



Transformation of the labor market and the necessary professional competencies of employees under the influence of the development of technologies and practical sciences

Transformación del mercado laboral y las competencias profesionales necesarias de los empleados bajo la influencia del desarrollo de tecnologías y ciencias prácticas

Vladimir Sekerin^{1,*}, Anna Gorokhova¹, Sergey Bank², Natalya Gayduk³, Liudmila Gorlevskaya⁴

¹ Moscow Polytechnic University. Moscow, Russia.

² MIREA-Russian Technological University. Moscow, Russia.

³ Kuban State Agrarian University. Moscow, Russia.

⁴ V.A. Trapeznikov Institute of Control Sciences, Russian Academy of Sciences. Moscow, Russia.

*Corresponding author: sekerin_v@list.ru

(recibido/received: 18-septiembre-2022; aceptado/accepted: 12-noviembre-2022)

ABSTRACT

With the transformation of technologies, the requirements for labor resources are also being modified, for which it will be necessary to adapt to the latest circumstances and trends in the labor market in the short term. Therefore, it is important to have work skills and competencies that are practically significant and relevant for a potential employer. The sectoral nature of the economy, technologies implemented by companies and technical production equipment set the tone for the professional structure of personnel and the demand for labor resources, considering professional competencies. According to experts, to adapt and respond to uninterrupted technological progress in the future, people will alternately master about 10 professions throughout their lives. Today, as in the last 5-7 years, the demand for IT specialists is actively developing, to a greater extent for system and computer developers and analysts, and security experts. Modern employers point out that development skills along with easy learning new things are the priority qualities of potential employees. In addition: the ability to correctly respond to the introduced technological changes; communication skills not only within a single specialty, but also far beyond its framework; processing the large information volumes. The priority competencies of personnel are closely linked to the technological space and economic digitalization of Russia.

Keywords: Resource economics, knowledge economics, personality development index, labor skills.

RESUMEN

Con la transformación de las tecnologías también se están modificando los requerimientos de recursos laborales, para lo cual será necesario adaptarse a las últimas circunstancias y tendencias del mercado laboral en el corto plazo. Por lo tanto, es importante tener habilidades y competencias laborales que sean significativas y relevantes en la práctica para un empleador potencial. El carácter sectorial de la economía, las tecnologías implementadas por las empresas y los equipos técnicos de producción marcan la pauta para la estructura profesional del personal y la demanda de recursos laborales, considerando competencias

profesionales. Según los expertos, para adaptarse y responder al progreso tecnológico ininterrumpido en el futuro, las personas dominarán alternativamente unas 10 profesiones a lo largo de su vida. Hoy, como en los últimos 5 a 7 años, la demanda de especialistas en TI se está desarrollando activamente, en mayor medida para desarrolladores y analistas de sistemas y computadoras, y expertos en seguridad. Los empleadores modernos señalan que las habilidades de desarrollo junto con el fácil aprendizaje de cosas nuevas son las cualidades prioritarias de los empleados potenciales. Además: la capacidad de responder correctamente a los cambios tecnológicos introducidos; habilidades de comunicación no solo dentro de una sola especialidad, sino también mucho más allá de su marco; procesamiento de grandes volúmenes de información. Las competencias prioritarias del personal están estrechamente vinculadas al espacio tecnológico y la digitalización económica de Rusia.

Palabras claves: Economía de los recursos, economía del conocimiento, índice de desarrollo de la personalidad, competencias laborales.

1. INTRODUCTION

As practical realities show, for at least the last decade, there have been constant transformations in the content of labor and the competencies of employees.

What awaits the domestic labor market in the era of the digital economy? How will technology improve? How will the professions of our time transform in the future?

The Boston Consulting Group carried out a special study involving the management of the largest Russian companies. The results are the following:

- 17% of the population belongs to the “Knowledge” group and realizes themselves in highly skilled work;
- 35% belong to the “Skill” group, which includes low-skilled labor that does not require any prolonged education or specialized training (cleaners/drivers/sellers/security guards);
- 48% are assigned to the “Rule” group, reflecting routine work within specific competencies and standards (locksmiths/accountants/ medical personnel/service segment) (Oganessian et al., 2017).

It is important that in the leading countries the “Knowledge” group exceeds the mark of 25% of the population.

Now Russia is at a transitional stage that separates the economy of resources from the knowledge economy, which, according to the practice of developed countries, is characterized by a high degree of profitability, a transforming digital economy, the highest personal development index and a significant share of the population belonging to the mentioned “Knowledge” group (Lavrinenko & Shmatko, 2019).

Consequently, with the transformation of technologies, the requirements for labor resources are also being modified, for which in the short term it will be important to adapt to the latest circumstances and trends of the labor market. Therefore, it is important to have work skills and competencies that are practically significant and relevant for a potential employer.

According to economic experts, by 2025 the structure of competition for employees will change enormously due to the aging of the population and the development of the market by young personnel, especially representatives of the new generation (Serditova & Belotserkovsky, 2020; Solina, 2017).

The sectoral nature of the economy, technologies implemented by companies, and technical production equipment set the tone for the professional structure of personnel and the demand for labor resources, considering professional competencies.

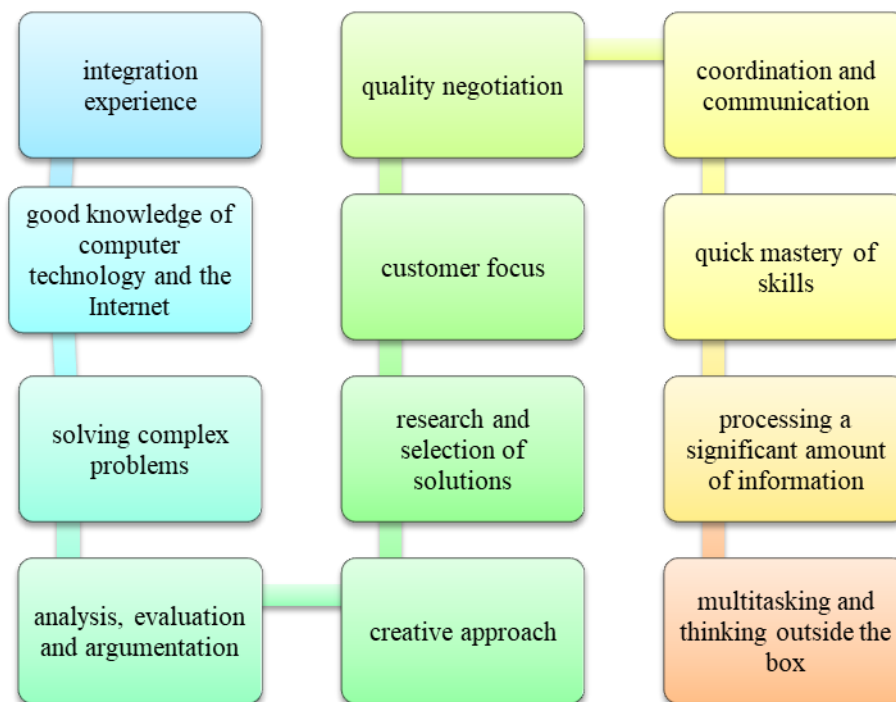
2. MATERIALS AND METHODS

Russia is now quite vulnerable to meeting the demand for skilled workers with the right entrepreneurial skills. This demand is influenced by digitalization, production automation and business aspects of robotization (Zorgner, 2019).

Thus, according to the experts, there are certain standard competencies and skills for the personnel of the future, regardless of the age category, which are still relevant at the moment (Figure 1) (Abuzyarova et al., 2019; Solina, 2017; Zorgner, 2019).

Over time, specialties associated with the selection of solutions, analytics, and the resolution of non-trivial issues will only add value to the market. For intellectual flexibility and integrated thinking, the relevant staff will only receive a large salary. However, this does not mean that each potential worker who is on the open labor market is required to have a set of the above qualities (Abuzyarova et al., 2019).

At the same time, the importance of owning an ever wider range of these skills, regardless of the current position (to a greater extent in terms of skilled labor), is growing every year (Popkov, 2020).



*Created by the authors

Figure 1. Standard competencies and skills for the workforce of the future, which are still relevant at the moment*

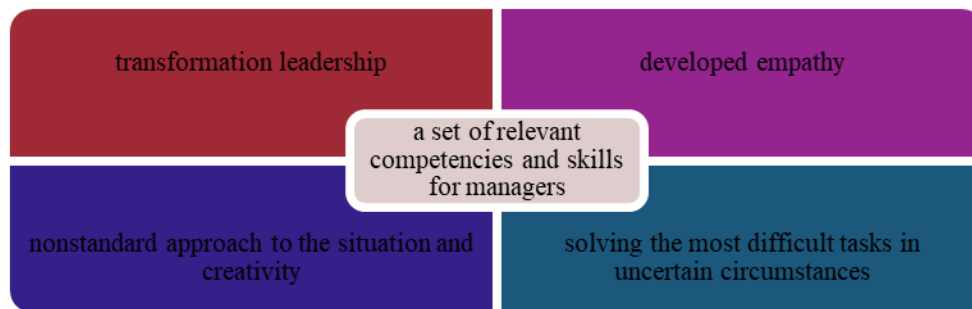
However, not all professional areas need such skills, since a number of them, according to analytical forecasts, will disappear altogether in the shortest time, therefore, personnel will have to either completely retrain or completely exit the labor market.

It is also important to separately indicate the most relevant competencies that are significant for the development of managers at various levels and areas of activity in the short term (Figure 2) (Polianskaya, Bespalova, & Tatarenko, 2018; Popkov, 2020; Zorgner, 2019).

To some extent, these competencies coincide with the previously mentioned standard ones. However, it is precisely the managers who will need special skills that can start to develop appropriately even during the secondary, professional and higher forms of training. Consequently, it will be more and more difficult for older workers to occupy any managerial position (Polianskaya et al., 2018).

It should be noted that at the moment, a large share of Russian specialists in the field of engineering can be distinguished by objectively strong knowledge and skills in applied fields that are relevant in the context of digitalization (Merzlyakova, 2019).

In the territory of Russia, ICT infrastructure for national purposes is developing more and more, the capacity of its national market is significant, while the possibilities of digitalization in the industry segment are disclosed to a small extent.



*created by the authors

Figure 2. A set of competencies and skills for managers that are already relevant in the short term*

According to analysts' forecasts, in the near future, competition in niches where low personnel qualifications are required will only increase. At the same time, the level of workload on those specialists who have high qualifications will increase (Aranzhin & Nekhoda, 2019). Therefore, due to the change of generations in the labor market, the period 2020-2030 will have a fundamentally different structure of competition.

3. RESULTS AND DISCUSSION

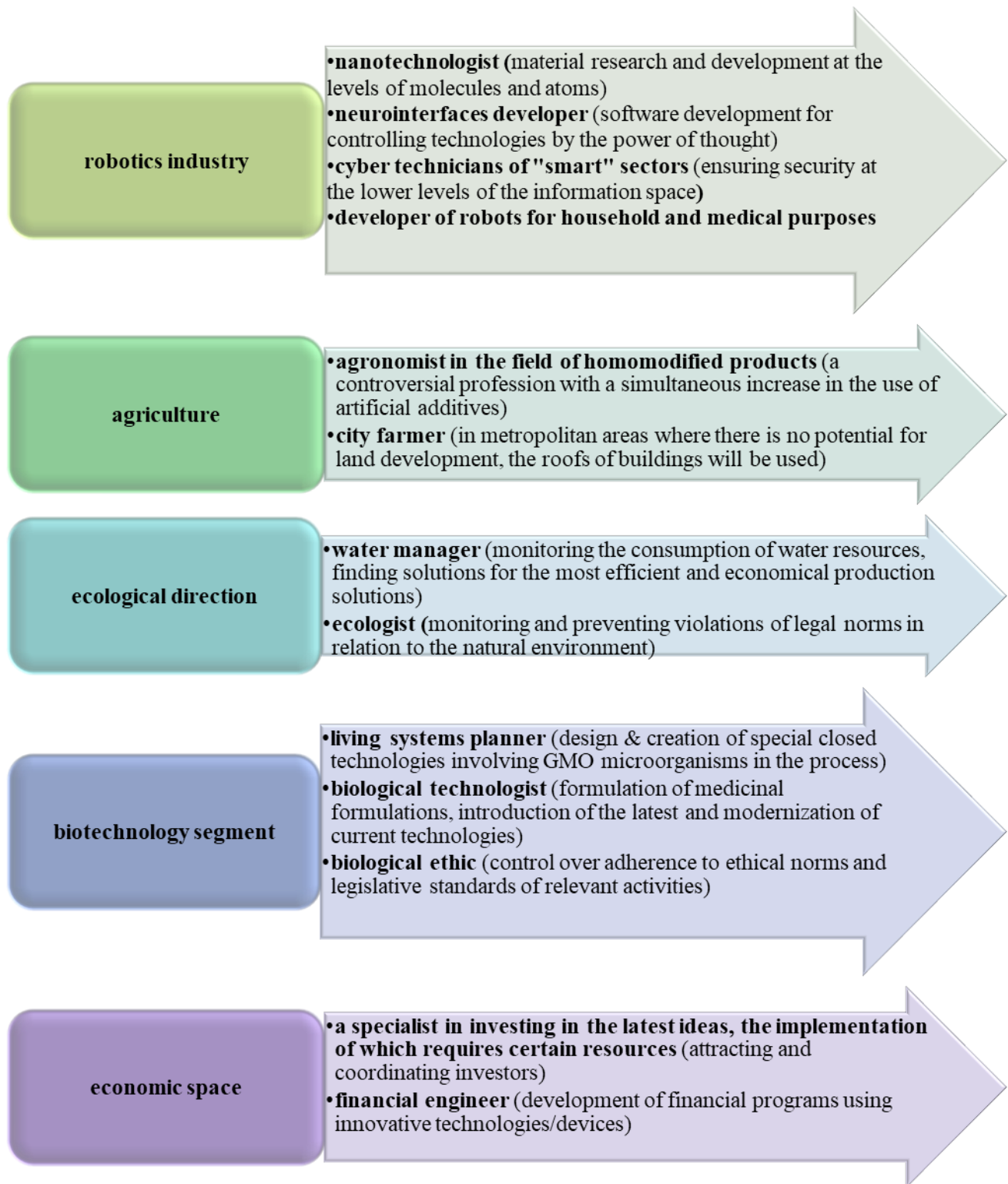
There are hopes for a breakthrough in the field of biotechnology, which leads to high demand for the relevant specialties.

In addition, technical professional directions are the future of each country and the world in aggregate, which marks the transition to the newest electronic technological era (Ananeva, 2017).

It is important that social professions are extremely relevant now and in the long term for different periods, because even in a technical breakthrough, inherent emotional and psychological difficulties occur with people.

With regard to the aesthetic side of human life, we also note a wide field of activity for the design direction, considering the constant technological modernization (Luksha, 2014).

Figure 3 shows grouped professions in demand in the short term, according to estimates and research of the Internet portal WomanAdvice.ru (2017).



*created by the authors

Figure 3. Professions in demand in the short term, according to the Internet portal WomanAdvice.ru*

As other value judgments reflect, the latest and already relevant for the present and future times of the profession are:

- consulting expert on life activities for the elderly generation;
- a surgeon in the field of increasing the volume of human memory;
- designers and “guides” at space stations;
- an expert on the prevention of involuntary climate change;
- employees of the online education environment;
- constructors of variable transport alternatives;
- information liquidator;
- specialists in social work with people in the space of social networks (Aranzhin & Nekhoda, 2019; Luksha, 2014).

In the near future, the demand for biotechnological specialists will actively manifest itself, since it is becoming increasingly important to replace outdated, but fundamental technologies in various sectors of the economy and areas of life with innovative and advanced biotechnology solutions.

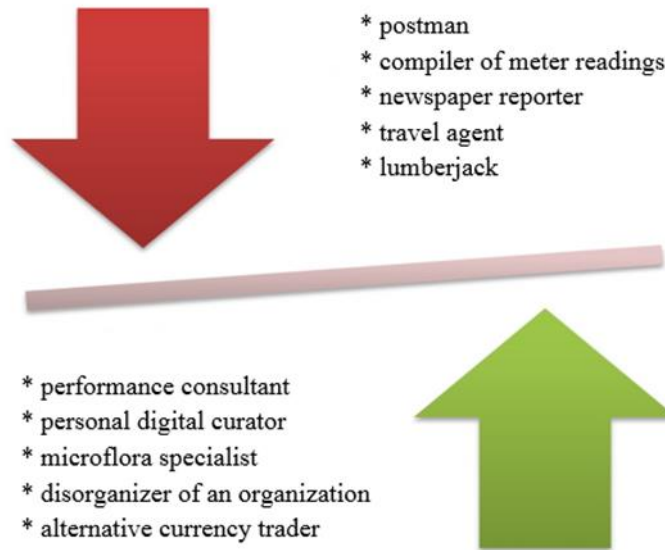
It is crucial that for economics and medicine, specialists who are grounded in modern theoretical research and can practically implement the latest technologies are urgently needed to develop new drugs of biological origin and/or restart synthetic ones, which will have specific properties and purposes (Luksha, 2014).

For several years, a specialist who selects composite components for the production processes of individual elements of special robotic devices with specific parameters will appear in the list of the most in-demand professions.

The positions of operators of robotic complexes with multifunctional purposes in developed countries, as well as specialists engaged in the design of industrial robotics, are especially in demand in modern digital conditions (Vatrak, 2016).

As for the current situation, in the Russian labor market, employers are searching for and attract only the best personnel for their own company. Demand is constantly growing, as well as competition for qualified employees in the fields of programming, development, analytics, microbiology, high-tech pharmaceuticals, and engineering, as well as specialists in the rocket and space complex and the chemical sphere, and sales management is increasing (Mandykh & Bykova, 2019; Urazov, 2017).

According to another special expert assessment, a rating was presented of professions that are increasing in relevance and becoming more and more in demand, as well as those that are rapidly leaving the labor market (five positions each) (Figure 4).



*created by the authors

Figure 4. Rating of professions that are increasing their relevance and are rapidly leaving the labor market*

4. CONCLUSION

We can comprehensively summarize that in the shortest time, the specifics of employment and the specifics of demand in the Russian labor market will change enormously. Therefore, it is important to prepare for this and, in addition, to learn how to adapt and respond flexibly to changes. However, the training of personnel for the digital economic space cannot be carried out without significant changes in the complex of vocational education in Russia.

REFERENCES

- Abuzyarova, D., Belousova, V., Krayushkina, Zh., Lonshcikova, Y., Nikiforova, E., & Chichkanov, N. (2019). The role of human capital in science, technology and innovation. *Foresight and STI Governance*, 13(2), 107-119. <http://dx.doi.org/10.17323/2500-2597.2019.2.107.119>
- Ananeva, T. (2017). Desyat kompetentsii, kotorye budut vostrebovany v 2020 godu [Ten competencies that will be in demand in 2020]. Retrieved from <http://tananyeva.com/desyat-kompetentsij-kotorye-budut-vostrebovany-v-2020-godu/>
- Aranzhin, V. V., & Nekhoda, E. V. (2019). Future labour values and skills: Structure and content. *Vestnik Tomskogo gosudarstvennogo universiteta. Ekonomika*, 48, 150-165. <http://dx.doi.org/10.17223/19988648/48/11>
- Lavrinenko, A., & Shmatko, N. (2019) Twenty-first century skills in finance: Prospects for a profound job transformation. *Foresight and STI Governance*, 13(2), 42-51. <http://dx.doi.org/10.17323/25002597.2019.2.42.51>
- Luksha, P. (Ed.). (2014). Atlas novykh professii [Atlas of new professions]. Moscow, Russia: Skolkovo Moscow School of Management and The Agency for Strategic Initiatives.

Mandych, I. A., & Bykova, A. V. (2019). Trends in innovation and investment development of high-tech enterprises. Russian Technological Journal, 7(5), 79-92. <http://dx.doi.org/10.32362/2500-316X-2019-7-5-79-92>

Merzlyakova, E. A. (2019). Transformatsiia chelovecheskogo kapitala v tsifrovoi ekonomike [Transformation of human capital in the digital economy]. Region: Sistemy, ekonomika, upravleniye, 4(47), 166-171.

Oganesyan, T. K., Styrin, E. M., Abdrakhmanova, G. I., Rozmirovich, S. D., Merkulova, D. Yu., & Bikbulatova, Yu. S. (2017). Tsifrovaia ekonomika: Globalnye trendy i praktika rossiiskogo biznesa [Digital economy: Global trends and practice of Russian business]. Moscow, Russia: National Research University "Higher School of Economics". Retrieved from <https://imi.hse.ru/data/2017/10/07/1159564192/!Цифровая%20экономика%20-%20глобальные%20тренды%20и%20практика%20российского%20бизнеса.pdf>

Polianskaya, O. A., Bessalova, V. V., & Tatarenko, V. N. (2018). Polozhitelnye i otritsatelnye tendentsii razvitiia tsifrovoi ekonomiki v Rossii [The positives and negatives of digital economy in Russia]. Saint-Petersburg Economic Journal, 3, 24-30.

Popkov, S.Yu. (2020). Human and labor in the digital post-crisis economy: Relationships, modern trends, statements, future professions, system solutions. Economic problems and legal practice, 16(2), 20-28.

Serditova, N. E., & Belotserkovsky, A. V. (2020). Education, quality and the digital transformation. Vysshee Obrazovanie v Rossii = Higher Education in Russia, 29(4), 9-15. <http://dx.doi.org/10.31992/0869-3617-2020-29-4-9-15>

Solina, K. (2017). Chemu nuzhno uchitsia segodnia, chtoby byt vostrebovannym zavtra [What needs to be learned today to be in demand tomorrow]. Retrieved from <https://hightech.fm/2017/11/02/polehin-riw>

Urazov, R. (2017). Navyki vmesto professii: Kak izmenitsia rossiiskii rynek truda [Skills instead of professions: How the Russian labor market will change]. RBC. Retrieved from <http://www.rbc.ru/opinions/business/18/10/2017/59e75a959a794776fde701b7>

Vatrak, V. (2016). Kompetentsii budushchego: Chto razvivat i s chem proshchatsia [Competences of the future: What to develop and what to say goodbye to]. Information and analytical portal HR-tv.ru. Retrieved from <https://hr-tv.ru/articles/author-opinion/kompetentsii-budushchego.html>

WomanAdvice.ru. (2017). Professii budushchego – kakie professii budut vostrebovany v budushchem? [Professions of the future – What professions will be in demand in the future?]. Retrieved from <https://womanadvice.ru/professii-budushchego-kakie-professii-budut-vostrebovany-v-budushchem>

Zorgner, A. (2019). Tekhnologicheskii progress, transformatsiia rynkov truda i spros na kompetentsii [Technological progress, transformation of labor markets and the demand for competencies]. Foresight, 13(S2), 6-8.