TRANSFORMATION OF LABOUR FORCE MARKET UNDER THE IMPACT OF DIGITAL ECONOMY DEVELOPMENT IN THE REPUBLIC OF MOLDOVA

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ABSTRACT: *This article presents the results of a study the impact on labour force market of the process the digitalization of economy in the Republic of Moldova. Based on an analysis of the education level of labour force, a multi-factor regression model of the relationship between changes in the number of employed population by education level and GDP, as the main macroeconomic indicator, was developed. The model allows to assess the quantitative impact of changes in the structure of employed population, depending from the education level, on GDP, both in the current period and in the medium term. In this context, using methods of comparative analysis, synthesis, induction, deduction, systematization and graphical interpretation, the main factors influencing the development of labour force market by education level and professional training in conditions of the challenges of the digital economy were identified. Based on the results of the study, recommendations on the consolidate efforts and create the necessary mechanisms of state regulation to increase the sustainability of labour force market in conditions of the digitalization process in the Republic of Moldova were elaborated.*

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Keywords: *employed population, GDP, model, education level, digital economy.*

JEL Classification: *C51; F66; I25; J21; J24; O15*

1. INTRODUCTION

The term "digital economy" was first used in scientific research in 1995. The socio-economic development of society is now impossible without digital tools and transformations. This has become especially evident after the COVID-19 pandemic crisis, and as a result, research into the impact of digitalization on labour market has special relevant. Digitalization

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of the economy, one of the most significant trends in the modern world, has a direct impact on the nature of labour relations, changing their quantitative and qualitative characteristics, flexibility and the state of employment in countries and regions. The impact of digitalization on labour relations was researched by such scientists as Degryse Christophe [Degryse Chr., 2016], De Groen Willem P., Karolien Lenaerts, Romain Bosc and Felix Paquier [De Groen W.P., Lenaerts K., Bosc R. and Paquier F., 2017], De Stefano V. [De Stefano V., 2015], Dosen Igor, Michael Graham [Dosen I., Graham M., 2018], Johnston, Hannah, Chris Land-Kazlauskas [Johnston H., Land-Kazlauskas Chr, 2019] and others. At the same time, particular attention was focused on the emergence and dissemination of new atypical forms of employment involving computers or mobile devices. The growing role of intellectual labour compared to traditional labour, the complexity of content and structure, the legislative recognition of new forms of employment and special normative-legal acts regulating labour relations in the new conditions, including the difficulty of identifying discrimination, zones and subjects of responsibility of the parties, the absence of concrete forms and technologies of protection, social guarantees and compensation. All of the above-mentioned cause the transformation of relations between the employer and the worker in the context of the growing complexity of labour and the progress of knowledge when working in the digital economy, and the necessity for more in-depth scientific research. The rapidly developing process of digitalization of the economy led to both a change in economic resources and the necessity for new tools and forms of management in conditions of the growing diversity of interactions and participants in this process, which presupposes a transition from the traditional model of economic management based on the sectoral principle to an integrated service-oriented model, including the use of new norms and forms of legal regulation of labour relations. The nature of work and employment are most significantly influenced by the replacement of human labour, mainly manual labour, with machines, the implementation of new digital technologies, the conversion of physical objects and documents into digital form or vice versa, the expansion of the use of digital platforms as intermediaries in algorithmic organisation for economic transactions, and so on.

In the Republic of Moldova, the adoption of the National Strategy for the Development of the Information Society "Digital Moldova 2020" [Government of the Republic of Moldova, 2013] was an important stage and the basis for the implementation of the digital transformation of socio-economic processes. This Strategy was an important fundamental step in the development of information technology (IT), the main aim of which was to increase the accessibility and quality of services through the development of the digital economy, improve IT infrastructure, develop electronic services, including e-Government services, train specialists and increase the digital literacy of the population. As a result of the official completion of the strategy, systems such as the state services portal (servicii.gov.md), the electronic signature system (MSign), and the IT park (Moldova Innovation Technology Park) were implemented and operational in the country, and fiber-optic networks and mobile internet (4G/5G) were expanded. Given the necessity for digital transformation as one of the main priorities, new normative and legal documents were adopted to replace the above-mentioned strategy, including the Digital Transformation Strategy of the Republic of Moldova for 2023-2030[Government of the Republic of Moldova, 2023.]. The key directions of activity in the Strategy correspond to the directions of the European Union's digital compass [European Union's digital compass, 2025], including integration into the united digital market and sustainable development of human resources in the Republic of Moldova. The main directions of focus are increasing the number of people with digital skills and highly qualified professionals in the field of digital technologies; creating a secure and sustainable digital infrastructure; digital transformation of enterprises and digitization of state services; and integration of the country into the European Union's united digital market. Given the

importance of realization the aims of digital transformation, the Republic of Moldova has also adopted the Strategy for the Development of the Information Technology Sector and the Digital Innovation Ecosystem for 2018-2023, the Information Security Strategy of the Republic of Moldova for 2019-2024, the National Program for Research and Innovation for 2020-2023, and the Radio Spectrum Management Program for 2021-2025 and the Minimum Cost of Reference Frequency Blocks for Competitive Selection. In this context, it should be noted that the above actions constitute the foundation for the further development and to achieve of the Republic of Moldova's status of a "fully digital" country, with a priority on contactless interaction between citizens and the state.

The Report of the Intergovernmental Group of Experts on E-commerce and the Digital Economy, 7th session, Geneva, 6-8 May 2024 [United Nations Conference on Trade and Development, 2024] notes "the urgent need to build digital readiness amid cascading crises and persistent inequalities, in particular in developing countries lagging behind in an increasingly digital global economy", as well as the importance of this topic, given taking into account that "the expansion of e-commerce and the digital economy was unfolding in different ways for countries at varied levels of development" and that and that to successfully address these issues, further development of international collaboration and resources is necessary as a tool for accelerating the process of sustainable development of digital readiness and digital transformation in accordance with national priorities of the country.

In the Republic of Moldova, digital transformation is identified определено as one of the most important political objectives, in accordance with the Association Agreement with the European Union and the United Nations 2030 Agenda for Sustainable Development. In addition, the country's status as a candidate for accession to the European Union (23 June 2022) is a mobilising factor for integration into the EU legal base and the digital markets unit (GMU). Consequently, accelerating transformative processes, including aligning national policies with European and global tendencies, as well as implementing new policies based on transversal EU priorities and the national needs of the Republic of Moldova. It is a necessary prerequisite for rapid and effective digital transformation and depends on financial opportunities and the availability of qualified human resources. In the context of the practical realization of the digital reform program in the Republic of Moldova, the financial support of the European Union (EU4Digital) is of great importance, including the promotion of EU norms and practices in key fields of the digital economy and society, which will allow the country to both ensure economic growth, and have the possibility to create new working places and increase the living standards of the population (for example, the development of high-speed broadband will stimulate the development of the economy, perfect the digital skills of the population and create new working places). Moreover, given the financial support of EU4Digital, there is a real possibility to increase the country's competitiveness by harmonising digital markets, improving the quality of online services, and expanding their assortment (expanding the assortment of electronic services, increasing the level of cybersecurity (coordination the operations of national competent authorities with European Directives NIS), harmonising digital databases in all spheres of activity) taking into account reducing prices (lowering roaming tariffs). An important stage of EU financial support was the launch in 2020 of the EU4MOLDOVA: Startup City—Cahul (the project budget was 7 million euros for the period 2020-2023), aim is to increase the regional potential of the digital economy and improve its competitiveness, organise a European digital innovation hub in the country, which is possible thanks to the cooperation between the Association for the Development of Electronic Communications and Innovative Technologies (ACETI) and the Technical University of the Republic of Moldova. The total investment in the project is 2.0 million €, including half of the amount will be provided by the EU, and the other half will be provided through the Entrepreneurship Development Organisation of the Republic of Moldova. The funds will be directed for the

digital transformation of small and medium-sized enterprises (adaptation to the digital economy, implementation of modern technologies and increased competitiveness). and it should be noted that this project is part of the "Digital Europe" program, which is one of the EU's key programs for financing the digital transformation of the economy and society of countries for the period 2021-2027. Support is also provided for the development of other programs for the digital transformation of the economy in the Republic of Moldova. The country's progress in this field is noted in the results of the Digital Readiness Assessment of the Republic of Moldova conducted by the UNDP, that the country has all the prerequisites for rapid and results digital transformation [Government of the Republic of Moldova, 2023]. Ultimately, the development of digitalization creates opportunities to attract investment, which will also stimulate trade and increase employment rate in the country, thereby contributing to its further development.

The digital economy, based on automation, increased demand for new skills, the use of artificial intelligence, the necessity for requalification, the transformation of forms of employment, as well as challenges such as working place loss, strengthening inequality, the adaptation of education systems, is a catalyst for transformations in various fields of socio-economic activity, and labour market is no exception. This necessitates a comprehensive analysis of the impact of digitalization on labour market. It should be noted that in conditions of the economy digitalization, firstly, the tendency of increase in the number of specialists in the field of information and communication technologies. Secondly, as a result of the digitalization process, new working places are emerging in various types of economic activity, but mainly and primarily in the service sector, including employed through online platforms, with a reduction in employment in real economy. This process changes the nature of relationships and interactions between workers, workers and employers, as the digitalization process brings the greater flexibility, transparency and changes to the traditional regime the organization of labour, the consolidation of efforts by practically all participants in social and labour relations and, as a result, the application of *new tools the management and legal regulation*. Consequently, the impact of economic digitalization on the development of national labour market is an actual problem. Given its importance, evaluating quantitative and qualitative changes in labour market, as well as the presence and assessment the impact of specialists (qualified labour force) on GDP is necessary in conditions of the digital economy for elaboration and implementation of social and economic policies to ensure the country's sustainable development and the formation of a competitive labour market in domestic and foreign markets.

This article presents the results of a research on the transformation of labour force market in conditions of digitalization in the Republic of Moldova. In particular, it assesses the structure of labour force by educational level, its losses due to labour migration, labour force reproduction by education, and the relationship between GDP and labour force education. The research is based on statistical data on the number of economically active and employed population, the structure of labour force by educational level, the training of young specialists, GDP dynamics and labour migration.

2. PURPOSE AND RESEARCH METHOD

The *principal purpose* is to analyze the situation on labour market in conditions the process of the economy digitalization in the Republic of Moldova, including identifying the specific features and problems, as well as the challenges of digitalization for the development of a competitive labour market at the domestic and international levels. The process of the digitalization has resulted in change in the quantitative and qualitative characteristics of labour force market, industrial relations between workers and employers, forms of employment,

management organization, as well as the necessity to perfect legal norms regulating employment in the new conditions of economic activity. Based on the analysis, the main fields and problems faced by labour market in conditions of the digitalization process were identified, and a number of recommendations was elaborated to improve the effectiveness of policies for stabilizing and developing labour market in the new conditions of the transition to a digital economy in the Republic of Moldova.

The established purpose was achieved through the realization of the following objectives:

Analysis of tendency the exchange in number of labour force, including by gender and regional aspect.

Assessment of changes in the quality of labour force, including by education level, under the influence of migration processes.

Analysis of labour force reproduction, including through the training and involvement of youth in labour market.

Assessment of the impact of the education level of labour force on GDP based on regression analysis, including the elaboration of a conformed model.

Development of recommendations and measures to improve the effectiveness of labour market development policies in conditions of digitalization and related changes in socio-economic activity.

To achieve the objectives, complex and systematic approaches were used, as well as scientific methods such as quantitative, qualitative and comparative analysis, synthesis, graphical and econometric (regression model construction), and calculations of secondary and tertiary indicators by the authors.

The research uses official statistical data from the National Bureau of Statistics of the Republic of Moldova, research materials from scientific and non-governmental organizations, and indicators calculated by the authors. All indicators used are calculated based on the population with usually residence, which characterizes the place where a person has lived predominantly during the last 12 months, independently of temporary absences (for recreation, leave, visiting relatives and friends, business, medical treatment, religious pilgrimages, etc.).

The assessment of the relationship between employed population and GDP was carried out using the following stages:

- collection and processing of statistical information (National Bureau of Statistics of the Republic of Moldova, www.statistica.md). In order to eliminate the impact of the consumer price index (inflation) and ensure the comparability of GDP value indicators, the annual indicators were deflated (using 2014 as the base year);
- analysis of the structure of employed population by level of education, assessment of the relationship between the growth of the physical GDP index and employed population by level of education;
- building construction an econometric model for quantitative assessment of the relationship between GDP and variables (employed population by level of education) based on pairwise correlation coefficients, calculation and selection of the form of the regression model (equations). Gross Domestic Product (GDP) was taken as the dependent variable (Y_t) in the model, and the number of employed population by level of education was used as factors (X_n) or variables;
- assessment of model parameters, including the reliability of the results obtained using the coefficient of determination and autocorrelation of residuals based on Durbin-Watson statistics, determination of the average error of approximation of the regression model;
- recommendations for the application of the regression model in practical activities.

3. PRINCIPAL RESULTS OF RESEARCH

One of the important tendencies in socio-economic development in the Republic of Moldova is the process of digitalization of various spheres of society, which is directed at increasing economic indicators, simplification the relationship between people and society, and improving the quality of life. In this article, the *digital economy* is defined as the creation, implementation, dissemination and using of digital technologies, including related products and services in the economy and social sphere. As a consequence of the above-mentioned process, many professions will cease to exist in labour market, but new ones will emerge that will require principally different skills, retraining and *professional development* (increase qualification), i.e. the demand in labour market will shift towards specialists who use digital technologies (data analysts, social media specialists, software developers, innovation managers, training and development specialists, and so on). Consequently, a transformation in demand is taking place in labour market force – the requirement for professions involving standard repetitive operations is decreasing and the demand for professions requiring flexibility, adaptability, competence, emotional intelligence, or the ability to analyse both one's own feelings and those of others and the environment in order to build relations based on mutual understanding or mutual support. Given the new conditions of economic activity in the digital economy, employers provide in their resumes of future worker to have special digital skills, including adaptability and the ability to work in conditions of uncertainty, solve the tasks "under key", systemic thinking, knowledge of the basics of cybersecurity, and the ability to continuous learning, including the use of various forms of *professional development*. At the same time, a negative factor in the digital transformation of labour market force is the imbalance in the digitization of various sectors, including the lack of skills necessary to work in the changed conditions, the lack of technologies to perform their duties in conditions of the digital economy, and employers' the lack and unpreparedness of working places for "digital" workers.

In the Republic of Moldova, the process of digitalization of the economy oriented towards:

- the small and medium-sized business sphere (web development services, implementation of new information technologies and business social networks), with the possibility to use of innovative potential and provide access to domestic and foreign markets (with financial support from the governments of Germany and Switzerland, implementing partners - COR Association, Startup Moldova Program, developed by the Tekwill project, with support from USAID, Sweden and the United Kingdom);

- provision of public services, including e-government and platforms of the e-Governance Agency Moldova (AGE[5]), which has been developing the MConnect platform since 2021 (united approximately 20 government systems into a single data exchange network, served more than 10 million civil requests annually);

- the MPay state payment platform, electronic payments (multi-channel and transparent payments based on cards, internet banking, cash), connected to more than 500 state and municipal recipients, since 2024 used for paying salaries in the budget sector and social benefits.

The EU and USAID provide the pilot "Smart" communities in 15 rural communities financially to improve access to the internet, digital platforms of business and education. In order to effectively ensure of digital transformation at the local level, Unified Public Service

[5] AGE - Agenția de Guvernare Electronică.

Centres (UPSCs), the e-LPA portal for local public authorities and other digital systems for providing services to the population in digital format were established in all regions of the country.

e-Governance Agency Moldova (AGE) is developing a system for analysing citizen appeals, forecasting tax revenues and detecting corruption risks - AI modules in state administration and the e-court system "E-File", which will cover all courts in the country from 2026;

-the social sphere (health, including electronic patient cards, educational platforms, and other services).

One of the most important components of the digitalization process in the small and medium-sized enterprise (hereinafter referred to as SME) sector is the potential of qualified labour force. The given circumstance is also related to the specific nature of the above-mentioned sector, as the economic activity of SMEs should be mobile, able to quickly respond and adapt to changing conditions of demand for goods and services, and flexible in transforming production relations in a market economy. Table 1. reflects the structure of economic agents, including the share of SMEs.

Table 1. Characteristics of economic agents by size, number of employed population and revenue from economic activity

	2021	**2022**	**2023**	**2024**
Number of enterprises, RM -total	60 305	62 608	63 778	68 725
Average annual number of employed workers, persons	532 454	529 281	539 032	543 085
Sales revenue, mln MDL	488 014.15	612 042.63	636 124.72	668 594.97
Large enterprises				
Number of enterprises	547	497	512	531
Average annual number of employed workers, persons	190 353	182 013	186 961	187 133
Sales revenue, mln MDL	262 990,88	337 271,98	350 185,84	360 627,04
Small and medium enterprises - total				
Number of enterprises	59 758	62 111	63 266	68 194
Share of total number, %	99,1	99,2	99,2	99,2
Average annual number of employed workers, persons	342 101	347 268	352 071	355 952
Share of total number, %	64,2	65,6	65,3	65,5
Sales revenue, mln MDL	225 023,28	274 770,65	285 938,88	307 967,93
Share of sales revenue, %	46,1	44,9	45,0	46,1
including:				
-medium enterprises				
Number of enterprises	1 293	1 192	1 222	1 225
Average annual number of employed workers, persons	110 932	106 978	108 480	104 660
Sales revenue, mln MDL	69 722,08	76 390,93	82 513,58	90 602,71
-small enterprises				
Number of enterprises	6 611	5 994	6 132	6 327
Average annual number of employed workers, persons	123 684	120 049	122 345	124 754
Sales revenue, mln MDL	93 565,89	109 027,37	112 349,56	118 191,83
-micro enterprises				

	2021	2022	2023	2024
Number of enterprises	51 854	54 925	55 912	60 642
Average annual number of employed workers, persons	107 485	120 241	121 246	126 538
Sales revenue, mln MDL	61 735,30	89 352,36	91 075,74	99 173,39
Note: a) micro-enterprise – an enterprise with no more than 9 workers, an annual turnover of up to 18 million MDL or total assets of up to 18 million MDL; b) small enterprise – an enterprise with no more than 49 workers, an annual turnover of up to 50 million MDL or total assets of up to 50 million MDL, and which is not a microenterprise; c) medium-sized enterprise – an enterprise with no more than 249 employees, an annual turnover of up to 100 million MDL or total assets of up to 100 million MDL, and which is not a micro or small enterprise.				

Source: NBS, www.statistica.md

An analysis of economic agents allowed the fact, that small and medium-sized enterprises constituted 99.2% and the share of employed population is 65.5%. Over period 2021-2024, the number of enterprises increased by 14.1% with growth of employed by 4.1%. At the same time, it should be noted that the increase in the above-mentioned indicators was achieved due to the growth of micro-enterprises, the number of which increased by 16.9%, and the number of employed by 17.7%. In 2024, micro-enterprises constituted 88.9% of total number of small and medium-sized enterprises, 35.5% of employed and 32.2% of revenue. For a more complete interpretation of the specifics of the economic activity of small and medium-sized businesses, an analysis of employed population by type of economic activity and form of property was carried out (Table 2.).

Table 2. Characteristics of employed population by form of property and type of economic activity, 2024 in small and medium-sized enterprises (SMEs**)**

Types of economic activity	Average annual number of employed, SMEs, thousand persons	including employed in enterprises:		
		medium	small	micro
Total employed in small and medium-sized enterprises, thousand persons	**356.0**	**104.7**	**124.8**	**126.5**
Agriculture, forestry, and fisheries	35.5	9.9	14.9	10.7
Processing industry	47.3	20.3	17.2	9.9
Production and supply of electricity, heat, gas, hot water, and air conditioning systems	1.8	1.1	0.2	0.5
Water supply; sewerage, waste disposal, decontamination	6.4	3.4	1.7	1.4
Construction	25.8	6.7	10.2	8.9
Wholesale and retail trade; maintenance and repair of automobiles and motorcycles	86.4	15.1	28.9	42.4
Transportation and storage	26.4	5.7	11.6	9.1
Гостиничное хозяйство и общественное питание	17.7	4.1	7.7	5.9
Information and communication services (communications)	21.2	6.6	7.6	6.9
Real estate transactions	12.7	1.9	4.4	6.4

Professional, scientific, and technical activities	14.5	1.7	3.9	8.9
Other activities	60.2	28.3	16.4	15.5
Total, SMEs by form of property, thousand persons	**356.0**	**104.7**	**124.8**	**126.5**
- state property	39.1	28.1	9.2	1.8
- private property	281.9	57.8	104.9	119.2
- mixed property (state and private) without foreign companies	2.0	1.9	0.1	0.0
- foreign property	23.1	12.5	6.8	3.8
- property of mixed-type enterprises (with foreign capital participation)	9.9	4.4	3.7	1.8
Results of financial activity, SMEs by form of property, million MDL (profit+, losses -)	**30 868.3**	**7 140.5**	**10 738.3**	**12 989.4**
- state property	-63.3	17.3	-33.4	-47.2
- private property	27 874.5	6 056.6	9 786.1	12 031.8
- mixed property (state and private) without foreign companies	5.2	-18.4	3.3	20.3
- foreign property	1 955.0	581.4	660.8	712.8
- property of mixed-type enterprises (with foreign capital participation)	1 096.9	503.6	321.5	271.7

Source: [NBS, 2024]

An analysis of the data in Table 2. allow to identify that 79.2% of employed population in the small and medium-sized business works in privately owned SMEs (of which micro-enterprises account for 42.3% and small enterprises for 37.2%), 6.5% are employed in foreign-owned enterprises, and 11% are employed in state-owned SMEs. The largest number of SME employed work in wholesale and retail trade, maintenance and repair of motor vehicles and motorcycles (24.3%), other types of activities (16.9%), manufacturing (13.3%), agriculture, forestry, and fisheries (10%), transport and warehousing (7.4%) and construction (7.2%), while the smallest number of employed are in information and communication services (6.3%) and professional, scientific and technical activities (4.1%). Based on the results of financial activities, it should be noted that the state-owned SME sector was unprofitable in 2024, especially small and micro-enterprises, as well as medium-sized businesses based on mixed property, state and private.

Analyzing the situation on labour market and its adaptation for activity in conditions the digitalization of economy, special attention should be directed to the stability of economic agents that demonstrated the preservation of the basic potential of labour force and the possibility of growth the qualifications of workers (training, retraining, etc.). For realization this task, can use data from a statistical study for the period 2019-2023, which covered 41.800 active s, or 75.5% of total number of enterprises, among which the main share, or 39.0%, was accounted for by enterprises in the wholesale and retail trade sector. In 2023, 2.300 enterprises were created, which is 50.9% less than in 2022, *enterprise creation rate* constituted 5.5%. At the same time, the number of enterprises stopped them activities in 2023 amounted to 4.1 thousand, which was the highest in the last three years, with *enterprise liquidation rate* amounting to 9.8%. Table 3. presents data on the process of enterprise creation and liquidation depending on the number of employed [NBS, 2025].

Table 3. Characteristics of created and liquidated enterprises depending on the number of workers[6]

	Number of created enterprises				Number of liquidated enterprises			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Total	**4179**	**4493**	**4548**	**2314**	**2882**	**3092**	**1758**	**4094**
0-4 workers	3676	4007	4149	1883	2642	2902	1584	3884
5-9 workers	351	319	277	314	164	131	112	125
10 and more workers	152	167	122	117	76	59	62	85
Demographics of enterprises by region, 2023								
	Number of active enterprises, units		Active enterprise rate, %		Enterprise creation rate, %		Enterprise liquidation rate, %	
Total, RM	**41802**		**75.5**		**5.5**		**9.8**	
mun. Chisinau	26358		72.9		5.0		10.0	
Northern region	5306		82.1		7.0		8.9	
Central region	6606		76.9		5.8		9.7	
Southern region	2242		83.4		6.9		8.0	
ATU Gagauzia	1290		84.5		6.2		12.3	

Source: [NBS, 2025]

According to statistical data, in 2023, micro-enterprises with 0–4 workers accounted for the largest share of active enterprises, or 68.6% of the total number of active enterprises. This category of enterprises also accounts for 81.4% of total created enterprises, while the smallest number of created enterprises are in the category "10 and more employees", or 5.1% of total number of created enterprises in 2023. At the same time, it should be noted that in 2023, the largest number of liquidated enterprises was also in the category of micro-enterprises with 0–4 workers, or the share of closed enterprises with 0–4 workers was 94.9% of total number of liquidated (closed) enterprises. In second place were enterprises with 5 to 9 workers, or 3.1%, and in third place were enterprises with 10 and more workers, or 2.1%. In the regional aspect, in 2023, the number of active enterprises by their share in total number of active enterprises on a descending scale is located as follows: in 2023, the number of active enterprises

[6] *Active enterprises* is enterprises that reported turnover and/or had one or more workers during the reporting period. *Active enterprise rate* reflects the total number of active enterprises in relation to the total number of enterprises that submitted reports.
Enterprises Creation rate is the ratio the number of created enterprises to the number of active enterprises in the reporting year.
Enterprises stopped activities are enterprises that stopped their activities in the reporting year and did not restart them within two years after the reporting year. Enterprises stopped activities do not include enterprises stopped them activities as a result of mergers, divisions and restructuring.
Enterprises liquidation rate reflects the number of liquidated enterprises in relation to the number of active enterprises in the reporting year.

by region of development was distributed as follows: mun. Chisinau - 63.1%, Central region - 15.8%, Northern region – 12.7%, Southern region – 5.4% and ATU Gagauzia – 3.1%. At the same time, the analysis of enterprise activity reflects the following tendencies for 2023:
mun. Chisinau, the enterprise creation rate was 5.0% and the enterprise liquidation (closure) rate constituted 10.0%;
Northern region, the enterprise creation rate was 7.0% and the rate of liquidation (closure) was 8.9%;
Central region, the enterprise creation rate was 5.8% and the enterprise liquidation (closure) rate constituted 9.7%;
Southern region, the enterprise creation rate was 6.9% and the enterprise liquidation (closure) rate constituted 8.0%;
ATU Gagauzia, the enterprise creation rate was 6.2% and the enterprise liquidation (closure) rate constituted 12.3%.

Consequently, the above-mentioned analysis leads to the conclusion that there is instability in the socio-economic infrastructure and, consequently, about the existence of corresponding changes in the structure, imbalance and qualifications of labour force market with a high level of rotation of economic agents in the small and medium-sized business. In the given context, it is difficult to retain qualified workers and to provide their training and increase the level of professional training, retraining for work in the digital economy.

Table 4. reflects the structure of employed population by education level in the Republic of Moldova.

Table 4. Characteristics of employed population by education level and type of occupation,
2020-2024, thousand persons

	2020	**2021**	**2022**	**2023**	**2024**
Employed population, total	**834.2**	**843.4**	**862.3**	**886.9**	**853.9**
Higher	236.1	235.4	244.0	245.2	260.0
Technical specialists without a higher education (Secondary specialised education)	119.1	119.2	120.9	126.7	119.8
Secondary professional and technical education	188.5	191.3	199.2	200.7	182.9
Lyceum, general secondary education	146.5	139.6	138.1	139.4	126.0
Gymnasium	142.0	155.9	158.2	171.9	161.8
Primary or without education	2.0	2.0	1.8	3.0	3.3
Characteristics of employed population by type of occupation, %					
Total by economy, % Всего по экономике	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Legislators, members of the executive branch and other high-ranking officials	7.2	7.6	8.3	7.6	8.3
Specialists in various spheres of activity	17.5	16.7	15.9	16.2	17.9
Technicians and other specialists of mid-level qualification	6.4	7.1	7.2	7.0	7.4
Administrative officials	3.1	3.1	3.5	3.1	3.4
Workers in trade and services	13.8	14.2	14.2	15.0	15.2

	2020	2021	2022	2023	2024
Qualified workers in agriculture, forestry, aquaculture, fisheries and fishing	13.7	13.6	13.4	13.2	11.5
Qualified and assimilated (equivalent) workers	15.1	15.1	14.8	13.9	13.6
Other professions	23.2	22.6	22.7	24.0	22.7
Of which: unqualified workers	61.0	59.5	61.0	62.2	62.8

Source: elaborated on the base of NBS, www.statistica.md and authors' calculations

Analysis of data on the quality of employed population in labour market allowed to identify the following tendencies for the period 2020-2024: growth of 10.2% in the number of labour force with higher education with a slight increase in 2022-2023, while maintaining over a five-year period the potential for employed technical specialists without higher education, as well as a 13.9% increase in 2024 in employed population with gymnasium. At the same time, with a 6.5% increase in the number of labour force with secondary professional and technical education in 2020-2023, the given category of workers decreased by 8.9% in 2024 only one year. It should also be noted that analogous tendency about the total employed population, which increased by 6.3% between 2020 and 2023, but decreased by 3.7% in 2024 compared to 2023. An analysis of labour force by occupation showed that during 2020-2024 years, that share of workers in trade and services, technicians and other specialists of mid-level qualification increased respectively by 1.4 p.p. and 1.1 p.p. in the share of legislators, members of the executive branch and other high-ranking officials. At the same time, there was a clearly defined downward tendency in share of qualified workers employed in agriculture, forestry, aquaculture, fisheries and fishing (by 2.2 p.p.) and qualified and assimilated (equivalent) workers (by 1.5 p.p.). The education level of employed population by type of occupation in 2024 is shown in Table 5.

Table 5. Characteristics the education level of employed population by type of occupation, type of economic activity and professional status, 2024

a) type of occupation, thousand persons

Share of employed population by type of occupation, % of the total employed in this activity	**Total**	Higher	Technical specialists without higher education	Secondary professional and technical education	Lyceum, general secondary education	Gymna-sium	Primary or without education
Total, RM, thousand persons	**853.9**	**260.0**	**119.8**	**182.9**	**126.0**	**161.8**	**3.3**
% of total	**100.0**	**30.4**	**14.0**	**21.4**	**14.8**	**18.9**	**0.5**
Legislators, members of the executive branch and other high-ranking officials	100.0	80.0	9.4	5.8	3.1	1.7	-
Specialists in various spheres of activity	100.0	91.1	7.5	0.3	1.0	0.1	-
Technicians and other specialists of mid-level qualification	100.0	30.0	57.8	4.9	6.8	0.5	-

Administrative officials	100.0	30.8	20.2	18.8	18.5	11.7	-
Workers in trade and services	100.0	12.6	13.9	29.6	23.7	20.0	0.2
Qualified workers in agriculture, forestry, aquaculture, fisheries and fishing	100.0	5.8	9.9	20.4	25.0	37.8	1.1
Qualified and assimilated (equivalent) workers	100.0	6.1	10.8	40.6	16.0	26.2	0.3
Other professions	100.0	3.6	9.8	33.1	20.0	32.6	0.9
Of which: unqualified workers	100.0	2.6	9.2	23.3	21.1	42.4	1.4

Source: elaborated on the base of NBS, www.statistica.md

According to the analysis, in 2024, employed population with higher education constituted 30.4% of the total labour force, mainly in the categories of legislators, members of the executive branch and other high-ranking officials (80.0%) and specialists in various spheres of activity (91.1%), and also decrease in the categories of technicians and other specialists of mid-level qualification (30.0%) and administrative officials (30.8%). Employed population with secondary professional and technical education is the main potential in the category of qualified and assimilated (equivalent) workers (40.6%), workers in other professions (33.1%), in trade and services (29.6%) and accounted for 24% of employed population. It should also be noted that in the category of working technicians and other specialists of mid-level qualification, the majority of those employed are technical specialists without higher education (57.8%). In trade and services, employed labour force with higher education accounts for only 12.6%, technical specialists without higher education – 13.9% and those with secondary professional and technical education – 29.6%. Consequently, an analysis of employed population by type of activity suggests that the level of labour force training does not respond the modern requirements of the digitalization of the economy. Section (b) presents an analysis of employed population by education level in the aspect of types of economic activity.

b) by type of economic activity and professional status

Types of economic activity, Education rate, % of Total employed population in a given type of economic activity	**Total**	Higher	Technical specialists without higher education	Secondary professional and technical education	Lyceum, general secondary education	Gymna-sium	Primary or without education
Total, RM	100.0	30.4	14.0	21.4	14.8	18.9	0.5
Agriculture, forestry and fisheries	100.0	7.1	9.3	21.5	22.0	38.6	1.5
Industry	100.0	16.7	13.8	33.0	15.2	21.1	0.2
Construction	100.0	15.2	7.7	32.6	13.5	30.7	0.3
Wholesale and retail trade, hotels, catering	100.0	26.6	17.2	25.9	16.3	14.0	-
Transport and storage, information and communications	100.0	49.6	11.2	19.4	11.1	8.7	-
Public administration, education, health and social protection	100.0	48.1	19.3	12.1	10.3	10.0	0.2
Other activities	100.0	49.4	11.4	14.5	13.5	11.0	0.2

By status of economic professional activity							
Total, RM	100.0	30.4	14.0	21.4	14.8	18.9	0.5
Hired workers	100.0	35.5	15.0	20.8	13.1	15.5	0.1
Working for their own account - self-employed workers	100.0	9.1	9.4	26.5	21.1	33.1	0.8
Unpaid family workers	100.0	6.9	9.5	16.0	25.2	38.4	4.0
Employers, members of cooperatives	100.0	20.8	41.8	20.8	8.3	8.3	-

Source: elaborated on the base of NBS, www.statistica.md and authors' calculations

The smallest share of employed population with higher education is in agriculture, forestry and fisheries (7.7%), followed by construction (15.2%) and industry (16.7%), while in wholesale and retail trade, hotels and catering this indicator is higher at 26.6%. The highest share of employed persons with higher education is in transport and warehousing, information and communications (49.6% or almost 50% of employed persons), in public administration, education, health and social protection (48.1%) and in other activities (49.4%). The largest share of employed population with secondary professional and technical education is concentrated in industry (33.0%), construction (32.8%), wholesale and retail trade, hotels and catering (25.9%), agriculture, forestry and fisheries (21.5%), and in this type of economic activity, a significant proportion of those employed are graduates of lyceums, gymnasiums, with general secondary education and with primary or even without education – 62.1%. When analysing the status of employed population, it should also be noted that the largest share of employed population with higher education belongs to hired workers (35.5%), those with secondary professional and technical education (20.8%) and technical specialists without higher education (15.0%), who constitute a total - 71.3% of employed population. For the self-employed population, which in fact represents part of the business environment, but low levels of education are one of the reasons for rotation – from creation to liquidation and unprofitability due to insufficient literacy (deficiencies in knowledge) and qualifications of workers.

One of the factors contributing to the decline in the quality of labour force and the imbalance in its professional composition of labour force is labour migration. The structure of labour migrants by education level presents in Table 6.

Table 6. Structure of labour migrants by education level

Education level	Total, thousand persons					Share in the total number of labour migrants, %				
	2020	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
Total, RM	**151.1**	**129.0**	**126.0**	**99.8**	**111.8**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Higher	18.3	16.1	16.6	17.8	16.1	12.1	12.5	13.2	17.9	14.4
Secondary specialised education	20.8	18.2	17.4	14.3	12.5	13.8	14.1	13.8	14.3	11.2
Professional education	41.1	36.0	31.9	25.7	33.4	27.2	27.9	25.3	25.8	29.9
Lyceum, general secondary education	30.7	26.2	26.9	17.2	19.1	20.3	20.3	21.3	17.2	17.1
Gymnasium	39.3	31.0	32.0	24.5	30.4	26.0	24.0	25.4	24.6	27.2
Primary or without school education	1.0	1.4	1.2	0.4	0.3	0.6	1.2	1.0	0.2	0.2

Source: elaborated on the base of NBS, www.statistica.md and authors' calculations

An analysis of labour migration data for the period 2020-2024 allow the clear downward tendency in the number of labour migrants in the first three years, including decrease by 23.0% in 2023 compared to 2020, and an increase in 2024 compared to 2023 by 12.0%. However, considering labour migrants by education level, it can be noted a tendency of increase in the share of migrants with higher education (by 5.8 p.p.) in the period 2020-2023 and a decrease in this category of migrants in 2024 compared to 2023 by 3.5 p.p., as well as a tendency of maintaining the highest share of migrants with professional education (29.9%) in 2024. One of the main reasons for the existence of labour migration flow to work outside the country is the lack of stability in socio-economic development and the availability of future prospects in this area: economic crisis, inflation, low wages and a deterioration in living standards.

The analysis of the quality of labour market allowed, that adequate knowledge and professional training are necessary to work in the digital economy. Currently, labour force participation in continuing professional education programs is insufficient, as is evident from the data reflected in Table 7.

Table 7. Participation rate in continuous professional training (CPT) programs by type of economic activity

	Total participation rate in professional development programs, %					Participation rate in professional development programs				
	2020	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
Total, types of economic activity	**16.1**	**18.1**	**19.7**	**20.8**	**21.6**	**24.4**	**26.7**	**28.3**	**29.6**	**30.2**
Agriculture, forestry and fisheries	2.0	5.6	5.9	4.5	6.4	7.9	19.2	17.8	13.1	14.6
Industry	15.9	15.2	17.0	18.8	18.1	23.4	22.4	24.5	26.3	24.8
Construction	9.2	9.9	11.5	10.9	13.3	14.5	15.1	18.4	17.2	20.1
Wholesale and retail trade; maintenance and repair of motor vehicles and motorcycles	12.3	12.1	16.0	17.3	19.7	21.7	21.7	26.0	28.2	31.2
Transport and storage	13.3	14.1	12.7	16.2	13.4	20.4	22.9	20.5	25.6	22.2
Hotels and catering	3.7	6.2	7.6	7.0	10.3	14.1	14.5	16.8	15.5	21.3
Information and communications	29.7	26.4	37.5	38.0	36.8	44.4	38.1	54.3	54.9	56.7
Professional, scientific and technical activities	9.2	12.3	12.7	17.8	19.7	16.8	20.7	22.8	28.5	29.6
Public administration and defence; mandatory social insurance	35.4	41.5	43.3	41.7	47.1	45.4	51.4	50.9	49.0	56.5
Education	13.2	15.5	15.4	16.5	15.4	17.9	19.2	19.1	20.3	18.9
Health and social assistance	17.0	22.0	24.0	21.5	23.2	19.3	24.5	27.1	24.5	24.9
Other activities	13.9	21.3	23.4	23.2	21.6	30.9	43.6	41.2	44.0	42.3

Total participation rate in professional development programs reflects the share of participants in all types of professional development programs among all workers of all surveyed units.
Participation rate in professional development programs reflects the share of participants in all types of professional development programs among all workers of units offering such programs.

Source: elaborated on the base of NBS, www.statistica.md

Total participation rate in professional development programs, as well as the participation rate in professional development programs during 2020-2024, both in the country as a whole and by economic activity, had clearly defined upward tendency. However, the coverage of workers by professional development programs remains low, especially in agriculture, forestry, fisheries, industry, construction, transport and storage, catering, education, and health, i.e. those fields which, by their nature of activity, are directly related to the consumer and, in this context, should be interested in the digitalization of routine processes and the implementation of new technologies and working places based on information technology, software, information and digital platforms, and computer equipment. At the same time, total participation rate in all types of professional development programs in 2024 reached in the country 21.6%, and by type of economic activity is ranging in limits from a minimum of 6.4% (agriculture, forestry and fisheries) to a maximum of 47.1% (public administration and defence; mandatory social insurance).

While the participation rate in workers' professional development programs, under the programs of the economic agents for they work, is somewhat higher and for the country as a whole - 30.2%, and therein the share of labour force receiving professional development is in the range from 14.6% (agriculture, forestry, fisheries) to 56.7% (information and communications) and 56.5% (public administration and defence; mandatory social insurance), including below the national average indicator in industry (24.8%), construction (20.1%), transport and storage (22.2%), hotels and catering (21.3%), education (18.9%), health and social assistance (24.9%). Table 8 shows the indicators of continuous professional training of labour force, for a category of hired workers. The quantitative assessment of the data revealed, that the number of workers participating in all forms of training for the period 2020-2024 had the growth tendency, including in 2024 compared to 2020, the increase in the number of labour force, who completed at least one professional development program was 30.9%, those who completed professional development courses was 27.7%, and those who completed other forms of training was 52.6%, or 1.5 times.

The average duration of training is short-term, for example, courses, 45 hours per worker, and in the case of other forms, only 17 hours per worker, and has varied within this volume over the last three years, and the latter also applies to the number of economic agents providing programs and courses of continuous professional education.

Table 8. Number of hired workers participating in continuous professional training (CPT), (persons)

	2020	**2021**	**2022**	**2023**	**2024**
Hired workers, completed at least one type of training under the professional development program (courses and/or other forms)	102 745	114 468	123 441	129 269	134 497
Hired workers, completed professional development courses	77 944	89 732	88 966	93 675	99 520
Hired workers, completed other forms of training for professional development program	30 047	34 714	45 012	48 094	45 859
Average duration of continuous professional training (CPT), hours per person					
Average duration of CPT	41.0	45.0	44.0	45.0	45.0
Average duration of CPT courses	48.0	52.0	53.0	55.0	53.0

Average duration of other forms of CPT	150	14.0	15.0	13.0	17.0
Share of units providing continuous professional training (CPT), % of total units participating in the survey					
Share of economic agents providing CPT programs (courses and other forms)	36.8	40.1	41.9	41.7	42.2
Share of economic agents providing CPT courses	33.8	36.7	37.4	37.6	37.3
Share of economic agents providing other forms of CPT	7.0	7.5	9.6	9.5	10.5
Economic agents' expenditure on continuous professional education (CPE)					
- Total cost, thousand MDL	114 189.8	132 602.6	175 946.8	240 857.5	264 709.8
- average per hired worker, MDL	1 111.4	1 158.4	1 425.4	1 863.2	1 968.1
- % of the previous year	69.9*	104.2	123.0	130.7	105.6

Note: The data covers economic and social legal entities and budgetary organizations with 10 or more hired workers.

*In 2019, the average cost per hired worker was 1,591.1 MDL.

Source: elaborated on the base of NBS, www.statistica.md

It is important to note that during the analyzed period, the growth in the expenditure of economic agents for the continuing professional education of workers in 2024 compared to 2020 by 2.3 times, while the average expenditure per hired worker for this period increased by 1.8 times, and only starting from 2022 (in 2022, this indicator increased by 23.0% compared to the previous year, and in 2023, compared to 2022, by 30.7%). On average, in the structure of annual expenditure of economic agents for professional training and continuous professional formation of labour force, according to [NBS, section Labour costs], constitutes insignificant value and fluctuates on average in the structure of total expenditure for the period 2020-2024 within the range of 0.0% in the agriculture and forestry sectors, fisheries to 0.4% in the fields of health and social assistance, scientific and technical activities, transport and storage, and in the financial and insurance sectors, where it was highest, including 0.9% in 2023 and 0.8% in 2024. On average (across the country), this indicator remains unchanged during 2021-2024 at 0.2% of total expenditure structure, including a similar situation in construction (0.1%), public administration and defence, mandatory social insurance, education, arts, recreation and leisure (0.1% in 2020-2023 and 0.2% in 2024).

The quality of labour force market also impacts on economic growth, including the principal macroeconomic indicator – *Gross Domestic Product* (GDP). It is necessary to note, that the use of econometric methods, specifically regression models, enables to analyze the quantitative impact of labor force market quality and assess the effect of education level of labor force on GDP.

- **Assessing the impact of labour force quality on GDP**

The quality of labour force market also affects economic growth, including the principal macroeconomic indicator – *Gross Domestic Product* (GDP). The econometric method, in particular the construction of regression models, can be used to analyse the quantitative impact of labour force market quality and assess the effect of the education level of labour force on changes in GDP.

Considering the above- mentioned, an econometric method, including the development of regression models, was used in order to more fully analyse the impact of labour force's quality factor on the main macroeconomic result indicator, or GDP, in conditions of the development and implementation of the digital economy. This approach takes into account the advantages such as the ability to quantitatively assess the impact of each factor characterizing the quality of labour force by educational level on GDP growth. Moreover, the regression model allows to forecasts changes in GDP depending on changes in the structure of labour force by educational level, identify imbalances (shortages) of labour force with a certain level of professional training, and obtain an assessment the degree to which economic agents are interested in improving the qualifications and training of their hired workers in order to retain staff, as well as redistributing or changing the functions of the already formed potential of workers in connection with the implementation of digitalization of economic activity.

Gross Domestic Product (GDP) as the main indicator reflecting the result of activity the labour force market, its quality and level of professional training, connects with economic growth (Y_t). GDP was calculated in 2014 prices for exclusion the influence of the price factor and possibility of comparison of this indicator over the period 2014-2024. To quantitatively assess the impact of labour market on economic development or GDP growth/decline, the number of employed population in labour market by level of education (with higher education, with secondary specialised education, with professional education and without professional education, including lyceum, gymnasium and primary school) was taken as factors.

As a result of calculations and analysis of the obtained model parameters and their compliance with accepted standards and criteria, a linear regression model was developed that characterises the impact of labour market quality on GDP and has the following interpretation (Model 1)[7]:

$$Y_t = 75982.293 + 623.139X_{1t} - 1601.400X_{2t} + 197.650X_{3t} + 269.647X_{4t} + \mathcal{E}_t, \qquad (1)$$

where:

Y_t - GDP, in 2014 prices, million MDL;

X_{1t} - number of employed population with higher education, thousand persons;

X_{2t} - number of employed population with secondary specialised education, thousand persons;

X_{3t} - number of employed population with professional education, thousand persons;

X_{4t} - number of employed population without professional education (lyceum, gymnasium, without education), thousand persons;

ε_t - sampling error for unaccounted factors;

t - year of observation.

Regression Model 1. shows that during the analyzed period (20214-2024), GDP growth was mainly influenced by employed population with higher education: while in 2014-2018 the share of employed workers averaged 26-27%, in 2019-2024 its share increased from 27.9% in 2019 to 30.4% in 2024 (by 2.5 p.p.). At the same time, the decline in the number of workers with professional and technical education had a negative impact on GDP throughout the analyzed period (2014-2024): while in 2014 the share of this category of employed population was 23.6%, in 2024 it was 21.4% (or 2.2 p.p.), which is associated with the factor of labour

[7] The linear regression Model of GDP-employment was calculated by the authors using the SPSS computer program for statistical data processing.

migration (among labour migrants, the share of the population with professional education is predominant; in 2014-2018, it increased by 2.1 p.p. and amounted to 38.3% at the end of the period, in 2019-2024, it tended to decline due to the crisis situation caused by the Covid-19 pandemic, but by 2024, migrant flows increased and amounted to 33.4% in 2024. The outflow of skilled labour had a negative impact on GDP. According to the regression model, the other categories of the employed population with secondary specialised education and without professional education have a positive impact on GDP.

The econometric model has a coefficient of determination (R^2=0.556). The Durbin-Watson statistic ($1.5 \leq DW \leq 2.5$) falls within the acceptable interval, indicating the absence of autocorrelation of residuals and the influence of previous observations on subsequent ones. The average approximation error ($\overline{A}$ < 10 %) also confirms the existence of a relationship between GDP and the factor of the number of employed persons by level of education. However, Fisher's criterion does not confirm the influence of factor variation on the outcome sign. The quality characteristics of the model parameters are presented in Table 9.

Table 9. **Criteria for assessments the quality of regression models**
(Comparative characterisation of the quality of regression models)

Indicators		**Characteristics**
		Model 1.
$\mathbf{Y_t = 75982.293 + 623.139X_{1t} - 1601.400X_{2t} + 197.650X_{3t} + 269.647X_{4t} + \varepsilon_t}$ **(1)**		
Quality indicators of regression coefficients (a, b)		
Standard errors of coefficients (*Std. Error*) or standard deviations of assessments of coefficients *a* and *b*	$s_a, s_{b1}, s_{b2}, s_{b3}, s_{b4}$	s_a = 113426.473 s_{b1} = 265.142 s_{b2} = 1004.388 s_{b3} = 496.866 s_{b4} = 630.403
t statistic (Student's t test)	$\lvert t \rvert > t_{tabl.}$; $t_{tabl.} = t_{1-\alpha;\, n-m-1}$**	$\lvert t \rvert < t_{0,95;6}$ $t_{tabl..} = t_{0,95;6} = 2.4469$[1] t_a= -0.670; t_{b1}= 2.350; t_{b2}= -1.594; t_{b3}= 0.398; t_{b4}= 0.428
Quality indicators of regression model as a whole		
Coefficient of determination (R^2)	$0 \leq R^2 \leq 1$	$\mathbf{R^2=0.556}$
F – Fisher's criterion	F fact. > F tabl., $F_{\alpha;\, k1;k2}$ α=0.05	**F fact. < F (4; 6)** at α=0.05 F fact.=1.879; F tabl.=F(κ₁;κ₂)*=F(4; 6) = **4.53**[2]
Autocorrelation of residuals (Durbin-Watson statistic, *DW*)	If $1.5 \leq DW \leq 2.5$ no autocorrelation of residuals	$\mathbf{1.5 \leq DW \leq 2.5}$[3] DW=2.364
Stage of verification of regression models		
Average approximation error	$\overline{A} < 10$ %	$\overline{A}$ **< 10 %** $\overline{A}$ = 3.8252 %

* *k1= m; k2=n-m-1*,
where *m* is the number of variables in model, *n* is the number of observations in model.
** *1- α*, where, α is the significance level; *n-m-1* is the number of degrees of freedom.

[1] Special table "The values of Student's t criterion at the significance level of 0.10, 0.05, 0.01". Afanasiev V.N., Iuzbashev M.M., Guliaeva T.I. (2006). Econometrics. Moscow: FINANCE and STATISTICS, Appendix 2, p. 251.
[2] Special table "Values of Fα;k1;k2 -Fisher-Snedekor criterion" . Kremer N.S., Putko B.A. (2007). Econometrics. Moscow: UNITI-DANA, Mathematical and Statistical Tables. Table IV., pp. 295-297.
[3] Special table "Values of the Durbin-Watson criterion at the significance level α=0.05" (starts at n equal to 15 observations). Kremer N.S., Putko B.A. (2007). Econometrics. Moscow: UNITI-DANA, p. 298.

Source: authors' calculations

In conditions the transition to a digital economy, the requirements for educational level of labour force are increasing. At the same time, in conditions the decline and imbalance of labour force in labour market, it is particularly important the professional development, acquire skills for working in the new conditions of advanced IT technologies, computerisation of routine processes, and so on. To assess the impact of the factor of increasing the level of professionalism, training and interest of economic agents in maintaining a stable labour force, a regression was elaborated, that characterises the impact of increasing the education level of employed population on changes in GDP (Model 2.).

$$Y_t = 66349.642 + 3935.563_{1t} + 905.410X_{2t} - 16.309X_{3t} + \mathcal{E}_t, \quad (2)$$

where:

Y_t - GDP, in 2014 prices, million MDL;

X_{1t} - overall participation rate in professional development programs, %;

X_{2t} - share of units providing professional and technical training (courses and other forms), % of the total number of enterprises surveyed;

X_{3t} - average expenditure of economic agents on continuing professional training per worker, MDL;

ε_t - sampling error for unaccounted factors;

t - year of observation.

Regression Model 2. reflects the quantitative impact on GDP of factors that reflect, firstly, the share of economic agents interested in improving the professional level of personnel, preserving their potential and the possibility of using them in conditions of the digitalization of economic activity and, secondly, the real possibility of training directly employed workers. Thus, analysis of Model 2 allows to conclude that:

– a 1% increase in the overall participation rate in professional development programs (X_{1t}) increases Gross Domestic Product by 3,935.563 million MDL, in condition that the other factors in the model are fixed;

– a 1% increase in the share of departments providing professional and technical training (courses and other forms) increases GDP by 905.410 million MDL;

- A sharp decrease in the costs of economic agents for continuing professional training per employee on average in 2019-2023 compared to 2014-2018 had a negative impact on GDP (a decrease of one monetary unit would result in a decrease in GDP of 16309 MDL).

The characteristics of the compliance of Model 2. parameters with the criteria for assessing the quality of regression models are presented in Table 10.

An analysis of the Student's t-test of the regression coefficients showed that its are statistically significant (with the exception of factor $\mathbf{t}_{b2}$ - the share of subdivisions providing professional and technical training, including courses and other forms), the coefficient of

determination (R^2=0.874) is quite high. Model 2 is statistically reliable and significant at a 5% error probability, the characteristic of assessment the model quality presented in Table 10.

Table 10. **Criteria for assessments the quality of regression models**
(Comparative characterisation of the quality of regression models)

Indicators		**Characteristics**
		Model 2.
$\mathbf{Y_t = 66349.642 + 3935.563_{1t} + 905.410X_{2t} - 16.309X_{3t} + \varepsilon_t}$, **(2)**		
Quality indicators of regression coefficients (a, b)		
Standard errors of coefficients (*Std. Error*) or standard deviations of assessments of coefficients *a* and *b*	s_a, s_{b1}, s_{b2}, s_{b3}, s_{b4}	s_a = 36050.928 s_{b1} = 791.481 s_{b2} = 1167.768 s_{b3} = 6.651
t statistic (Student's t test)	$\lvert t \rvert > t_{tabl.}$; $t_{tabl.} = t_{1-\alpha;\, n-m-1}$**	$\lvert t \rvert > t_{0,95;7}$ $t_{tabl.} = t_{0,95;7} = 2.3646$[1] t_a= 1.840; t_{b1}= 4.972; t_{b2}= 0.775; t_{b3}= -2.452
Quality indicators of regression model as a whole		
Coefficient of determination (R^2)	$0 \leq R^2 \leq 1$	$\mathbf{R^2=0.874}$
F – Fisher's criterion	F fact. > F tabl., $F_{\alpha;\, k1;k2}$ α=0.05	**F fact. > F (3;7)** at α=0.05 F fact.=16.206; F tabl.= F(κ1;κ2)*= F(3;7)= **4.35**[2]
Autocorrelation of residuals (Durbin-Watson statistic, *DW*)	If 1,5 ≤ DW ≤ 2,5 no autocorrelation of residuals	**DW ≤ 2,5**[3] DW=2.405
Stage of verification of regression models		
Average approximation error	$\overline{A} < 10$ %	$\overline{A}$ **< 10 %** $\overline{A}$ = 1.9673 %

* *k1= m; k2=n-m-1*,
where *m* is the number of variables in model, *n* is the number of observations in model.
** *1- α*, where, α is the significance level; *n-m-1* is the number of degrees of freedom.

[1] Special table "The values of Student's t criterion at the significance level of 0.10, 0.05, 0.01". Afanasiev V.N., Iuzbashev M.M., Guliaeva T.I. (2006). Econometrics. Moscow: FINANCE and STATISTICS, Appendix 2, p. 251.
[2] Special table "Values of Fα;k1;k2 -Fisher-Snedekor criterion" . Kremer N.S., Putko B.A. (2007). Econometrics. Moscow: UNITI-DANA, Mathematical and Statistical Tables. Table IV., pp. 295-297.
[3] Special table "Values of the Durbin-Watson criterion at the significance level α=0.05" (starts at n equal to 15 observations). Kremer N.S., Putko B.A. (2007). Econometrics. Moscow: UNITI-DANA, p. 298.

Source: authors' calculations

Consequently, the practical application of regression analysis makes it possible both to assess the quantitative impact of each factor included in the linear model and to develop possible scenarios for GDP assessment when the factors included change due to ongoing state' socio-economic policies aimed at improving the situation on labour market.

4. CONCLUSIONS

The digitalization of the economy is changing the structure of the national economy and, consequently, on the labour market due to the implementation of new digital technologies, innovations, and the redistribution of material resources, which ultimately leads to the emergence of new atypical forms of employment in conditions the use of mobile devices, computers, and digital platforms. Thus, the transition to a digital economy led to changes in both the quantitative composition of labour force and the qualitative nature of labour relations, including through the transformation of employer-worker relationships in conditions of distant relations and the decentralization of labour activities, which is a factor in the creation of a flexible labour market and the impossibility of protection and use the classical model of employment. The main issue of labour market under the influence of digitalization are the risks of working places losses, demand for new professions and skills that require correction in qualifications, retraining in conditions of distant and digital methods of activity, flexibility and adaptability of forms of employment, as well as the necessity for new methods of regulating the social and labour sphere and normative and legal norms, including remuneration.

In the Republic of Moldova, the digital transformation of the economy is an important task in the context of the Association Agreement with the EU, as well as a mobilizing factor for integration into the EU legal basis and the single digital market. The implementation of EU standards and practices in key areas of the digital economy, with financial assistance and support from the EU, let to possibility to create new working places, increase competitiveness through the harmonization of digital markets, improve the quality and expand the range of online services, and harmonization digital databases in all fields of activity. However, the digitalization process in the Republic of Moldova has its own features: firstly, it is focused on small and medium-sized businesses (as a rule, on web development services, the implementation of new information technologies and business social networks); secondly, on the digitalization of public services (**e-Government** and the **platforms of the Electronic Governance Agency (AGE),** including the creation of the "**MConnect**" platform, which (unites about 20 government systems into a one data exchange network and handles more than **10 million civil requests** annually); **the creation of the MPay public payment platform** (electronic payments); the **digitization of routine operations** in the social sphere (health, educational platforms).

In the context of the above-mentioned, one of the principal components of a successful digitalization process is the potential of a qualified labour force, capable of carrying out economic activities in the conditions of digital technologies, computer skills, the use of mobile devices and digital platforms, remote employment and the ability to interact with employers and colleagues. At the same time, as follows from the analysis of the quality of labour force market by level of education in 20224, employed population with higher education accounted for 30.4% of total population, with an increase of 10.2% for the five-year period 2020-2024, and the share of employed population with education at the end of gymnasium in 2024 increased by 13.9% compared to 2020, with the increase in the share of employed persons by 1.9 p.p. (17.0% in 2020 and 18.9% in 2024), the share of labour force with a lyceum, general secondary education and gymnasium in 2024 was 33.7%, or 3.3 p.p. higher than labour force with higher education. It should also be noted that there is a factor of inability to ensure stable employment and labour force potential in the small and medium-sized business due to the high rate of enterprises liquidity. Data from the NBS statistical research for the period 2019-2023 on active enterprises allow to conclude that the infrastructure of socio-economic activity is dominated by instability and a high level of rotation of economic agents in the field of the small and medium-sized business. Thus, in 2023, there was a 50.9% decrease compared to 2022, including the enterprises creation rate was 5.5% and the enterprises liquidation rate was 9.8%,

or 4.3 p.p. higher (1,780 more than were created), and the given situation is typical for all regions of the country, including mun. Chisinau (the enterprises creation rate was 5.0%, but the enterprises liquidation rate was 10.0%, or practically twice as high).

Labour migration processes also affect the deterioration of the quality and structure of labour force by education level. Thus, while a downward tendency in the number of labour migrants was recorded in the period 2020-2023, in 2024, compared to 2023, the growth in the number of migrants in just one year was amounted to 12.0%, including by education level can be noted the tendency of growth the share of migrants with higher education (by 5.8 p.p.) in the period 2020-2023 and a decrease in this category of migrants in 2024 compared to 2023 by 3.5 p.p. At the same time, the upward tendency of share of migrants with professional education (29.9%) continues, including in 2024. This situation has a negative impact on the imbalance between labour demand in national labour market and the quality of labour force, especially with the potential of labour force with secondary specialised education.

Consequently, based on the analysis of the quality of labour force, can be concluded that the use of existing potential in conditions of the digital economy is not possible without special programs for professional training, retraining and the use of modern tools and methods for learning new digital skills in the economic and social spheres. According to participation of labour force in continuing professional education programs, it should be noted that during 2020-2024, the rate of participation in continuing professional education programs was low, including in 2024 the share of participants in all types of professional development programs among all workers of all surveyed departments was 21.6%, and the share of participants in all types of professional development programs among all workers of departments offering such programs was 30.2%. It should also be noted that, in quantitative value, the number of workers who participated in all forms of training and professional development during the specified period tended to increase, including the number of those who completed at least one type of training under a professional development program (courses and/or other forms) increasing by 30.9%. In this context, can also be noted that the growth of employers' expenditure on continuing professional education for workers in 2024 increased 2.3 times compared to 2020, and the average expenditure per employee during this period in 2024 increased 2.3 times compared to 2020, while the average cost per hired worker for this period increased 1.8 times. However, on average in the country, the share of expenditure on continuing professional education for workers in the overall cost structure remains unchanged, at only 0.2%, it is insufficiently for carrying out activities in conditions of key information technologies, the use of digital online platforms as intermediaries for economic transactions, digitization of physical documents and objects into digital and other formats for adaptation and the skills to be in demand in modern labour market.

The analysis of the situation on labour market in conditions of digital transformation process leads to the conclusion that, firstly, it does not correspond` the standards and criteria for digitalization (including the economy, ecosystem, digital transformation, the creation of digital space at the national and regional levels, and digital assets) and, secondly, there are a number of challenges that must be resolved at the state and regional levels, including the issue of labour force dismissal and imbalance in connection with the implementation of digital technologies, labour force outflow, the creation of reliable personal data protection and an institutional and normative-legal environment for the control and management of economic activity in the new conditions of the digital economy and worker autonomy, assessment of routine working places in professions that can be automated, disciplinary fixes in conditions of distance working, and the adaptation of worker-employer labour relations to the new conditions (individual and collective relations). Research conducted by McKinsey confirms the penetration and impact of digitalization on labour market, noting that "one new working place in the information and computer technology sector stimulates the creation of 2–4 working

places in the digital economy" [McKinsey&Company, 2016]. This factor cannot be ignored and must be practically implemented.

In order to improve the situation in labour market in conditions of digital transformation, as well as to reduce its impact on labour relations and resolve emerging problems, the following is proposed:

- will be brought the Labour Code of the Republic of Moldova, including the model of legal relations, the labour specifics and non-standard forms of employment, disciplinary responsibility, management, and legal regulation of collective labour rights, in conformity with the changing working conditions in the digital economy;

- Elaborate models of digital skills for employers and specialists (workers) in conditions of digitalization, including:

- training workers with basic digital knowledge and skills;

- training or improving workers' existing digital skills;

- corporate training of personnel in digital skills or perfection of existing knowledge and skills, taking into account the specifics of the economic agent's work activities;

- training, education and professional development of IT specialists in order to accompany the digitalization process and support the digital environment of economic agents and relationships within the business environment;

- development of digital skills in the field of existing national computing systems;

- development and implementation of a skills map for experts to assess labour activities in conditions of the digital economy.

In developing the above-mentioned normative documents, it is recommended to use the experience of the Digital Technology Centre Dannelse, which has proposed the so-called "Competence Wheel" or a model that provides a visual set of digital skills, as well as opportunities to use concrete tools to both improve and deepen existing skills [The Digital Competence Wheel].

- the elaboration of a Roadmap for Quality Working Places in the Republic of Moldova and the conforming law on quality of working places, that digital transformation is one of the most important political tasks, which conforms to the Association Agreement with the EU, the integration of the country into the EU united digital market [European Parliament and of the Council, 2022], as well as the European Commission's current experience in elaboration and implementation an action plan to ensure high-quality working places in condition of a competitive EU in the future, including support for workers and employers in the digital transition process. The above-mentioned normative-legal documents should provide for the protection of workers' rights, as well as such important directions as algorithmic management and artificial intelligence in working place, labour protection and technical safety when working in conditions of new technologies and mobile digital equipment, activities based on the principle of subcontracting (access to knowledge and innovation along with possible violations of current legislation, including labour legislation), ensuring control and the role of social partners;

- development of an econometric model of modern labour market, taking into account the impact of digitalization process based on complex multidimensional factor analysis, including factors such as the share of young people and adults who have skills in information and communication and digital technologies (ICT), the share of the population using the internet, the labour productivity index, expenditure on scientific-research activity as a percentage of GDP, domestic gross expenditure on the development of the digital economy as a percentage of GDP, and other main macroeconomic indicators and indicators for assessment the use of labour force potential related to employment of the country's working-age population (including employed in the informal sector). Regression modelling will lead to a quantitative

assessment of labour market development in the digital economy, including determining the effect of a 1% increase in GDP spent on digitalization.

Consequently, as the digitalization process develops and expands, the format of employer-workers relationships, the forms and nature of labour activity are changing. This necessitates the consolidation of all participants in the economic business environment, social and labour relations, and the creation of new tools for digital state administration and adequate forms of legal regulation in the changing conditions of the country's socio-economic development (changes in business models, remote and flexible forms of employment, the emergence of "digital unemployment", etc.).

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