Important Digital and Non-digital Competencies in the Near Future: How Employers' Expectations Change in the Digital Economy

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ABSTRACT

The analysis of trends and forecasts of changes in digital and non-digital skills and competencies demanded by employers and determining the future professional success of workers in the digital economy is presented. Key digital skills are identified and disclosed, namely: general IT-skills, professional IT-skills, problem-oriented digital skills, complimentary IT-skills, skills of using digital economy services. It is shown that along with digital skills, an increase in demand for higher cognitive, as well as social and emotional skills, not peculiar to machines, but necessary, are expected for cooperation with artificial intelligence. Based on the research materials, the author identifies a number of generic skills, the relevance of which will increase in the digital economy: cognitive competencies (self-development, organization, management skills), social behavioral and communication competencies (communication skills, interpersonal skills, interdisciplinary and intercultural interaction), digital (technological) competencies (systems creation, information management).

Keywords

Digital economy, intelligent technologies, digital skills, occupation-specific skills, soft skills.

1. INTRODUCTION

The labor force is very flexible in adapting to new technologies: as previous experience shows, the introduction of new technologies, as a rule, not only ensures the replacement of human labor, but, no less important, leads to a change in its structure and creates new employment. According to McKinsey experts, by 2030, from 75 to 375 million workers (from 3 to 14% of the global workforce) will have to retrain to meet the demands of the digital economy, and everyone else will have to adapt as their professions develop along with the development of intelligent technologies [1]. The nature of work is evolving quickly, and will only accelerate as humans and machines increasingly collaborate with each other.

2. INTELLIGENT TECHNOLOGIES ARE SUBVERTING THE SKILLS MIX

In connection with the introduction of digital technologies, the requirements for the presence and level of development of computer and information skills are changing significantly, first of all [2]. ICT foundation skills are becoming increasingly important in order to benefit from technological innovation in terms of better employment chances and higher wages. Jobs requiring more intensive ICT use also require a range of technical, professional and other occupation-specific skills, a solid level of information-processing skills (e.g., literacy and numeracy), as well as the ability to collaborate, share information, give presentations, provide advice, work autonomously, manage, influence and solve problems.

"Digital" competencies, which to a large extent acquire a "super-professional" character, include:

1) general ICT-skills allowing the employees of a wide range of professions to use intelligent technologies in their daily work;

2) professional ICT-skills, first of all necessary for specialists in the field of intelligent technologies and their applications for the production of products, services and resources in the field of intelligent technologies;

3) Problem-oriented digital skills required for specialists developing and using specialized problem-oriented platforms, applications, software packages, computer-aided design systems, BIM platforms, logistic tools);

4) complementary ICT skills that allow the use of ecosystem capabilities to perform new tasks associated with the use of intelligent technologies in the workplace);

5) the skills of using the services of the digital economy, allowing to widely use various useful services and processes implemented on the basis of the Internet of things and functional components of the digital economy.

In a number of countries, an approximate personnel capacity for "digitalization" of various sectors of the economy is already forecast. Thus, according to the UK government estimates, by 2020 it is necessary to double (to 1.86 million) the number of university graduates with engineering and digital skills and provide £ 2.5 billion in investment to train a sufficient number of scientists, designers and engineers of new qualifications. National projects have been launched to develop the necessary skills among the population (for example, in the USA - "Computer Science For All Initiative"), and this concerns already advanced digital competencies, including and programming areas. Programming is included in the standard training for working specialties, because most of them involve working on machines with numerical control. As a result of the implementation of the Digital Economy of the Russian Federation program, by 2024 the proportion of the population with digital skills should be at least 40%.

The following is fundamentally important: the introduction of artificial intelligence and automation increases the significance of not only technical, but also universal skills and high-level cognitive, which is also indicated by the results of the conducted research.

For example, in a 2018 study "Skill Shift: automation and the future of the workforce" conducted by McKinsey on the example of the United States and five European countries (France, Germany, Italy, Spain and the United Kingdom) presented a forecast of the future relevance of 25 basic work skills (the focus was on five sectors: banking and insurance, energy and mining, health care, manufacturing and retail: after evaluating how much time an employee uses this or that skill, analysts came to the conclusion that they would grow the most the demand for technological skills (including

programming) is 55% (now these skills involve 11% of working time, and in 2030 it will be 17%).
At the same time, due to the introduction of digital technologies, the demand for more than high cognitive as well as social and emotional skills, not peculiar to machines, - the ability to work in a team, lead others, negotiate and empathize. Thus, according to experts, by 2030, the demand for social and emotional skills will increase by 26% in the US and by 22% in Europe, the demand for entrepreneurial skills and explore opportunities for innovation will increase by 33% in the US and 32% in Europe, a significant increase in the demand for management skills is also projected, including development and motivation management [3].

3. GENERIC SKILLS FOR TOMORROW'S DIGITAL WORLD

3.1. Contact address

In the Atlas of New Professions, prepared by the Moscow School of Management Skolkovo and the Agency for Strategic Initiatives (ASI), a number of promising "super-professional" competencies are highlighted, including: environmental thinking, systems thinking, project management, working with people, working in uncertainties, programming / robotics / artificial intelligence, artistic skills, multilingual and multiculturalism, interdisciplinary communication, customer focus and lean manufacturing. The development of these competencies will allow a person not only to increase the efficiency of work in his industry, but also provide the possibility of inter-sectoral mobility.
The study of the World Economic Forum identified 10 competencies that by 2020 will become the highest priority for employers when searching for new employees [4]:
1) Complex problem solving.
2) Critical thinking (experts identify the following characteristics as behavioral indicators of this competence: properly organized memory (storing and reproducing information), language proficiency as a tool of thinking, skill of extracting meaning from information, ability to make logical judgments, ability to analyze and evaluate arguments, ability to form and test hypotheses , the ability to make judgments about uncertainty and probability, discipline in decision-making, the skill of solving clearly and ill-defined tasks).
3) Creativity in solving non-standard tasks (experts identify the following signs as behavioral indicators of this competence: speed, accuracy, flexibility and originality of thinking, resistance to uncertainty, openness to new experience, independence). The relevance of the competence is due to the need to solve problems that do not have a standard solution, finding the best / new solution to a problem, creating a new product, service, business method, simplifying / optimizing products, processes, procedures, an adequate response to the changes, mastering new behaviors and activities.
4) People management (in conditions, where the object of management will become more difficult compared to today, and, according to the Author curve, either the cheapest employees whose work is cheaper than robots or highly professional will be in demand).
5) Coordinating with others.
6) Emotional intelligence (EI) (ability to determine how people feel, use emotions to help think and analyze, understand the causes of emotions, manage emotions, and include them in the decision-making process)..
7) Judgment and decision making.
8) Service orientation.
9) Negotiation.
10) Cognitive flexibility.

A similar picture is presented in the result of a survey of managers of the largest companies in the world, conducted by PWC and allowing to highlight the following relevant skills: problem solving, flexibility, ability to negotiate, leadership, creativity and innovation [5].
Among the most valuable skills required for cooperation with artificial intelligence, the study presented by Accenture, along with specialized technical skills, marked the skills of resource management, leadership, communication, integrated problem solving. It is also noted that within five years, 2000 global companies will begin to hire employees, based not only on their experience, but also on behavior in a particular situation [6].
Deloitte experts draw attention to the fact that at least a third of new high-paying professions will require communication skills, social interaction, the ability to define the context and formulate goals, and the most in-demand skills of the employee of the future, apart from empathy, highlight the knowledge of their field of activity and customer needs (professionalism), perception of oral speech, oratorical skills, knowledge of native and foreign languages, active listening skills, presentations, writing perception, proactivity, grammatically correct speech, critical thinking, the ability to analyze [7, 8, 9].
According to Global Education Futures estimates, by 2025 at least 30% of the working-age population will face the need to develop entrepreneurial competencies due to the spread of self-employment and the expansion of individual areas of responsibility within hired labor. In the study Delivering the workforce for the future, presented by Mercer and Oliver Wyman, the following promising “human competencies” are highlighted, the relevance of which will only increase in the future [10]:

- ability to adapt and curiosity, commercial flair to identify opportunities for innovation and communication skills for persuasion;
- ability to provide first-class service to internal and external customers, which implies the development of opportunities to solve problems, as well as personal responsibility and empathy for company employees;
- skills of building relationships, the ability to motivate others and successfully develop in a heterogeneous environment of colleagues of different generations.

Based on the materials of these studies, as well as the 2025 Task Model of Competences presented by BCG experts [11], which, in turn, summarized the approaches of the Lominger Competence Library, Sberbank, RosExpert / Korn Ferry, Higher School of Economics, WorldSkills Russia and Global Education Futures, we can distinguish the following generic skills, the relevance of which will increase in the digital economy:
1). Cognitive competencies:

- self-development (self-awareness, learning, curiosity, openness to new experience, willingness to look for opportunities to develop their knowledge and skills, for continuous learning, the perception of criticism and feedback);
- organization (resource management, entrepreneurial skills);
- managerial skills (global thinking, prioritization, decision making, setting goals, forming teams, developing others, motivating others to achieve goals, delegating);
- achieving results (responsibility, risk acceptance, perseverance in achieving goals, initiative, resource management);
- thinking and solving non-standard tasks (creativity, including the ability to see prospects and opportunities, generate ideas, critical thinking, innovativeness);

- adaptability (work in conditions of uncertainty, willingness to change).

2). Socio-behavioral and communication competencies:

- communication skills (the ability to interact with other people, the skills to effectively transfer and share thoughts, ideas and information through various means and approaches - presentation, writing, negotiation; openness);
- interpersonal skills (teamwork, ethical, emotional intelligence, stress management, adequate perception of criticism, focus on achieving consensus and results, focus on priority consideration of the interests of internal and external clients);
- interdisciplinary and intercultural interaction (awareness of cultural diversity, social responsibility, cross-functional and cross-disciplinary interaction with people from different ethnic, social, cultural and educational groups, understanding of the problems and interests of various working groups).

3). Digital (technological) competencies:

- creation of systems (programming, application development, design of production systems, knowledge of the fundamentals of robotics, ability to understand and use new technologies);
- information management (using ICT tools, equipment and software for searching, evaluating and exchanging information in digital form, processing and analyzing data and digital content, developing and using computational models, tools and methods for interpreting and understanding data and digital content in a specific area , problem solving and decision-making management; use of interactive tools for collaboration in project implementation.

According to experts, the most popular in the future will be "hybrid" professions, which involve combining expert knowledge in one or more technical areas with the skills of project management and business relations development. Deloitte predicts that the wages of such "hybrid" workers will, on average, be 50% higher than those of purely technical specialists. In connection with the introduction of new technologies, the traditional work model is changing, in which employees apply their skills within the designated function, defined as a place in the organizational structure, towards a more dynamic model, where employees apply their skills to implement certain roles in different projects. The key to the future success of companies will be to provide the staff with the opportunity to develop and develop a culture of continuous learning throughout the organization.

4. CONCLUSION

Analysis of the main trends of skills related to future roles allows to draw the following conclusions:

1) According to experts, the most popular in the future will be "hybrid" professions, which involve combining expert knowledge in one or more technical areas with the skills of project management and business relations development. In connection with the introduction of new technologies, the traditional work model is changing, in which employees apply their skills within the designated function, defined as a place in the organizational structure, towards a more dynamic model, where employees apply their skills to implement certain roles in different projects.

2) Today's education and training systems are ill-equipped to build these skills. By their nature, these skills are acquired through practice and experience, often over long periods of time. They are not inculcated in the classroom, lecture hall or library.

3) The key to the future success of companies will be to provide the staff with the opportunity to develop and develop a culture of innovation, lifelong learning throughout the organization.

REFERENCES

[1] What the future of work will mean for jobs, skills, and wages. URL: https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages.

[2] Skills for a Digital World 2016 Ministerial Meeting on the Digital Economy Background Report. URL: http://www.oecd-ilibrary.org/scienceand-technology/skills-for-a-digital-world_5jlwz83z3wnw-en Retrieved: Dec, 2016.

[3] Skill Shift automation and the future of the workforce. URL: https://www.mckinsey.com/de/~/media/McKinsey/Locations/Europe%20and%20Middle%20East/Deutschland/News/Presse/2018/2018-05-24/Studienreport_MGI_Skill%20Shift_Automation%20and%20future%20of%20the%20workforce_May%202018.ashx

[4] The 10 skills you need to thrive in the Fourth Industrial Revolution. URL: https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution

[5] 20 Ezhegodnyj Opros Rukovoditelej krupnejshih kompanij mira PwC. URL: http://www.pwc.com/talentchallenge

[6] Reworking the revolution. URL: https://www.accenture.com/t20180511T023023Z__w__/us-en/_acnmedia/ PDF-69/Accenture-Reworking-the-Revolution-Jan-2018.pdf

[7] Reconstructing work: Automation, artificial intelligence, and the essential role of humans. URL: https://www2.deloitte.com/insights/us/en/deloitte-review/issue-21/artificial-intelligence-and-the-future-of-work.html (дата обращения: 8.11.2018).

[8] From careers to experiences. URL: https://hctrendsapp.deloitte.com/reports/2018/from-careers-to-experiences.html.

[9] Kane, G.C., Palmer, D., Phillips, A.N., Kiron, D. and Buckley, N. (2017) Achieving Digital Maturity: Adapting Your Company to a Changing World, *MIT Sloan Management Review, Deloitte Digital, and Deloitte University Press*. URL: https://www2.deloitte.com/insights/us/en/focus/digital-maturity/digital-mindset-mit-smr-report.html

[10] Delivering the workforce for the future. URL: http://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/oct/Delivering%20The%20Workforce%20For%20The%20Future.pdf

[11] Rossiya 2025: ot kadrov k talantam. URL: http://d-russia.ru/wp-content/uploads/2017/11/Skills_Outline_web_tcm26-175469.pdf.