Zborník vedeckých príspevkov z medzinárodnej vedeckej konferencie

### VPLYV INDUSTRY 4.0 NA TVORBU PRACOVNÝCH MIEST 2019

21. novembra 2019 Hotel Krym, Trenčianske Teplice Slovenská republika



Proceedings of scientific papers from the international scientific conference

# THE IMPACT OF INDUSTRY 4.0 ON JOB CREATION 2019

21. November 2019 Hotel Krym, Trenčianske Teplice Slovak Republic

Publishing House Alexander Dubček University in Trenčín 2020

#### Recenzenti/Reviewers:

- > prof. RNDr. Jaroslav Holomek, CSc.
- > doc. Ing. Adriana Grenčíková, PhD.
- > doc. Ing. Jozef Habánik, PhD.
- ➢ prof. Dr. Rolf Karbach
- > prof. Dr. Valentinas Navickas, PhD.
- > prof. Ing. Eva Rievajová, PhD.
- doc. Ing. Peter Sika, PhD.
- 🕨 doc. Dr. Nikolai Siniak
- > doc. PhDr. Jana Marie Šafránková, CSc.
- > doc. Mgr. SergeVojtovič j, DrSc.

Zostavovateľ/Editor:

➢ Ing. Marcel Kordoš, PhD.







Konferencia je organizovaná v rámci riešenia projektu VEGA č. 1/0430/18 Conference was organized within the project VEGA reg. n. 1/0430/18

Za obsahovú a jazykovú stránku príspevkov zodpovedajú autori.

Authors are responsible for the content, linguistic and stylistic editing of their papers.

© Trenčianska univerzita Alexandra Dubčeka vTrenčíne, Fakulta sociálnoekonomických vzťahov, 2020

© Alexander Dubček University in Trenčín, Faculty of Social and Economic Relations, 2020

**ISBN 978-80-8075-903-2** © FSEV TnUAD, Trenčín 2020

OBSAH	
Úvod / Introduction	13
THE IMPORTANCE OF INTERCULTURAL COMPETENCE IN	4.4
<b>ORGANIZATIONS DURING THE 4TH INDUSTRIAL REVOLUTION</b> <i>Ruta ADAMONIENE, Martina BLAŠKOVÁ, Ruta PETRAUSKIENE, Rimantas RAULECKAS</i>	14
THE IMPACT OF 4.0 INDUSTRIAL DEVELOPMENT ON THE FUTURE TRAINING OF POLICE OFFICERS	24
Ruta ADAMONIENE, Aurelija PŪRAITĖ, Vytautas ŠLAPKAUSKAS	
DISCOVERING GENERATIONAL DIFFERENCIES IN EMPLOYER ATTRACTIVENESS: THE CASE OF FINANCIAL ORGANIZATION	25
Irena BAKANAUSKIENĖ, Asta KYGUOLIENĖ, Lina ŠIUMETĖ	
VPLYV INDUSTRY 4.0 NA ZMENY V ŠTRUKTÚRE PRACOVNÝCH MIEST Impact Industry 4.0 to Changes in the Structure of Jobs	44
Vladislav BERKOVIČ, Tatiana MASÁROVÁ, Adriana GRENČÍKOVÁ	
TREND ANALYSIS OF INDUSTRY DIGITIZATION IN EU MANUFACTURING SECTOR	52
Daiva BIČKAUSKĖ, Žaneta SIMANAVIČIENĖ, Artūras JAKUBAVIČIUS	
LABOR MIGRANTS AS A RESOURCE FOR THE SHADOW ECONOMY IN A CONTEXT OF TRANSITION TO INDUSTRY 4.0	63
Irina BRITVINA, Polina SHUMILOVA, Dmitriy ZAKHAROV	
ZVYŠOVANIE ODOLNOSTI A KONKURENCIESCHOPNOSTI PRIEMYSELNÝCH PODNIKOV NA VONKAJŠIE A VNÚTORNÉ VPLYVY	
POMOCOU IMPLEMENTÁCIE MANAŽMENTU RIZÍK V PROJEKTOVOM RIADENÍ	70
Increasing the Resilience and Competitiveness of Industrial Enterprises to External and Internal Impacts through the Implementation of Risk Management in Project Management	
Michal BRUTOVSKÝ, Katarína BUGANOVÁ	
ZVYŠOVANIE KONKURENCIESCHOPNOSTI PODNIKOV PROSTREDNÍCTVOM IMPLEMENTÁCIE MANAŽMENTU RIZÍK V	
KONTEXTE KONCEPCIE INDUSTRY 4.0 Increasing the Competitiveness of Enterprises through the Implementation of Risk	79
Management in the Context of the Industry 4.0 Concept Katarína BUGANOVÁ, Jana ŠIMÍČKOVÁ	
THE IMPACT OF DIGITAL ECONOMY ON THE EMPLOYMENT AND CAREER PROSPECTS OF MANAGEMENT SPECIALISTS	07
Aleksey CHECHULIN, Ekaterina USACHEVA	ð/
THE IMPACT OF THE INDUSTRIAL REVOLUTION ON THE POPULATION EMPLOYMENT STRUCTURE	
IN THE AGRARIAN ECONOMY SECTOR	۵/
Nadiya DAVYDENKO, Olena LEMISHKO	

#### THE STRATEGIC APPROACH TO THE INNOVATIVE DEVELOPMENT OF RUSSIAN ECONOMY

#### Marina IZMAILOVA<sup>52</sup> Mikhail ABRASHKIN<sup>53</sup> Margarita SAVINA<sup>54</sup> Martin ŠIKÝŘ<sup>55</sup>

**Abstract:** The goal of the paper is to present an authors' concept of the strategic approach to the innovative development of the Russian economy developed in order to make Russia one of the most technologically advanced countries in the world. Achieving the goal of the paper is based on the results of the authors' research focused on the critical analysis of the state participation in the innovative development of the Russian economy. Based on these results the paper discusses the role of the state in the strategic management of the innovative development of the Russian economy, summarizes proposals the state participation in the innovative development of the state participation in the innovative development of the Russian economy, and presents scenario variants of the innovative development of the Russian economy. The results support research assumption that making Russia one of the most technologically advanced countries in the world require urgent and complex innovative technological renovation of all areas of the economy. Only this can bring a real innovative character to the Russian economy.

Key words: innovative development, economic growth, Russian economy

JEL Classification: R10, R58, O32

#### **1. INTRODUCTION**

The paper actuality is determined by the necessity of seeking new tools for the modernization of the Russian economy based on the acceleration of the innovative development (Gorokhova, Šafránková, & Sekerin, 2015). The innovative breakthrough of Russia is becoming possible through providing formation of the new scientific and industrial policy (Spitsin, Mikhalchuk, Chistyakova, Spitsyna, & Pavlova, 2018) focused on technological upgrading of all economic landscape, attaching really innovative character to the economy (Sekerin & Gorokhova, 2016). The world-wide experience analysis of technological countries proves that in modern reality innovations are an effective tool of solving strategic tasks within the all national economy (Li, Hou, & Wu, 2017) and each particular company as they determine development acceleration rate, leadership strengthening and leaving behind competitors, creating timely protection from hurt for the branch in the case of radical innovation introduction, making economically unreasonable the whole business (Schuh, Potente, Wesch-Ponte, Weber, & Prote, 2014). These tasks should be solved in the shortest period in Russia, because developed countries have from 3 to 5 years to bring to an end structure rearrangement, after that period new leaders appear who will be able to capture a new long wave of economic growth (Glazyev, 2017). Russia should not omit the chance to become one of the leaders. That's why it's necessary to implement powerful initiative impulse in accelerating a new technological renovation.

<sup>&</sup>lt;sup>52</sup> Prof. Financial University under the Government of the Russian Federation, , Leningradsky prospect 49, Moscow, 125993, Russian Federation, e-mail: m.a.izmailova@mail.ru

<sup>&</sup>lt;sup>53</sup> Assoc. Prof. State Budgetary Higher Educational Institution Moscow Region University of Technology, ul. Gagarin, 42, Moscow region, Korolev, 141070, Russian Federation, e-mail: abrashkinms@mail.ru

<sup>&</sup>lt;sup>54</sup> Prof. Russian State Social University, Vilgelm Pik str.,4, building 1, 129226, Moscow, Russian Federation, email: marg.savina@yandex.ru

<sup>&</sup>lt;sup>55</sup> Assist. Prof., PhD. Czech Technical University in Prague, Masaryk Institute of Advanced Studies, Kolejni 2637/2a, 160 00, Praha 6, Czech Republic e-mail: martin.sikyr@cvut.cz

#### 2. PROBLEM FORMULATION AND METHODOLOGY

The goal of the paper is to present an authors' concept of the strategic approach to the innovative development of the Russian economy developed in order to make Russia one of the most technologically advanced countries in the world.

Achieving the goal of the paper is based on the critical analysis of the state participation in the innovative development of the Russian economy using empirical and statistical data on innovations and the development of Russian economy available in the scientific literature and provided by the Russian Federal State Statistics Service (Rosstat). To formalize and summarize the results of the analysis, comparative, abstract-logical, inductive-deductive and statistical methods were used. Based on the results of the analysis, it was possible to discuss the role of the state in the strategic management of the innovative development of the Russian economy, summarize proposals the state participation in the innovative development of the Russian economy, and present scenario variants of the innovative development of the Russian economy. Authors current results of the researches have been summarized in the study edited by Veselovsky (2018).

#### 3. PROBLEM SOLUTION / RESULTS / DISCUSSION

The authors' research results are presented in three aspects: 1) in revealing state role in strategic management of innovative development of the Russian industry; 2) in elaboration of suggestions on state policy perfection in the field of innovative development of the Russian industry; 3) in forecasting scenario variants of the industry in Russia.

## 3.1 The role of the state in strategic management of innovative development of the Russian industry

In Russia the state makes considerable efforts to support demand on innovation both subsidizing innovative companies and distributing orders directly to the innovative products. Russia is the eighth in the world in spending on research a development (Rosstat, 2018). At the same time co-financing program introduction of scientific research and experimental constructive work and extending preferences and benefits for the companies implementing scientific-research and experimental constructive work on priority guidelines can become additional measures to increase demand for innovations (Veselovsky & Izmailova, 2019). Besides, the state can play a considerable role in creating demand of highly technological branches product from the big business. Having been a shareholder of the biggest companies, the state can stimulate its involvement in the system work on innovations by the set of tools of corporative management (Kordos, 2019; Kordos, 2018). In particular, the following innovation effectiveness estimation indices can be considered: share of innovative products in receipts, investment of innovations in the revenue's growth, size and structure of innovative projects portfolio, innovative strategy availability and its quality, roadmaps of partnership development for innovations (Sekerin & Gorokhova, 2016).

The state provides environment and terms for the development of innovations in the country (see The Strategy for Innovative Development of the Russian Federation until 2020) creating necessary infrastructure, which includes the educational system, innovative clusters and peculiar economic zones, agencies and innovation development institutions, intellectual property protection and law system, system of standards, certifications and accreditation, as well as institutional environment, including favourable conditions for running business and fiscal policy (Kurakova, Zinov, & Tsvetkova, 2014). But in spite of it, there hasn't been qualitative leap in innovation and entrepreneur activity in the country yet. That's why there is an improvement conditions potential as before.

Development of science and production cooperation, guidelines accuracy of specialized clusters development and agencies for innovation development as well as stimulation of appearing in the market and technological brokers and engineering centres formation are the key tasks of infrastructure perfection requiring purposeful attention (Westerman, Bonnet, & McAfee, 2014). There are five innovative agencies in the world four of which are functioning successfully in Russia (table 1), while activity of the agency which should stimulate science and production cooperation is developed least of all (Knyaginin, Kudrin, & Rozhkova, 2017).

This is the close interaction of science and business which makes possible scaling and introduction of innovative ideas, arising in the process of fundamental and applied researches. This guideline can be developed, for example, establishing consortiums and increasing effectiveness of the areas for communication on innovation problems between players from different branches, start-ups and research institutes and change of experience and technologies (Li et al., 2017).

Areas of activity of innovation agencies	Specialization	Examples in Russia
Cooperation of science and production	Comprehensive support of associations or joint projects with enterprises and research institutes or higher school participation	The function of this type of agencies is implemented by technological areas partially
Strategic programs of researches	Financing of fundamental or applied researches	Russian scientific fund, Russian fund of fundamental research
Services for innovative companies	Techno parks, incubators and centres of technology transition, rendering consultative services for innovative companies	Innovative centre "Skolkovo" Techno park "Mosgormash"
Financing of innovative companies	Direct financing by granting, credit arrangement, guarantees and financing by share issue	Fund of innovation assistance "Vebinnovation"
Financing of priority guidelines	Financing of guidelines and groups of companies	Fund of internet initiatives development

Table 1: Types of agencies and institutions for innovation development

Source: authors based on Veselovsky et al. (2018)

Although technological platforms have also been playing the role in them yet, company representatives – leaders of the branches often don't participate in them, but it's necessary for the effective dialogue. It's important to go on development of specialized clusters on priority guidelines, financing their activity and helping in determining priorities of the next development stage. A specialized agency on production and science cooperation could be a centre of competence for different clusters, consortiums and other interaction formats of scientific and business environment. It could determine a priority development guideline in this branch, coordinate actions of the agency and support measures of different clusters, technological platforms and other consolidating systems.

### 3.2 Proposals on state policy perfection in the field of Russian industry innovative development

The systemic view supposes the complex of measures on the content of the economic development policy aimed at industry innovative development (Veselovsky & Izmailova, 2019):

- to reduce percentage rates and to create mechanisms of innovative and investment activity refinancing through target monetary issue under obligations of the government, state

development institutions, enterprises envisaged by federal and regional investment programs, projects of development institutions, special investment contracts within strategic and indicative planning systems;

- to exempt from taxation incomes of enterprises aimed at investment to implement scientific research and experimental constructive work, mastering new technologies, production development, accelerated amortization of main funds on the basis of depreciation deduction target use;
- double increase (as minimum) the budgetary means expenditures on financing scientific applied research, launching target scientific-technical-technological program complex on the basis of state support of innovative activity implementation on economic development perspective guidelines;
- to increase (repeatedly) refinancing and development institutions effectiveness raising by the Bank of Russia associated with planning arrangement of their investment activity in according to the accepted priority guidelines of modernizing and economic development;
- to establish the state off-budgetary investment credit fund (the analogue of German KFW) at the expense of the target credit emission;
- to establish modern information infrastructure of scientific research and entrepreneur activity;
- to provide effective protection of Russian intellectual ownership rights including abroad, to assist supporting new technological import.
- To establish the management system of industry modernization and technological development it's necessary (Glazyev, 2015):
- to elaborate and introduce the target program implementation mechanism outpacing economic development provided the new technological structure establishment; the program should envisage measures of investment volume increase for development of components of a new technological setup of productive technological complexes, creation of favourable macroeconomic environment and formation of appropriate institutions and outlines of management;
- to create a strategic planning system in which it's necessary to establish priorities of economic development and scientific technical activity, envisage elaboration of indicative plans and programs of their implementation;
- to implement as quick as possible the federal law "on strategic planning" requiring the additions by procedures formation choice of priority guidelines scientific technical progress and planning of measures for their implementation, by adopting target indices of developing institution activity;
- to submit activity of all bodies implementing macroeconomic regulation, including Bank of Russia and Department of Finance of the Russian Federation, as well as state corporations for achievement task goals and decision in the field of economy modernization, its technological development and scientific technical potential of full value. Implementation of this measure requires carrying out indicative planning of joint activity of the state and companies in concluding and realizing investment contracts in which the form of responsibility for observance of all adopted obligations should be provided.

#### 3.3 Scenario variants of innovative development of Russia

Implementation of abovementioned approaches to a new policy of innovative development – at the stage of digital economy establishing – is capable to take the country to the main stream

of civilization technological development (Glazyev, 2017). Nevertheless, in according to the strategic documents revealing conceptual approaches to innovative development of Russian possibility of innovative development three scenarios implementation in the country is envisaged (Morozyuk, Sharkova, Merkulina, & Vasilyeva, 2017):

- acceleration capability scenario orients economy to purchase import technologies and equipment, reduction of state expenditures on scientific-educational branch and innovative activity accompanying salary administration growth stagnation in the budgetary sphere;
- the scenario of running down development envisages modernization of economy on the basis of import technologies introduction, increasing competitiveness of labour and capital at the international market at the expense of the investments involvement, state finances are directed to the infrastructure projects and salary administration growth in the state sector;
- scenario of the leading development covering fundamental research and the main scientifictechnical sectors will permit to modernize mentioned spheres, to start export of non-raw products, to achieve considerable rate of the economic growth. It will provide competitiveness of the domestic economy in the whole. Considerable growth of the state expenditures on the development of the human capital, scientific and innovative sphere, and scientific technical research results commercialization is provided.

Analysing each of the presented scenarios and taking into consideration the current situation in Russia and in the world characterized by geopolitical and economic instability the scenario of our country leading development involving a range of perspective guidelines is considered to be the most adequate (Veselovsky, 2018):

- increase of power of the industrial and technological potential, first of all at the expense of acting development and establishment of new technological productions;
- transition to the non-raw specialization of economy including through establishment of highly technological processing production for the competitive products issue;
- implementation of import replacement program with support of domestic commodities producers, increasing export effectiveness against the background of import curtailment, motivation of domestic consumer demand growth of population on the domestic product;
- increasing energy- and resources efficiency of ownership management, infrastructure development which can minimize sanction costs in all sectors of economy;
- establishment of the leading development zones within which it's possible to implement mega- and infrastructure projects;
- attracting domestic and foreign investments on the basis of taking rational decisions for implementation of considerable investment projects, including ones on the principles of public-private partnership;
- creation of stimulus for the enterprise innovative activities, reduction of region polarization on the basis of region strategic management, increasing potential of subsidized regions;
- increasing steadiness of the financial system, ranging flexible tariff, customs and tax policy, budget financial support of the small and medium business;
- guarantee provision of population social protection, solving demographic problems, etc.

To achieve the specified results, it's necessary to consider the following conditions (Glazyev, 2015):

- establishing favourable conditions in the country for entrepreneur development and innovation stimulation, attraction of professionals with creative thinking and aimed at the making innovative products in the science and highly technological sectors;
- increasing innovative investment attractiveness of the country and on its base strengthening its competitive positions;
- establishment and development of economic environment which forms demand on innovations;
- successful implementation of innovative policy in the regions and in the whole country.

In the terms of risk and turbulent environment implementation of the whole complex of measures capable to transit economy of Russia to the innovative development way should be based on the adoption of balanced management decisions.

#### **4. CONCLUSION**

Earlier the state role in the innovative process was to establish innovative environment in which all participants of the market could work out and introduce effectively innovations as well as to sponsor fundamental sciences and new elaborations. In the modern coming up with every day complicating world when there is a high degree of interpenetration of branches and growing speed of changing the role of the state is becoming more considerable (Hermann, Pentek, & Otto, 2016). Carrying out policy of country innovative development involving elaboration and implementation of the industry development strategy the state not only assists in financing strategic important perspective projects, but influences directly how branches are developed innovatively.

For large scale innovations it's necessary principally a new level of big business, state, science and technological entrepreneur interaction (Schuh et al., 2014). Innovations are very often associated with start-ups, but at the same time big companies and fundamental researches are the sources of the biggest part of global innovations. Consequently, in the scale of the country involvement of the big business into innovative process will play the most important role. In view of the fact that innovations require a wide set of competences and serious resources which aren't often available in the separate company the decisive factor of introduction of innovative solutions and their successful commercialization is becoming partnership and effective interaction of a wide range of innovative activity participants.

#### REFERENCES

- [1] Glazyev, S. Yu. (2015). About Urgent Measures of Economic Security Strengthening of Russia and Withdrawal of Russian Economy to the Trajectory of Forestall Progress. Moscow: Institute of economic strategies, p. 356.
- [2] Glazyev, S. Yu. (2017). *Economy of the Future. Does Russia Have any Chance?* Moscow: Book world, p.256
- [3] Gorokhova, A. E., Šafránková, J. M., & Sekerin, V. D. (2015). Potential of New Management Technologies for Growth of the Industrial Companies' Efficiency. In: *T. Loster & T. Pavelka* (*Eds.*), *The 9th International Days of Statistics and Economics*, pp. 477-486. Retrieved from https://msed.vse.cz/msed\_2015/article/54-Gorokhova-Anna-paper.pdf
- [4] Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for industry 4.0 scenarios. In: T. Bui & R. H. Sprague, Jr. The 49th Hawaii International Conference on System Sciences, pp. 3928-3937.

- [5] Kordos, M. (2019). British-Slovak Foreign Trade Relations: Consequences of Brexit. *Marketing and Management of Innovations*, iss. 3, pp. 341-353. DOI: 10.21272/mmi.2019.3-26
- [6] Kordos, M. (2018). Risk Assessment of SMEs under Engaging in Cluster Cooperation in Terms of their Territorial Impact in Slovakia Within the EU Context. In: Proceedings of the 4th International Conference on European Integration 2018 (ICEI 2018), PTS 1-3, Book Series: International Conference on European Integration. pp. 773-780.
- [7] Knyaginin, V. N., Kudrin, A. L., & Rozhkova, E. S. (2017). *New technological revolution*. Moscow: Centre of strategic elaborations, p.206
- [8] Kurakova, N. G, Zinov, V. G., Tsvetkova, L. A. (2014). National Scientific Technological Policy of "Quick Reaction": Recommendations for Russia. Moscow: Publishing House "Business".
- [9] Li, G. P., Hou, Y., & Wu, A. (2017). Fourth industrial revolution: Technological drivers, impacts and coping methods. Chinese Geographical Science, 27(4), 626-637.
- [10] Morozyuk, Yu. V., Sharkova, A. V., Merkulina, I. A., & Vasilyeva, O. N. (2017). Innovative aspects of development of the waste recycling industry in the new economic context: problems and prospects. *Journal of Environmental Management and Tourism*, 8 (3), pp.507-515.
- [11] Rosstat (2018). *Metodologicheskaja baza Rosstata: Rossijskij statisticheskij ezhegodnik.* Available at: http://www.gks.ru
- [12] Schuh, G., Potente, T., Wesch-Ponte, C., Weber, A. R., & Prote, J.-P. (2014). Collaboration mechanisms to increase productivity in the context of industry 4.0. *Procedia CIRP*, 19, pp.51-56.
- [13] Sekerin, V. D., & Gorokhova, A. E. (2016). Assessment technique of innovative production competitiveness. In: *T. Loster & T. Pavelka (Eds.), The 10th International Days of Statistics and Economics*, pp. 1627-1636. Retrieved from http://msed.vse.cz/msed\_2016/article/123-Sekerin-Vladimir-paper.pdf
- [14] Spitsin, V., Mikhalchuk, A., Chistyakova, N., Spitsyna, L., & Pavlova, I. (2018). Development of innovative industries in Russia under unfavourable external environment. *Equilibrium-Quarterly Journal of Economics and Economic Policy*, 13(3), pp.467-485.
- [15] The Strategy for Innovative Development of the Russian Federation until 2020. The Decree of the Government of the Russian Federation on December 8, 2011, No 2227-r.
- [16] Veselovsky, M. Y. (Ed.). (2018). *Povysheniye innovatsionnoy aktivnosti promyshlennykh predpriyatiy*. Moscow: Publishing House Scientific Adviser.
- [17] Veselovsky, M. Y., & Izmailova M. A. (Eds.). (2019). Innovacionno-těchnologičeskaja transformacija promyšlennosti v regionach Rossii kak instrument dostiženija stratěgičeskich celej na puti stanovlenija cifrovoj ekonomiki. Moscow: Publishing House Scientific Adviser.
- [18] Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading Digital Turning Technology into Business Transformation*. New York: Harvard Business Review Press.