Employees' Competitiveness in Digital Transformation

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Abstract. Employees` competitiveness in the era of digital transformation is inextricably linked with digital competencies and digital skills that raise many questions. Firstly, the researchers did not come to a unified definition of digital competencies and digital skills. Secondly, it is necessary to identify the main trends related to digital competencies and digital skills in the Russian Federation. Thirdly, what paths can increase employees` competitiveness through digital competencies and digital skill. Fourthly, the analysis of measures and evaluation of indicators for the implementation of these ways. In this article we present several approaches to the definition of digital competencies and digital skills. Then we disclose the path of state programs to improve them to increase the competitiveness of workers and to analyze the measures and evaluate the indicators as the results of these programs implementation. As results we present the main trends in the Russian Federation related to digital skills and competencies.

1. Introduction

Employees' competitiveness is a key characteristic of the company, industry and the economy as a whole. In the conditions of digital transformation, there is an urgent need to increase the level of digital skills as employees' competitiveness factor due to the strong growth of digital technologies usage. According to a Vodafone Institute study, 85% of respondents need digital skills in their work, but 56% of employees believe that they lack the necessary digital skills or their digital skills need to be developed for future work [1].

2. "Digital skills" and "digital competencies" definition

We first clarify the concept of "digital skills" and "digital competencies", because there is no single definition of digital skills and competencies. There are many different interpretations related to the ability to use information and communication technologies (ICT) such as digital literacy, digital competence, computer literacy, e-skills (electronic skills), information literacy and others.

There are different classifications of digital skills supposed by van Laar, E. et al [2], European Commission [3], OECD [4], European Schoolnet and DIGITALEUROPE [5], Development Economics [6] and Carretero, S. et al [7]. We have chosen the most actual for our study.

According to experts of the European Commission, in a broad sense, digital skills mean the ability to localize, organize, understand, develop, create and disseminate information using digital technologies at different levels of competence [8]. The European Commission defines three levels of digital skills:

• Basic digital literacy skills. They allow individuals acquire digital literacy. These skills can be used both in the workplace and in the personal life of an individual to increase the level of knowledge and involvement in the digital community.

• Digital skills which relate to employment. They include basic digital skills, as well as on-the-job and related to information and communication technologies (ICT), developed by information technology professionals.

• Digital skills for the ICT professions. They cover both of the above-mentioned categories and skills required in the ICT field and bringing in innovative and creative components for the development of new digital solutions, products or services.

OECD [9] allocates:

• Low and basic activities. Using a computer mouse to download an Internet browser, copying or moving files, using copying tools, cutting and pasting information on the screen, using search engines to request information, sending an email with file attachments and others.

•Advanced activities. Writing code in a programming language, using software for design, counting or simulation, programming and using robots.

• Specialist activities. Software development, ICT architecture design for the workplace.

UKforCE [10] offers the following levels:

• Digital Muggle. There are no requirements for using digital technologies - they are perceived as magic.

• Digital Citizen. The ability to use digital technology purposefully and confidently for communication, information retrieval and for the purchase of goods or services.

• Digital Worker. The ability to develop and use integrated digital systems. For example, basic programming skills.

• Digital Maker. Digital skills, namely software development. An example is creating a macroses in Excel.

Summarizing all definitions and classifications mentioned above, we note that digital skills are the ability to use information and communication technologies, digital competencies - knowledge of information and communication technologies, ability and owning of information and communication technologies. Thus, digital competencies are a broader concept that includes digital skills. Nevertheless, both digital skills and digital competencies directly affect the level of competitiveness of workers in a digital transformation.

3. Paths to improve employees` digital competencies

There are four paths to improve employees` digital competencies:

1. Development and implementation of state programs (Russian Federation - "Digital Economy of the Russian Federation", European Union - Digital Skills and Jobs Coalition and others);

2. Transfer of training of the organization's employees to outsourcing to companies specializing in the development of digital skills (ISDI, Digital Marketing Institute and others);

3. In-house training of employees by organizations and the development of corporate universities (Sberbank Corporate University, VTB courses and others);

4. Self-study (books, online distance courses and others).

In this article we analyze the path of state programs, since they create the legislative, informational and motivational basis for other paths.

The program "Digital Economy of the Russian Federation" [11] was approved by the order of the Government of the Russian Federation dated July 28, 2017 No. 1632-p. "Digital Economy" aims to:

• Create an ecosystem of the digital economy of the Russian Federation, where the key production factor is data in digital form with effective interaction between business, the scientific and educational community, the state and citizens.

• Create infrastructure and institutional conditions.

• Remove existing and possible barriers and restrictions for the emergence and (or) development of high-tech businesses in both traditional and new sectors of the economy.

• Increase competitiveness in the global market and industries, and the economy of the Russian Federation as a whole.

4. Analysis of measures and evaluation of indicators

The "Personnel and Education" section is devoted to measures to increase the digital competence of the population by 2024. However, the planned indicators are not given for each year, but are presented as intermediate results for several years. For example, the achievement of the indicator "the share of citizens using the profile of competencies and personal development trajectory" is planned for only 2020 and 2024). There is a need to create an indicator to assess the change in digital competencies of the population due to the implementation of the program. Table 1 displays selected indicators from other areas of the state program. We offer the indicator "The proportion of citizens who have increased the level of digital competencies", calculated as a product of indicators:

1. "The share of information systems and resources of state authorities and local governments transferred to the state unified cloud platform."

2. "The share of citizens who have increased literacy in the field of information security, media consumption and the use of Internet services."

3. "The share of the population that used information protection tools in the regions of the Russian Federation (as a percentage of the total population that used the Internet during the last 12 months, the relevant subject of the Russian Federation)."

Table 1. Indicators dynamics of the state program "Digital Economy of the Russian Federation".

Indicators	2018	2019	2020	2021	2022	2023	2024
The share of citizens using the profile of competencies and personal development trajectory, percent	**-**	**-**	**5**	**-**	**-**	**-**	**60**
The share of information systems and resources of state and local authorities transferred to the state single cloud platform, percent	10	30	50	80	90	90	90
The share of citizens who have increased literacy in the field of information security, media consumption and use of Internet services, percent	10	15	20	25	35	45	50
The share of the population that used information protection tools in the regions of the Russian Federation (as a percentage of the total population that used the Internet during the last 12 months, the corresponding subject of the Russian Federation)	86	87	88	89	90	95	97
The proportion of citizens who have increased the level of digital competencies, percent (assessment offered by us)	**0.86**	**3.92**	**8.80**	**17.80**	**28.35**	**38.48**	**43.65**

We justify the choice of these three indicators by the fact that with the growing share of information systems and resources, it is necessary to increase the level of digital competencies associated with them, that is possible in two ways:

1. Through the receipt of new information about them - literacy improvement.

2. Through the usage of this information in activities - for example, the usage of information security tools.

Therefore, through the implementation of the state program, by 2024, 43.65% of the population of the Russian Federation will increase the level and set of digital competencies.

Following the state program "Digital Economy of the Russian Federation", an autonomous non-profit organization created the program "Digital Economy" [12] to ensure a productive dialogue between business and the state. It implements the national program of the same name and enjoys the support of the Presidential Administration and the Government of the Russian Federation.

 "Digital Economy of the Russian Federation" and "Digital Economy" have different directions.

Despite the interconnectedness of the programs of the same name, they do not fully coincide in the areas that are presented in Table 2. Therefore, we note a greater focus on education and competencies related to digitalization in the state program, and business management - in the business program. All areas of the state and business program in one way or another affect the digital skills and thus the employees` competitiveness. First of all, the programs set the environment in such areas as regulatory regulation, information infrastructure and information security, digital technology and digital public administration, thereby contributing to the development of digital skills, but indirectly. These five areas set the basis for the areas of personnel and education, formation of research competencies and technological reserves that directly increase the level of digital skills of employees, and hence their competitiveness.

Table 2. Directions comparison of the state program "Digital Economy of the Russian Federation" and the business program "Digital Economy".

Areas of the state program "Digital Economy of the Russian Federation"	Areas of the business program "Digital Economy"	Impact type on digital skills and employees` competitiveness
Regulatory regulation	Regulatory regulation	Indirect
Personnel and Education	Personnel for the digital economy	Direct
Formation of research competencies and technological background		Direct
Information infrastructure	Information infrastructure	Indirect
Information Security	Information security	Indirect
	Digital technology	Indirect
	Digital public administration	Indirect

Since 2018, when the implementation of the business program started, there is a large base of cases. As a result of the analysis of cases in which the "Digital Economy" program was involved and which are related to digital skills, the following trends are identified, as shown in Table 3.

Table 3. Problem situations, solutions and their results through the state program "Digital Economy of the Russian Federation".

Problem situation	Solution	Digitization results
Manually collecting and processing data and information that slows down the decision making process and increases the risk of errors due to the "human factor"	IAS "Horizon", Bars Group, "N3.Investment and construction"	Reducing the number of business processes and automatization the collection and processing of data and information, as well as quality control
Insufficient productivity of workers, leading to a high level of expenditures of the consolidated budget for their control and support	1C	Increase productivity in the activities of employees, reducing costs through the acquisition of information systems

Low level of process automation that increases staffing levels and budget expenses for its maintenance	Unified IT Property Management Regional System	Reduced staff budget costs up to 50%
Difficulty or impossibility of promptly verifying the data on the authenticity of employees	BI-system MFC	Single repository of statistical quantitative and qualitative data, access to data from various sources
Insufficient effectiveness of control and supervisory measures	MTS	Increase of control and supervisory measures effectiveness in the use of operational and accurate data

5. Conclusion

In conclusion, it is necessary to note the main trends associated with the development of digital skills and competencies in the Russian Federation:

• Rapid growth in the number of digital competencies;

• Increasing need for digital skills and competences in different areas of activity due to the increasing use of ICT;

• Increasing need for highly qualified ICT personnel;

• Improvement of the digital environment (regulatory, information infrastructure, information security) as an indirect development factor of digital skills and competencies;

• Increase in the number of business events introducing ICT into work processes that contributes to the development of employees` digital skills and competencies.

Further development of employees` digital skills and competencies, strengthening employees` competitiveness in digital transformation require coherence and motivation of all economic agents: the state, companies and employees.

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