

II International Scientific Conference GCPMED 2019
"Global Challenges and Prospects of the Modern Economic Development"

DEVELOPMENT OF INNOVATIVE EMPLOYMENT IN THE
CONDITIONS OF DIGITALIZATION OF ECONOMY

M. V. Simonova (a)*, L. V. Sankova (b), F. I. Mirzabalaeva (c)
*Corresponding author

(a) Samara state University of Economics, 443090, Soviet Army St., 141, Samara, Russia, m.simonova@mail.ru

(b) Yuri Gagarin State Technical University of Saratov, 410054, Polytechnic St., 77, Saratov, Russia,
sankovalv@sstu.ru

(c) Plekhanov Russian University of Economics, 117997, Stremyanny Lane, 36, Moscow, Russia,
faridamir@yandex.ru

Abstract

The relevance of the study is due to the need to assess the emerging processes of digitalization of the economy in the aspect of the development of innovative employment at the Federal and regional levels. This article is aimed at the study of the current state of differentiation of regions in terms of innovativeness of employment and determining the impact of digitalization on its transformation. Within the framework of this study, both opportunities and limitations and growth points of a new type of employment are noted, including at the regional level. The authors emphasize the need to expand the problem field of new types of innovations in employment in the conditions of digitalization, new requirements for the skills of employees, the problem of the ratio of innovative employment profiles and opportunities of organizations in the aspect to provide the digital profiles of jobs and new challenges for employment policy. The article presents the typology of regions on a number of indicators of innovative employment, identifies intergroup transitions, justifies the emerging "information" profiles of employment, analyses the transformation of forms of innovative employment under the influence of digitalization processes. The materials can be of practical value for the development of employment policies at the regional and Federal levels, taking into account the "digital" and "innovative" profiles of regional economic systems, and can also be used in the study of regional asymmetry of digital profiles of the labor market.

2357-1330 © 2020 Published by European Publisher.

Keywords: Digital economy, innovative employment, digital competencies, regions.



This is an Open Access article distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

The process of digitalization of the economy determines a significant transformation of employment in general, new risks, opportunities and growth points. The most significant forms of such changes are the generation of new types of jobs, modification of the professional space, the formation of new competencies, forms of social and labor relations and collaboration. As a form of realization of the labor potential of the population, employment concentrates within its forms and types of the content aspects of the new-digital stage of economic development at the global and local levels. Modern economy with high information "capacity" has adequate innovative type of employment-flexible, dynamic, efficient, involving constant updating, new content, structure, types, forms of employment, improving the quality of human capital (Graetz & Michaels, 2017). Personnel, education, research competencies and technical background should be considered in the format of employment innovation, which is most directly related to the core of digitalization (OECD, 2016a). Achieving these objectives is closely linked to innovation, new technologies and materials, which require serious transformation in employment – the emergence of new types of jobs, the formation of digital competencies, the disappearance of old and the formation of new professions and so on (Osterman, 2013). At the same time, different rates of digitalization of employment are noted for traditional and innovative sectors of the economy (International Labour Organization, 2016). This problem has not received sufficient consideration in the modern scientific literature. Some aspects of the impact of digitalization on employment and jobs, their quality are reflected in the works of researchers (Ivaschenko, Simonova, Sitnikov, & Shornikova, 2019). The report of the European Foundation notes that the consequences of the "digitalization" of employment can range from a massive change in the number and sectoral composition of jobs to a radical reorientation of the labor organization (Eurofound, 2018). The rapid technological development of digital information processing and digital communication devices provide a technological opportunity for the expansion of new forms of employment with innovative elements.

Russia today is striving to achieve high rates of development of the digital economy: the level of digitalization, the share of the digital economy in GDP, etc. (the share of the digital economy in Russia's GDP is now about 3.9%, which is 2-3 times lower than that of the leading countries) (Baller, Dutta, & Lanvin, 2016). However, it should be borne in mind that behind these figures are real processes in the field of employment, which determine and create prerequisites for innovative development within the regions and in turn require the formation of appropriate "digital skills" that determine the possibility of effective employment.

One of the key characteristics of the digital phase of employment development is that it is fueled by a new type of innovation. In addition to making traditional scientific tools more powerful, digital technology provides new kinds of digital innovation through recombination, which practically does not require much effort of scientific research and development (SRD).

2. Problem Statement

Considering the nature of innovative employment, it should be emphasized that the conceptual basis of innovation is changing in the digital economy. Examples of a new type of innovation include

digitization of existing products and processes; new business models including platform enterprises, distributed manufacturing, block chains and ad-based "free services»; and innovative processes such as crowdsourcing (Manyika et al., 2017). Thus, it is legitimate to talk about both the expansion of the field of innovative employment and the transformation of its "core". For example, researchers (Hulten, 2017) show that the composition of the currently existing activities is a strong determinant of demand for labor skills, and changes in the composition due to technical innovations are a source of increasing demand for more complex skills. Foreign researchers analyse how online platforms affect market organization and employment; present an analysis of trends and consequences of non-standard employment in OECD countries and consider policy issues related to new forms of employment and work. In their view, the transformational effects of online platforms may challenge existing institutions and may require a review of policies and regulatory frameworks in many areas (OECD, 2016b). Researchers rightly note the complexity of the economic analysis of the digitalization process and the complexity of interpreting a number of functions of deciphering in the context of traditional economic models.

A new type of innovation in the conditions of digitalization is characterized by the following features:

- digitization of existing products and processes;
- firms face increasing pressure to innovate continuously and scale rapidly to ensure and maintain their competitiveness;
- the digital economy requires new types of leadership and behaviour, as well as more flexible approaches to governance (Baller, Dutta, & Lanvin, 2016). These areas, in turn, will influence the indicators of innovative employment and determine new profiles of regions in the common economic space.

The most important aspect of digitalization in the refraction of employment is the problem of skills. Turning to this aspect, we note the possibility of several situations: gaps, skill gaps and mismatches. Today, the problem of skills (their deficit or excess) is quite controversial in the academic and business communities in many countries (Cappelli, 2015).

3. Research Questions

The use of ICT at work changes the demand for three sets of skills related to ICT: General skills, special skills and additional ones. Studies have shown that the cross-country differences in demand for specialized ICT skills are much narrower than general skills. In 2014, the share of ICT professionals ranged from 5.9% in France and 1.6% in Ireland and Slovakia with most countries remaining around 3%. The increased use of ICT in employment increases the demand for new skills. This happens along three lines: the production of ICT products and services – software, web pages, e-commerce, clouds, big data, etc.; access to information on the Internet, the use of software; the use of ICT change the way of working and increase the demand for additional ICT skills, such as the ability to communicate on social networks, brand products on e-commerce platforms, etc.

Thus, the use of opportunities and the answer to the social challenges of digitalization presupposes the identification of trends and forms of digitalization in the aspect of the development of innovative

employment, accompanied by a change in the types, forms of employment, institutions and professional space.

4. Purpose of the Study

New global challenges in the field of digitalization of the economy involve the movement and transformation of jobs and professions in both traditional types of employment and in its innovative segment, in which the impact of digitalization is most noticeable (Abdrakhmanova et al., 2018). The replacement of less productive jobs and technologically obsolete jobs occurring in traditional sectors with more efficient and modern ones is a normal phenomenon in the modern economy and serves as a basis for improving the efficiency of the economy at the local, regional and federal levels. The purpose of the study is to identify trends, forms of manifestation of digitalization in the aspect of the development of innovative employment, accompanied by changes in the types, forms of employment, institutions and professional space, as well as to determine the regional specificity of this process.

5. Research Methods

Analytical methods and grouping methods based on the data of the Federal statistics service were used in the study (Federal Service of State Statistics, 2018). As the basis of grouping we selected the following: a) employment potential in the field of innovation production (number of students per 10 000 population); b) actual employment indicators (share of SRD personnel in the total number of employees); c) labour costs per 1 employee employed in the field of SRD; d) indicators of "output", the effectiveness of employment in the innovation sphere (innovative activity of organizations). The number of issued patents and security documents can also be considered as an indicator of the productivity of workers in this field. However, we found it possible to use a more traditional indicator (Simonova, Mirzabalaeva, & Sankova, 2019).

Grouping of regions by indicators of employment in the sphere of production of innovations was carried out by us in two stages: according to the data of 2000, 2005 and 2011 and the data of 2013-2016 (which is due to the characteristics of these periods and the availability of the necessary statistical base in the regional context). The normalized values of the selected indicators were used in the calculations.

6. Findings

As a result, we have conditionally identified several groups in the regional space:

- regions-leaders with the developed employment in the innovative sphere;
- regions with steadily developing employment in the innovation sector;
- mid-zone regions with employment growth potential;
- regions with "inefficient " employment in the innovation sector and with high costs for SRD personnel;
- regions - outsiders with low monetary and resultant indicators of employment in the innovation sector.

In the next study period, covering 2013-2016, five groups of regions with different parameters directly and indirectly characterizing the dynamics of employment in the production of innovations were formed.

Let us consider in more detail the content characteristics of the formed groups.

The first group is characterized by a high proportion of staff employed in SRD in the total number of employees in the region; above average is the indicator of innovative activity and the number of students per 10,000 population; the average level of labor costs for SRD personnel.

For the regions of the second group, the distinctive features are the highest indicators of innovation activity; the average number of students per 10,000 population; lower than average are labor costs and a small proportion of SRD personnel in the total number of employees.

The third group includes the regions with the highest costs for the remuneration of personnel engaged in SRD; indicators of innovation activity and the number of students per 10,000 population are below average.

Regions of the fourth group are characterized by innovative activity, number of students per 10,000 population which is below the average; the average level of costs of the worker in R&D and the dynamics of growth with low share of personnel involved in SRD in total employment.

The fifth group combines the regions with the least favourable situation - all indicators are below average.

The analysis of employment in the context of federal districts shows that the undoubted leader in quantitative indicators of its innovative component is the Central Federal district, followed by the North-Western, Volga and Ural districts. The lowest rates were observed in the study period in the North Caucasus Federal district. An appeal to the rating of constituent entities of the Russian Federation in terms of the index of scientific and technological development shows that the leading positions are held by Moscow, St. Petersburg and the Republic of Tatarstan. The top positions of the two capitals are due to the historically high level of development of science and technology, the concentration of leading research institutes, the presence of major universities and significant financial opportunities. Also the top ten on this index includes the Moscow region, Perm region, Sverdlovsk region, Tula region and Tomsk region. The most ambiguous composition of the group and inter-group transitions are typical for the study period for the second group of regions. In 2014, the composition of the second group completely changed. From 2014 to 2016, among the subjects of the second group, only a few regions remain in it - Lipetsk region, the Republic of Tatarstan, the Chuvash Republic and the Penza region. In 2015, the group includes Belgorod, Voronezh, Ryazan regions, the Republic of Mordovia, Altai Krai and a number of others, but only the listed regions managed to consolidate their positions in this group. Some regions have moved to the third group (in particular, Kursk, Orel, Astrakhan regions, etc.), which reflects rather the deterioration of positions on the parameters of innovative employment. Within the second group of regions in 2017, the share of organizations using PCs in activities was highest in the Republic of Tatarstan (99.8%) and the Voronezh region (99.8%). The lowest values are typical for the Republic of Mordovia (82%) and the Rostov region (85.1%). In other regions, the indicators exceed the national average (except for the Republic of Chuvashia).

7. Conclusion

The typology constructed by us allows supplementing the already existing one (developed on criteria of a social and economic condition, innovativeness) that creates more complete, multidimensional picture of asymmetry of regional economic and innovative space in Russia taking into account import substitution strategies and reference points of industrial policy. It should be noted that there is no complete synchronization of the change of the selected criteria. The researches have made the following conclusions: regions of Russia are characterized by the uneven development of different aspects of innovation processes and the factors influencing them; not confirmed the hypothesis about the relationship between balance various aspects of innovative development of regions and their ranking success; long-term impact of coordinated actions in the sphere of innovation development by the authorities, companies, universities and research organizations; inconsistent policy of regional authorities increases the volatility of the region's position in the ranking, but does not lead to sustainable growth; a territorial distribution of regions with different levels of innovation development can be characterized as steadily uneven, etc..

Referring to the influence of digitalization processes on employment models in the regions allows us to highlight the following feature. In the course of digitalization and automation of production processes, the effects on employment can be observed to a greater extent both in the leading regions and outsiders. Our analysis allows us to state the different starting positions of the regions on the development of innovative employment and filling it with information capacity. Further study of the information profiles of regional models of innovative employment requires a more detailed analysis of the “core” of the relationship of employment - workers (with relevant competency models) and jobs. At the same time, an important stage of the study should be the classification of new types of jobs, systematization of professional skills and prerequisites for the formation of new competencies in the digital economy. To date, data about the digital profile of employment in the region are significantly limited.

Thus, the processes of digitalization in various guises affected all elements of socio-economic systems at all levels of their hierarchy to varying degrees, which in turn is determined by the influence of many factors. Among them, the innovative susceptibility of economies, the availability of personnel with appropriate training, focus on the development of appropriate infrastructure, etc. The process of digitalization is irreversible and will have a significant impact on the structure of the economy, labor resources, the creation and elimination of jobs, the emergence and obsolescence of professions, innovation, etc. The most important condition and consequence of the impact of digitalization on employment today is the need to ensure decent work and effective social dialogue, which in turn will contribute to the sustainable development of the economy at the regional and national levels.

References

- Abdrakhmanova, G. I., Vishnevsky, K. O., Gokhberg, L. M., Demyanova, A. V., Dranev, Yu. Ya., & Fursov, K. S. (2018). *Digital economy: A brief statistical compilation*. Moscow: Nat researched University "Higher School of Economics". Retrieved from: <https://issek.hse.ru/data/2018/12/26/1143130461/ice2019kr.pdf> Accessed: 12.10.19. [in Rus.].
- Baller, S., Dutta, S., & Lanvin, B. (Eds.) (2016). *The global information technology report 2016: Innovating in the digital economy*. Geneva: World Economic Forum and INSEAD. Retrieved

- from: <https://www.insead.edu/sites/default/files/assets/dept/globalindices/docs/GITR-2016-report.pdf> Accessed: 12.10.2019.
- Cappelli, P. H. (2015). Skill gaps, skill shortages, and skill mismatches: Evidence and arguments for the united states. *Industrial and Labor Relations Review*, 68(2), 251-290. <https://doi.org/10.1177/0019793914564961>
- Eurofound (2018). *Non-standard forms of employment: Recent trends and future prospects*. Dublin: Eurofound. Retrieved from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1746en.pdf Accessed: 13.11.2019.
- Federal Service of State Statistics (2018). *Socio-economic indicators*. Retrieved from: http://www.gks.ru/free_doc/doc_2018/region/reg-pok18.pdf Accessed: 12.10.2019. [in Rus.].
- Graetz, G., & Michaels, G. (2017). *Is modern technology responsible for jobless recoveries?* Centre For Economic Performance: CEP Discussion Paper, 1461. Retrieved from: <http://cep.lse.ac.uk/pubs/download/dp1461.pdf> Accessed: 12.10.2019.
- Hulten, Ch. (2017). *The importance of education and skill development for economic growth in the information era*. National Bureau of Economic Research. Working Paper 24141. Retrieved from: <https://www.nber.org/papers/w24141> Accessed: 13.11.2019.
- International Labour Organization (2016). *Summary of the World Employment and Social Outlook - Trends 2016*. Retrieved from: http://www.ilo.org/global/research/global-reports/weso/2016/WCMS_443472/lang--en/index.htm Accessed: 12.10.2019.
- Ivaschenko, A. V., Simonova, M. V., Sitnikov, P. V., & Shornikova, O. V. (2019). Big data analysis for hr management at production enterprises. In V. Mantulenko (Ed.), *Proceedings of the International Scientific Conference "Global Challenges and Prospects of the Modern Economic Development" European. Proceedings of Social and Behavioral Science*, 57 (pp. 463-471). London: Future Academy. <https://doi.org/10.15405/epsbs.2019.03.46>
- Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., ..., Sanghvi, S. (2017). *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages*. Retrieved from: <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages> Accessed: 13.11.19.
- OECD (2016a). New skills for the digital economy Measuring the demand and supply of ICT skills at work. *OECD Digital Economy Papers*, 258. Retrieved from: <http://dx.doi.org/10.1787/5jlwnkm2fc9x-en> Accessed: 12.10.2019.
- OECD (2016b). Working party on measurement and analysis of the digital economy. *OECD Digital Economy Papers*, 260, OECD Publishing, Paris. Retrieved from [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/IIS\(2015\)13/FINAL&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/IIS(2015)13/FINAL&docLanguage=En) Accessed: 12.10.19.
- Osterman, P. (2013). Introduction to the special issue on job quality: What does it mean and how might we think about it? *Industrial & Labor Relations Review*, 66(4), 739-752. <https://doi.org/10.1177/001979391306600401>
- Simonova, M. V., Mirzabalaeva, F. I., & Sankova, L. V. (2019). Differentiation of regional labor markets: New risks and opportunities for smoothing. In S. Ashmarina, M. Vochozka (Eds.), *Sustainable Growth and Development of Economic Systems. Contributions to Economics* (pp. 259-274). Cham: Springer. https://doi.org/10.1007%2F978-3-030-11754-2_20