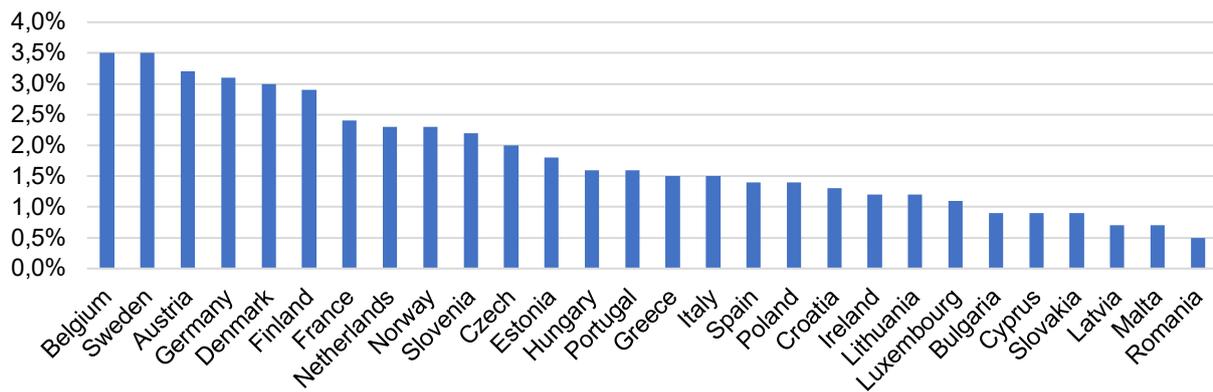
**Figure 5 The dynamics of R&D expenditure as a share of gross domestic product (GDP) in Moldova in period 2013-2021, %**

Source: Research and development expenditure Moldova. URL: <https://data.worldbank.org>

If in terms of the share of spending on education the Republic of Moldova corresponds to the European average, then in terms of the share of spending on R&D in GDP, Moldova lags behind the EU countries (about 600 million lei), which is clearly shown in Figure 6. The average share of spending on R&D in the GDP of the EU countries is 2.3% in 2020. The largest share of R&D expenditures is observed in the GDP of Belgium and Sweden – 3.5% respectively, the smallest share of R&D expenditures in Romanian GDP – 0.5%, which is 2 times higher than in Moldova [9].

EU gross domestic spending on R&D as a percentage of GDP has been relatively stable at 2.03% on average. The long-term goal of the EU is the level of achievement of 3% of R&D costs of the total GDP. The sources of investment in R&D in the EU member states are divided into four main sectors: business, government, higher education and the private non-profit sector. The business sector of the EU member states remains the largest source of investment in R&D (about 65% of total investment), the contribution of education structures is about 24%, the public sector is at the level of 12%, the non-profit sector is 1% [2].

According to the National Agency for Research and Development of the Republic of Moldova, own investments in the innovative development of enterprises in 2022 amounted to 4.9 million lei, which does not reach the funding level of 1% of the total R&D costs. Public investments for the implementation of research projects in 2022 amounted to 122.4 million lei, or 20% of the total R&D costs [13].



**Figure 6. R&D expenditure in the EU as a share of gross domestic product (GDP) in 2020**

Source: R&D expenditure in the EU at 2,3% of GDP in 2020 <https://ec.europa.eu/eurostat>

The existing difference in the basic methodology for calculating this indicator in the Republic of Moldova, namely, the lack of accounting for investments from three other sources when taking into account only public expenditures, does not allow us to speak correctly about the level of investment in research and development. Also, in addition to increasing public funding for R&D in the EU countries, tax incentives are widely used, funding programs are being developed, in particular, through the EU Framework Program and the functioning of structural funds.

According to the data of the National Bureau of Statistics of the Republic of Moldova, in 2021, expenditures on research and development amounted to 560.5 million lei, which, as noted, is 0.23% of GDP. In 2021, compared to 2020, spending on research and development activities increased by 90.9 million (by 19.4%), including public institutions – by 36.7 million or 8.8% (table 1).

**Table 1. Expenses on research and development, in 2020-2021, mln. Lei**

	2020		2021	
	Total	incl. in government agencies	Total	incl. in government agencies
Total expenses	<b>469,6</b>	<b>418,6</b>	<b>560,5</b>	<b>455,3</b>
Incl.				
current expenses	448,2	400,2	537,3	436,9
capital expenditures	21,4	18,4	23,2	18,4

Source: *Research and development activity in 2021*. URL: <https://statistica.gov.md>

From the data illustrate a large share in the total amount of costs for research and development is occupied by current costs - 95.9%, capital costs – 4.1%. The current expenditures are dominated by personnel costs (394.1 million lei or 73.3%), material costs in the amount of 61.1 million lei (11.4%), other current expenses in the amount of 82.1 million lei (15.3 %). Compared to 2020, both personnel costs increased (by 44.6 million lei or 12.8%) and other components of current expenses (by 44.5 million lei or 45.1%). In capital expenditures, the costs for the purchase of equipment and other fixed assets had the largest share – 78.9%.

According to the Global Innovation Index 2022 data, the Republic of Moldova ranks 78th in terms of contributions to innovation, which is higher than last year, but lower than in 2020. However, despite low spending on R&D, in 2022 the Republic of Moldova shows better results in terms of contributions to innovation than in terms of contributions to innovation - 46th place. The position is higher than in 2021 and 2020. The trend line between income levels (GDP per capita) and innovation performance indicators (GII) shows the expected performance of innovations depending on the level of income [6].

In relation to GDP, the indicators of the Republic of Moldova exceed the expected level of its development. Republic of Moldova ranks 78th in innovation inputs, higher than last year but lower than 2020. However, despite low R&D costs, the Republic of Moldova performs better in innovation outputs than innovation inputs in 2022 – ranks 46th. This position is higher than both 2021 and 2020. the trend line shows the relationship between income levels (GDP per capita) and innovation performance (GII score) are performing better than expected and those below are performing below expectations [6].

It is necessary to note a paradoxical situation – the Republic of Moldova produces more innovation outputs relative to its level of innovation investments, that is, they are effectively translating costly innovation investments into more and higher-quality outputs. The Republic of Moldova performs above the upper-middle-income group average in four pillars, namely: Human capital and research; Market sophistication; Knowledge

and technology outputs and, Creative outputs. The basis of the quality of any education and science is personnel. Let's consider how many researchers Moldova has in scientific areas.

**Table 2. Researchers by scientific fields, 2020-2021**

	Researchers, pers.				Researchers, %			
	2020		2021		2020		2021	
	Total	Incl. women	Total	Incl. women	Total	Incl. women	Total	Incl. women
Researchers – total	<b>2907</b>	<b>1430</b>	<b>2920</b>	<b>1459</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Natural sciences	985	487	941	469	33,9	34,0	32,2	32,1
Engineering sciences	351	71	336	69	12,1	5,0	11,5	4,7
Medical sciences	402	251	396	240	13,8	17,6	13,6	16,5
Agricultural sciences	453	217	464	226	15,6	15,2	15,9	15,5
Social sciences	477	278	535	323	16,4	19,4	18,3	22,1
Humanitarian sciences	239	126	248	132	8,2	8,8	8,5	9,1

Source: *Research and development activity in 2021*. URL:<https://statistica.gov.md>

In the period 2020-2021, most researchers worked in the field of natural sciences (32.2%), and the fewest researchers worked in the field of humanities (8.5%). At the same time, in 2021, the share of researchers from the natural sciences (by 1.7 p.p.), engineering and technical sciences (by 0.6 p.p.), and medical sciences (by 0.2 p.p.) decreased, and the share of researchers from the fields of social sciences (by 1.9 p.p.), agricultural and human sciences (by 0.3 p.p.).

The proportion of women researchers is higher than that of men in the following fields - medical sciences (60.6%), social sciences (60.4%) and humanities (53.2%), a minority in three other fields - natural sciences (49.8 %), agricultural (48.7%) and engineering sciences (20.5%).

Researchers with scientific titles (doctor and doctor habilitat) in 2021 accounted for 54.3% of the total number of researchers. At the same time, the share of researchers with the title of doctor in the total number of researchers is 42.4%, and with the title of doctor of habilitate – 11.8%. Doctor habilitate women researchers account for just over half of all doctors (50.8%), and doctor habilitate women researchers account for 30.3%.

Compared to 2020, there is a decrease in the number of researchers with the academic title of doctor, both among women and men (by 3.2% and 2.4%, respectively). The number of male researchers with the academic title of Doctor (Habilitation) also decreased (by 5.1%), and only among female researchers – Doctor (Habilitation) increased by 29.6%.

**Table 3. Researchers with academic titles by field of science, 2020-2021**

Type of Science	2020				2021			
	doctor (habilitat)		doctor		doctor (habilitat)		doctor	
	Total	Incl. women	Total	Incl. women	Total	Incl. women	Total	Incl. women
Researchers (scientific titles)	<b>335</b>	<b>81</b>	<b>1275</b>	<b>651</b>	<b>346</b>	<b>105</b>	<b>1239</b>	<b>630</b>
natural	100	17	436	230	100	17	422	226
engineering	21	1	97	14	25	3	94	12
medical	70	21	157	102	60	22	132	80
agricultural	38	5	166	72	35	5	164	75
social sciences	59	20	285	163	78	41	287	163
humanitarian	47	17	134	70	48	17	140	74
compound, %	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
natural	29,9	21,0	34,2	35,3	28,9	16,2	34,1	35,9
engineering	6,3	1,2	7,6	2,1	7,2	2,9	7,6	1,9
medical	20,9	25,9	12,3	15,7	17,3	20,9	10,6	12,7
agricultural	11,3	6,2	13,0	11,1	10,1	4,8	13,2	11,9
social	17,6	24,7	22,4	25,0	22,6	39,0	23,2	25,9
humanitarian	14,0	21,0	10,5	10,8	13,9	16,2	11,3	11,7

Source: *Research and development activity in 2021*/ URL:<https://statistica.gov.md>

Another challenge facing the system of higher education and the necessary condition for ensuring the quality and sustainability of education and research is the introduction of digital technologies, which is reflected in the Development Strategy „Education 2030”. The list of main activities and the required amount of funding from other sources includes [13]:

- ✓ equipping at least 80% of educational units with equipment, software and other information and communication technologies;
- ✓ ensuring the initial and continuous training of 100% of employees in the education sector regarding the development of digital skills and the implementation of education computerization standards;
- ✓ developing the institutional capacity of 95% of educational institutions in the creation, use and evaluation of digital learning tools;
- ✓ development and implementation of higher education programs with distance learning.

**Conclusions.** The results of the study illustrate a fairly high level of funding for the education sector, while the number of students and educational institutions is decreasing at the same time. R&D funding indicators require the construction of a system of statistical accounting of private investments, the development of incentive systems for financing this area. The study of the system of development of higher education in the Republic of Moldova makes it possible to note that the system of higher education cannot develop outside of global processes and trends - digitalization processes, inclusion more women in the field of science.

Solving the issues of reforming and developing the country's universities cannot be based on criteria only at the national level. Without studying and implementing best practices, universities will not be able to train specialists who meet the requirements of the modern market and ensure sustainable development. It should be noted the importance of strengthening the international component in the organization of the training of a competent specialist, the development of the internationalization of higher education and the field of scientific research.

National Agency for Quality Assurance in Education and Research (ANACEC) is already recognized in the Republic of Moldova as a body of competence and expertise in the field of external quality assurance of studies [14]. Since its establishment and to date, the Agency has made great progress in developing and improving its activities in line with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) recommendations. ANACEC is already recognized in the Republic of Moldova as a body of competence and expertise in the field of external quality assurance of studies.

Thus, for the Republic of Moldova in the context of integration processes, one of the most effective ways to improve the quality of education and its competitiveness is the participation of universities in international educational and research projects. One of these projects is the project QFORTE- Enhancement of Quality Assurance in Higher Education System in Moldova, implemented with the support of the ERASMUS+ funded by the EU [20].

Overall objective of the project: to contribute to deeper integration of Moldova into European Higher Education Area (EHEA) through the enhancing of quality assurance in higher education system. Specific objective of the project: to promote and strengthen the Quality Assurance culture in Moldova and to build national consensus of the key-actors on the development issues; to develop and advance a national legislative framework and stimulate regulatory changes on Quality Assurance in HEIs in Moldova; to enhance the Quality Assurance management of HEIs in Moldova through International institutional accreditation; to build the institutional capacities of HEIs in Moldova for efficient and effective implementation of Quality Assurance reform.

The implementation of the QFORTE project for the Moldovan higher education system is an opportunity to exchange experience with leading European universities, optimize the system for ensuring the quality of education and research, an important resource for modernizing education and introducing innovative methods. On the way to integration into the European Educational Area, the Republic of Moldova should strive to form educational and research programs that meet the highest quality standards.

## References

1. Cotelnic A. Quality assurance in higher education institutions through the risk management integration. *Journal of Social Sciences* Vol. VI, no. 1 (2023), pp. 58-68.
2. Demirguc-Kunt, Asli; Torre, Iván. 2020. Measuring Human Capital in Europe and Central Asia. Policy Research Working Paper; No. 9458. World Bank, Washington, DC. URL: <https://openknowledge.worldbank.org/entities/publication/>
3. Education spending as a share of gross domestic product (GDP) in Europe in 2020 URL: <https://www.statista.com/statistics/1073151/education-spending-in-eu-countries/>
4. Enders, Jürgen; Don F. Westerheijden. 2014. "Quality Assurance in the European Policy Arena." *Policy and Society* 33 (3): 167-176.
5. Global Convention on the Recognition of Qualifications concerning Higher Education. URL: <https://unesdoc.unesco.org/ark:/48223/pf0000372970>

6. Global Innovation Index 2022. URL: [https://www.wipo.int/global\\_innovation\\_index/en/2022/](https://www.wipo.int/global_innovation_index/en/2022/)
7. Harvey, Lee, and James Williams. 2010. "Fifteen Years of Quality in Higher Education (Part two)." *Quality in Higher Education* 16 (2): 81-113.
8. Ianioglo N., Racovchena T. International student mobility as an important process of internationalization of universities and improvement of education quality//Strategies for sustainable socio-economic development and mechanisms their implementation in the global dimension: collective monograph/edited by W. Musialic, in 3 Vol. // VUZF University of Finance, Business and Entrepreneurship. – Sofia: VUZF Publishing House "St. Grigorii Bogoslov", 2019. – Vol. 1. – 258-267 p.
9. Innovation Economic Development: Institutional and Organizational Dimension: International collective Monograph /red. Alla Levitskaia; science council: Michael Oklander [et al.]; Comrat State University (Moldova), National University "Kiev-Mohyla Academy" (Ukraine), Odessa National Polytechnic University (Ukraine) [et al.]. – [Comrat] : S. n., 2021.
10. Levitskaia A., Innovation driven model of increasing entrepreneurship innovative potential. Collective monograph. For ed. prof. Khrapkina V.V. VZ "Kiev University of Market Relations"/Kiev. 2018.
11. Markus Seyfried | Philipp Pohlenz Assessing quality assurance in higher education. *European journal of Higher Education*. 2018, vol. 8, № 3, 258-271.
12. Ministry of Education and Research. The third stage of the National Digital Literacy Program begins [Press release]. 2022. URL: <https://mecc.gov.md/ro/content/incepe-cea-de-treia-etapa-programului-national-dealfabetizare-digital>
13. Moldova: Education spending, percent of GDP. URL: [https://www.ru.theglobaleconomy.com/Moldova/Education\\_spending/](https://www.ru.theglobaleconomy.com/Moldova/Education_spending/)
14. National action plan on quality assurance of higher education in the Republic of Moldova for the period 2021-2023. ANACEC 2021, Chisinau.
15. Raportul de activitate al Agenției Naționale pentru Cercetare și Dezvoltare pentru anul 2022. URL: <https://ancd.gov.md/ro/content/rapoarte>
16. R&D expenditure in the EU at 2.3% of GDP in 2020. URL: <https://ec.europa.eu>
17. Research and development expenditure (% of GDP) – Moldova. URL: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?end=2020&locations=MD&start=2013&view=chart>
18. Research and development activity in 2021. URL: [https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454\\_59408.html](https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html)
19. Strajn, Darko; Zgaga, P., Teichler, U., & Brennan, J. (Eds.) (2012). *The globalisation challenge for European higher education / Convergence and Diversity, Centres and Peripheries*. Frankfurt/M.: Peter Lang. [Book review] - In: *CEPS Journal* 3 (2013) 4, S. 139-143
20. QFORTE- Enhancement of Quality Assurance in Higher Education System in Moldova. Reference number (618742-EPP-1-2020-1-MD-EPPKA2-CBHE-SP) URL: <https://www.qforte.usm.md/>

#### **DATA ABOUT THE AUTHORS**

##### **Levitskaia Alla,**

Doctor of Economic Sciences (Habilitation), Professor,  
 Department of Economics, Comrat State University, Republic of Moldova  
 ORCID ID: <https://orcid.org/0000-0002-0520-805X>  
 Researcher ID: AEW-5234-2022  
 e-mail: [alla.levitskaia@gmail.com](mailto:alla.levitskaia@gmail.com)

##### **Ianioglo Nadejda,**

Doctor of Economic Sciences (Ph.D.), Associate Professor,  
 Department of Economics, Comrat State University, Republic of Moldova  
 ORCID ID: <https://orcid.org/0000-0003-1784-3824>  
 e-mail: [ianioglo.n@gmail.com](mailto:ianioglo.n@gmail.com)