

Formation of Digital Competencies of Personnel in the Context of Security Aspects of the Digital Economy

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Abstract

Today, the impact of digitalization on all socio-economic processes is difficult to assess. The reasons for this lie not only in the rapid pace of robotization and automation, which makes it possible to satisfy the individual needs of each consumer as much as possible, but due to the fact that digitalization has affected all participants in the labor market, primarily employees. Digital competencies are increasingly becoming a key condition for getting a job in traditional sectors of the economy that are not directly related to the development of new information products. Existing trends to reduce the need for physical labor extend to the work of the so-called "white collars", when employers compete for highly skilled workers who skillfully use information technology, are able to creatively solve atypical problems and generate new ideas. The deepening of the digital divide entails labor migration due to the attempts of the population of less technologically developed countries to get a job with a higher level of wages and be able to take full advantage of the digital economy, which is rapidly developing in the leading countries. The hostilities in Ukraine provoked a wave of refugees to the EU countries, most of them highly qualified specialists, which for the Ukrainian economy threatens to complicate the post-war recovery due to the loss of human potential, but for the EU countries it creates new opportunities to improve the qualitative composition of the internal labor market.

Keywords:

digital economy, human resources, personnel, digital labor market, labor migration.

1. Introduction

The modern world has entered a period of rapid transformational actions, the catalyst of which was digitalization, which provokes the creation of a new technological, economic and social reality. The pace of change is significantly higher than the formation of an agrarian or industrial society, which, with the exception of the leading countries, destabilizes the processes of socio-economic development and requires the formation of models for maintaining competitive positions in the global economic space

for most imitator countries. The current turbulence requires a focus not only on technological advancement by facilitating the phased implementation of the third and fourth industrial revolution, resulting in the construction and operation of automated production to flexibly meet the individual needs of each consumer with minimal staff involvement, but to maintain control and regulation of the labor market at all times. to a greater extent acquires signs of digital, with a corresponding modification of the process of interaction between the employer and the employee.

The leading countries are primarily interested in the formation and use of the intellectual and creative potential of workers, while due to the formation of a digital labor market, they are not limited by human resources that are concentrated in their territory. The above provokes the need to consider at least two aspects of security: the transformation of the global labor market, when, due to the high level of robotization and automation, jobs can be lost not only by workers performing manual and low-skilled labor, but also by the so-called "white collars" who will incapable acquire new knowledge, skills, improve digital competencies, etc.; an increase in the digital divide, which creates additional risks for labor migration and the ability to maintain the required level of production of high-tech products in imitator countries. In 2022, the situation was further complicated by the fact that hostilities are taking place in the center of Europe, the scale of which is comparable only to the Second World War.

The number of labor migrants until February 24, 2022, and the number of refugees through hostilities have a direct impact on the formation of the digital economy and the state of the labor market in the EU

and Ukraine, which requires an appropriate thorough study.

2. Methodology

The process of development of the digital economy is very dynamic under the influence of multidirectional reasons, the formation of an idea about what requires the generalization of a significant amount of information. To characterize the processes of development of the digital economy, taking into account certain aspects of security, the following methods were used: induction and deduction, comparison and systematization - to characterize the modern understanding of the essence of the digital economy, digital competencies and the digital labor market; synthesis and analysis - for trends in the development of the digital economy in the EU and Ukraine; morphological analysis - to clarify the significance of the impact of digital competencies and the loss of human resources due to labor migration and military operations on the labor market; abstract-logical - for theoretical generalizations and conclusions of the study.

3. Research Results and Discussions

Describing the modern parameters of the digital economy, they are increasingly talking about it as an "economy on demand", that is, an on-demand economy, which does not consist in the sale of pre-developed goods, but in the implementation of an online order with its offline execution, which is possible due to a high level of automation. In the face of increased competition, the manufacturer uses all available resources as efficiently as possible, which is possible due to the lack of stocks of raw materials and materials, and in the future, the remnants of unsold finished products. In addition, other advantages include: direct contact between the manufacturer and the consumer, the acceleration of all business processes due to the reduction of communication time, a quick response to changes in the market situation. In turn, the consumer has the opportunity to satisfy his individual needs as quickly as possible at lower costs due to the absence of intermediaries.

The high pace of digitalization, covering all new areas of economic processes, does not allow us to unambiguously determine the essence of the digital

economy, rather, we are talking about determining its parameters at a certain point in time and establishing a certain quantitative dimension within the traditional economy. Another, no less important aspect is to find out the impact of the pace of development of the digital economy on the labor market, which we will focus on in the future.

An analysis of the dynamics of the scale of the digital economy convincingly proves the current change in its perception. If in the early stages it was about certain sectors of the economy, in particular information and communication technologies, high-tech industry and electronic commerce, today there are more and more supporters of referring to its composition and traditional industries, including agriculture, construction, transport, etc. where there is a transformation of business processes based on digitalization, which affects the labor market, requiring employees to constantly improve digital competencies and intellectual abilities.

The increase in the share of the digital economy affects the subjects of the labor market, that is, the employer and the employee, and in principle its functioning [1-4]. We are talking about changes in the process: hiring an employee, criteria for applicants, organizing a workplace and ensuring communications within the unit, stimulating self-improvement, implementing a reward mechanism for initiative and creativity, etc. This is due to the increased influence of the following factors presented in Table 1.

Table 1. Factors of influence on the development of personnel competence in the digital economy

№	Factors
1	Automation and robotization, which reduces the need for physical labor, but creates an interest in employees with digital competencies to perform more complex work, and therefore more valuable for the company

2	Cloud technologies, the use of which was updated in COVID-19. The organization of remote work made it possible to continue activities, despite the introduction of significant quarantine restrictions, while at the same time demonstrating the prospects for further digitalization of the labor market, when the employee is not physically tied to the workplace within the company, but performs the assigned tasks from anywhere in the world, while having Opportunity to work with multiple employers
3	Digitalization of personal space through the increasingly active use of augmented or virtual reality, which creates new conditions for organizing jobs, interaction and group achievement of goals

Along with other factors related to demographic changes, increased urbanization, exacerbation of environmental problems, the ones listed above form the necessary basis for the transition to a digital labor market.

If relatively recently, companies preferred to develop technical and social competencies and gain experience from employees, today professional knowledge and a constant readiness to generate, replenish and increase it are valued. The possession of digital competencies was considered a competitive advantage of IT specialists, but today it is relevant for every employee, because we are talking about the ability to use information technology for learning, work and participation in public life (information literacy, search, evaluation and processing of information, interaction and correct use technologies for communicating in an appropriate online environment, digital content creation and editing skills (including programming, security management), which are increasingly being used in everyday life. Today, the digital labor market should be considered a specific segment of the global labor market with the following specific characteristics: the use of information and communication technologies at all stages of interaction between the employer and the

employee; interaction between the subjects of such a market takes place within digital platforms, that is, it is virtual and as flexible as possible; the obligatory possession of digital competencies, since the means of labor are digital devices, in particular, such as computers, mobile phones, digital cameras, etc.; remote work without any geographical restrictions; the result of the work is an information product. The digital market based on the use of information and communication technologies contributes to the creation of new jobs, applicants for which are not limited to a physical presence in a particular place, but can compete for them only if they possess digital competencies and have constant access to the Internet [6-10].

The growing share of the digital sector in the global labor market provokes more and more significant changes in social and labor relations, which can be described as follows:

- a departure from the traditional division of labor, which was based on a narrow professional orientation within the entire work activity, in favor of a combination of super-professional competencies (creativity, sociability, initiative, originality and the ability to use digital technologies), which ensures the constant growth of competitive advantages in a highly dynamic environment the nature of the company's activities under the pressure of the individual needs of consumers and technological development in their satisfaction;
- the spread of flexible forms of employment (freelancing, crowdsourcing, insourcing, and others), relevant for young people and workers who see their main competitive positions in creativity of thinking and the ability to generate new ideas;
- an increase in the dynamism of changes during labor activity, largely caused by migration processes and constant technological changes in the production of a social product. Today, a trend is becoming more and more pronounced, according to which dissatisfaction with living conditions pushes the economically active population to change their place of residence, which further provokes the need to master new competencies in order to fight for a job. High rates of automation and robotization make it possible to create and change workplaces in accordance with technology focused on meeting the individual needs of the consumer. The average turnover of 3-4 career changes within the working life is already considered normal, although this

requires flexibility and makes the principle of "lifelong learning" mandatory and relevant for each age group [11-15].

In the context of considering a further increase in the share of the digital economy, one cannot ignore the influence of two factors that, being associated with the digital labor market, form new threats to the global economy and the economically active population.

Digitalization increases competition among employees due to an increase in their number by people living in areas with a lower standard of living and agreeing to work for less remuneration, or to occupy positions whose qualification requirements are less than their actual professional level. Another aspect of this problem is that in the medium term, automation and increased use of artificial intelligence will reduce the demand for white-collar workers as well, a clear example of which is the growth of payment terminals, which has led to a reduction in the number of bank employees who previously provided services to customers accepting payments in them, etc. The degree of influence of both factors is also determined by the processes associated with the movement of a significant number of the population. Using the example of Ukraine, we will further consider two processes, that is, brain drain and flight from hostilities, the large-scale phase of which began on February 24, 2022.

Firstly, we emphasize the fact that it is quite difficult to determine the share of the digital economy in Ukraine due to the lack of an agreed methodological framework and analytical data. Therefore, in our reasoning, we relied on several key points that characterize the generally accepted parameters for the formation of the digital economy. In Ukraine, the concept of "digitalization" is mostly associated with the creation of new types of services that provide for the improvement of information exchange, but are not aimed at the development of high-tech industrial production. Briefly, it can be argued that we are talking about a technological lag and innovative passivity of industrial enterprises with significant investments in agricultural production. This imbalance has a clear upward trend, the basis of which is an increase in demand for agricultural products in world markets and a deterioration in the competitive positions of Ukrainian industrial enterprises and in the domestic market due to the

discrepancy between their products at the technological level of foreign competitors.

Among the main reasons for labor migration, in particular highly qualified specialists and scientists, are higher salaries and living standards, which are formed due to the high pace of development of the digital economy. Other reasons include: lack of prospects for professional development; lack of opportunities to conduct serious scientific research due to limited funding; insufficient scientific and information support for the activities of scientists; low demand in Ukraine for science-intensive and high-tech products.

The negative consequences of exacerbating the problem of "brain drain" can be summarized as follows:

- the loss of highly qualified specialists provokes a reduction in the intellectual potential of the country, which in modern conditions makes it difficult to create and manufacture high-tech products and worsen the competitive position in the global economic space, and then slows down the pace of development of the digital economy;

- departure of the most able-bodied specialists entails the destruction of the core of scientific teams and complicates the process of reproduction of scientific schools, and hence the scientific potential of the country;

- financial losses associated with the training and development of an emigrant specialist. According to international estimates, the preparation of one doctor of science will take 15-20 years and an average of 1.5-2.0 million dollars. USA;

- the "outflow" of highly qualified specialists reduces the intellectual level of the population, worsens the specific position of the country, entails social tension and increased migration sentiment, deepens the economic lag behind the leading countries.

"Brain drain" leads to the withdrawal of human capital from the country, which creates additional obstacles to the development of the digital economy, and reduces the pace of economic development in general. This problem is relevant for many countries, including those in the EU. Unlike Ukraine, where only individual steps are being taken to stabilize the situation, Poland actually has a "Come Back" program that provides consulting services in finding housing, work and medical support for those who are ready to return to their homeland. Romania has a program of cooperation between entrepreneurs and

universities, which allows returnees to get a job and free training to develop the necessary competencies, including digital ones.

Several important generalizations can be made from the results of this study:

- military actions entailed the departure of highly qualified specialists. Although due to restrictions we are talking only about women, it is interesting that in January 2022 the share of highly qualified specialists among labor migrants was only 15%, when after the outbreak of hostilities it reached 67%. This indicates that the EU labor market is replenished with highly qualified applicants for jobs when Ukraine loses important human resources, which, along with other factors, will slow down its economic development;

- 36% of respondents want to return to Ukraine after they are convinced that it is safe to be in the area where they lived, 35% - immediately after the war ends; 13% - a year or several years after the end of the war. These data indicate that the determining factor for making a decision regarding the place of further residence, and hence labor activity, will be the timing of the end of hostilities. The EU countries can create acceptable conditions and leave a certain part of highly qualified specialists to continue working within the framework of the European economy, in particular from the position of further development of the digital economy. An additional argument in favor of this option is that after the removal of the travel ban, women who are now in the EU can be joined by their men to unite families.

In general, it can be argued that the hostilities entailed the transfer of high-quality and necessary human resources for the development of the digital economy. Possible results depend on the policies of the EU and Ukraine. In the first case, we are talking about creating acceptable conditions for changing the status of refugees to permanent residents of one of the European countries, and in the second, creating a program for the return of citizens to restore the national economy.

4. Conclusions

A further increase in the share of the digital economy creates revolutionary changes in the social environment, when motivated people with work experience and certain basic knowledge, who previously performed not only physical work, but belonged to a group of "white collars", become the

"new" unemployed, i.e. employees of the administrative apparatus, managers, etc. Digitalization entails a change in the list of professions in demand due to the high pace of automation and the increasingly active use of artificial intelligence, and also forms new requirements within each area of employment. In fact, it is said that the knowledge and experience gained from the beginning of an active labor activity becomes of little use for obtaining the opportunity and continuing to work and receive wages within a very short period of time. The problem is an order of magnitude deeper, given the fact that we are talking not only about the loss of income, but also life guidelines, which provokes a crisis in social ties within the inner circle and the community and the state as a whole. Psychological breakdown due to lack of demand with the ability to perform work on a significant scale creates new challenges for maintaining stability in the social environment, not only in a single country, but also on a global scale.

The possession and systematic improvement of digital competencies, regardless of age and professional activity, is becoming the main condition for maintaining personal competitive advantages in the struggle for a job. The transformation of the labor market is to increase its digital sector, where the interaction between the employer and the employee takes place without physical contact, which means that it allows the elimination of any geographical boundaries, which increases competition between the main participants. Employers compete for high-skilled people with digital competencies and the ability to generate new ideas when applicants who are physically oriented and / or without proper digital skills are gradually losing their ability to get a job, and therefore the ability to satisfy their needs.

The problem called "brain drain" exists in all countries of the world, but it becomes especially acute in relation to those who are in a state of deep reform of the national economy. In the process of transformation, the economy is not able to provide appropriate acceptable conditions for the productive work of highly qualified specialists, including scientists, whose activities are related to the development and production of high-tech products based on the widespread use of digital technologies and provoke a "brain drain". An increase in cases of departure of highly qualified specialists in the form of labor migration or in general as emigrants entails

significant losses for the donor country, because we are talking not only about the funds spent on training, but also about a decrease in human resources, which reduces the pace of socio-economic development. The brain drain slows down the pace of development of the digital economy, which increases the gap from the leading countries and provokes the deepening of migration processes through the orientation of the majority of the population towards better living conditions, which are now being created through digital technologies.

The current situation in Ukraine clearly demonstrates the depth of the problem, when fear for one's own life and other family members pushes highly qualified personnel to leave the country, which provokes the loss of human resources, although it creates additional opportunities for countries that can create attractive conditions for refugees for their subsequent labor activities.

The aspects of security considered in the study deepen the understanding of the complexity of transformational processes arising through digitalization and relating not only to economic processes through the development of the digital economy, but also relate to each participant in the labor market, requiring from the state to create conditions for the preservation of human capital, from the employer to promote the self-improvement of employees, from staff and job applicants - improving digital competencies.

References

- [1] Vovkanych, S., & Semiv, L. Theoretical and methodological foundations of the study of human and intellectual capital in knowledge-intensive economy: conceptualization of concepts. *Regional Economics*, (4), 2007, 7–18.
- [2] Podra, O. P. Development of the investment mechanism for the human capital reproduction under conditions of the information society. *Social-law Studios*, 3(5), 2019, 58–66.
- [3] Gladka, O., & Fedorova, V. Defining personnel marketing strategies. *Business: Theory And Practice*, 20, 2019, 146–157. <https://doi.org/10.3846/btp.2019.14>
- [4] Becker, G. Human capital: theoretical and empirical analysis, with special reference to education (3rd ed.). 1993, University of Chicago Press. <https://doi.org/10.7208/chicago/9780226041223.001.0001>
- [5] Podra, O., Kurii, L., Alkema, V., Levkiv, H., & Dorosh, O. Theoretical aspects of human capital formation through human potential migration redistribution and investment process. *Business: Theory and Practice*, 21(1), 2020, 71-82. <https://doi.org/10.3846/btp.2020.11197>
- [6] Sylkin, O., Buhel, Y., Dombrovska, N., Martusenko, I., & Karaim, M. The Impact of the Crisis on the Socio-Economic System in a Post-Pandemic Society. *Postmodern Openings*, 12(1), 2021, 368-379. <https://doi.org/10.18662/po/12.1/266>
- [7] Sylkin, O., Bosak, I., Homolska, V., Okhrimenko, I., & Andrushkiv, R. Intensification of Management of Economic Security of the Enterprise in the Post-Pandemic Space. *Postmodern Openings*, 12(1Sup1), 2021, 302-312. <https://doi.org/10.18662/po/12.1Sup1/286>
- [8] Shtangret, A., Korogod, N., Bilous, S., Hoi, N., & Ratushniak, Y. Management of Economic Security in the High-Tech Sector in the Context of Post-Pandemic Modernization. *Postmodern Openings*, 12(2), 2021, 535-552. <https://doi.org/10.18662/po/12.2/323>
- [9] Ticu, I. Migration as a (Non)Traditional Security Issue of the Risk Society. *Postmodern Openings*, 12(2), 2021, 387-409. <https://doi.org/10.18662/po/12.2/314>
- [10] Rushchyshyn, N., Medynska, T., Nikonenko, U., Kostak, Z., & Ivanova, R. Regulatory and legal component in ensuring state's financial security. *Business: Theory and Practice*, 22(2), 2021, 232-240. <https://doi.org/10.3846/btp.2021.13580>
- [11] Ceyhan, A., & Tsoukala, A. The securitization of migration in western societies: Ambivalent discourses and policies. *Alternatives: Global, Local, Political*, 27(1, S1), 2002, 21-39. <https://doi.org/10.1177/03043754020270s103>
- [12] Pencea, G. C., & Curteanu, A. B. Internal and External Migration. *Postmodern Openings*, 11(1), 2020, 57-70. <https://doi.org/10.18662/po/108>
- [13] Ismael, N.T., Yas, S.M., Hussain, A.H.A. Impact of migration resulting from ethnic and racial armed conflicts on accelerating urban sprawl. *International Journal of Design & Nature and Ecodynamics*, Vol. 17, No. 3, 2022, pp. 353-358. <https://doi.org/10.18280/ijdne.170304>

- [14] Sylkin, O., Kryshchanovych, M., Bekh, Y., & Riabeka, O. Methodology of forming model for assessing the level financial security. *Management Theory and Studies for Rural Business and Infrastructure Development*, 42(3), 2020, 391–398.
<https://doi.org/10.15544/mts.2020.39>
- [15] Ghadi, M. Y., & Almanaga'h, K. S. The role of job crafting in the relationship between empowering leadership and happiness at work: an empirical analysis. *Business: Theory and Practice*, 21(1), 2020, 244-251.
<https://doi.org/10.3846/btp.2020.11109>