

PEDTR 2019**18th International Scientific Conference “Problems of Enterprise Development:
Theory and Practice”****IMPROVING BUSINESS COMPETITIVENESS USING
INDUSTRIAL DIGITAL PLATFORMS**

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Abstract

The solution of the main problems of increasing the competitiveness of business entities is everywhere connected with the accelerated introduction of innovative methods of organization and management of enterprises on the basis of digital technologies and wide socialization. It is shown that newly emerging super-efficient technologies, which are based mainly on the principles of project investment, platform solutions, can change traditionally implemented national reproduction models for firms of all countries. Innovator companies gain competitive advantages in the formation and operation of digital platforms, and gain quasi-monetary profits through the early start effect. With successful scaling, these companies can set standards for effective business by reducing time and resource losses in high consumer value production related to networking, international cooperation and collaboration. The policy of digitalization of business activity, aimed at ensuring competitiveness of innovative type, has three stages. The first stage is the creation of services and infrastructure. The second stage is the formation of platforms, or aggregators. The third stage is the introduction of artificial intelligence. All over the world, businesses are undergoing these three stages of digital transformation in their entirety. Giving society great consumer value and reducing market uncertainty is the goal of such a transformation. The phenomenon of digital platforms for entrepreneurship raises many important research issues related to the convergence of digital technologies into universal sources of competitive advantage. Research, educational, analytical, computing, library and other shared resources refer to the scientific services of these platforms in demand in entrepreneurship.

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1. Introduction

Intensification of innovation activities is a feature of modern approaches to improving the competitiveness of entrepreneurial structures. Intensification relies on the implementation of the realized achievements of the world economy in science and technology, as well as on the implementation of new organizational and management models and industrial relations that have not yet been formed. Everywhere, "big challenges" have been identified with regard to the further development of national productive forces. These forces will be competitive provided they are committed to the latest advances in "disruptive" technological innovation (destruction technologies), and shape a whole new set of key competitive competencies.

The active formation and development of national innovation systems is taking place in the context of the rapid development of digital and information technologies around the world. National innovation systems are a systemically connected and upward spiral of elements: state-university-enterprise. The combined and organized operation of interrelated institutional structures has a significant and positive impact on the competitiveness of entrepreneurs. Such structures should include industry and business, universities and research centres, government and regions, innovation infrastructure, financial institutions and markets and others. Industrial digital platforms effectively operate the so-called linear innovation model – «market pull». At the same time, commercially successful innovations in the production and sale of new products arise mainly as a result of direct perception of consumer requests, their processing in targeted corporate research and development (R&D).

Possibilities of digital transformation of the modern enterprises allow to involve producers and consumers of products with predetermined properties in direct interaction in real time. It is the practical application of a new economic paradigm of modern network-centric society (Apatova & Korolev, 2017)

2. Problem Statement

The challenges of maintaining and strengthening the competitive position of business structures are constantly exacerbated by the following conditions:

- Continuous and development of processes of conceptual, institutional changes of the model of reproduction activity;
- Continuous change of process stages.

There is a compelling argument for changing the nature of economic growth and the sources of modern enterprise competitiveness. This makes it necessary to identify modern forms of organization of entrepreneurship and industrial activity, to find factors of their successful implementation in conditions of rapid development of modern "subversive" technologies. The economies of developing countries have come to the forefront of the world by no accident. In these countries, entrepreneurs are not burdened with obligations in relation to previous strategies. They effectively change the structure of global production chains and accelerate major changes in the balance of economic capacities of states.

3. Research Questions

Companies, entrepreneurs and labour suppliers should be able to formulate a new strategy based on a global outlook for new sources of competitive advantage. This will allow them to adapt to changing economic trends. Promising economic growth is possible through:

- The increasing role of research infrastructure;
- Maturity of national innovation systems (NIS) needed to create a competitive product and efficient business models in the digital economy.

In this regard, it is necessary to create qualitatively new jobs in Russian companies with high productivity; building a new economy that can demonstrate qualitative growth under conditions of high competition of factors of production and finished products in world markets.

4. Purpose of the Study

The world processes of large-scale modernization of science and production based on the achievements of Industry 4.0 require research in order to identify promising sources of competitive advantages of entrepreneurial structures. It is necessary to consider questions of creation of innovative infrastructure for the industrial research and development realized in each region of the country according to the state program «Digital economy» (Program "Digital economy of the Russian Federation" approved by the order of the Government of the Russian Federation of July 28, 2017. № 1632-p.). It is necessary to identify the time-specific relevance of digital technologies as factors of competitive advantage. Digital technologies should be introduced in enterprises as quickly as possible, within one or two years, quickly and successfully developed by specialists in the production of competitive products and services, ahead of competitors in time, efficiency, consumer value.

5. Research Methods

Methods of technological forecasting, international comparisons, meaningful economic interpretation of the studied processes from the economic practice of digitalization of enterprises were used in this study. The study suggests that the new paradigm of scientific and technological development is based on hybrid innovation. The possession of a basic asset is no longer a key factor. The development and implementation of innovative platforms with significant support from universities are becoming a key factor for success. According to forecasts, innovative platforms will be able to provide scientific and technical services for the enterprises. It will demand new knowledge and abilities as important attributes "Industries 4.0" in the conditions of global digital transformation. New knowledge will be based on technologies of a blockchain, technologies of multiagency systems and processings of big data, technologies of virtual and augmented reality, artificial intelligence and robotics. The modern concept of "the digital platform" integrates into itself set of digital technologies, products and services, services for external users for the purpose of production of innovative goods.

6. Findings

Research of Nambisan, Siegel and Kenney (2018) has revealed a change in the nature and direction of entrepreneurship in various industries as a result of the phenomenon of open innovation and platformization. We see a shift towards more open and distributed models of innovation, as well as the growing importance of digital platforms as a platform for creating and acquiring consumer values. De Reuver, Sorensen and Basole (2018) believe digital platforms are transforming almost every industry today. Digital platforms are a complex subject of research as they are distributed and intertwined with institutions, markets and technology. New research challenges arise from the exponentially growing scale of platform innovation, the increasing complexity of platform architecture, and the spread of digital platforms to many industries.

According to the program "Digital Economy of the Russian Federation," the formation of research competences and technical facilities to ensure technological independence, competitiveness and security at the global level becomes a priority. It is planned to create at least 10 specialized digital platforms on research and development at the national level, to ensure their integration with industrial platforms by 2024 (Ershova & Khokhlov, 2017). There will be at least 10 newly created leading companies operating "end-to-end" technologies at the world standard level.

This research priority area is recognized as a successful example by the European Strategic Forum for Research Infrastructures (ESFRI). Open access to powerful research infrastructures contributes to the quality of European science and technology. Sahut, Iandoli and Teulon (2019) looked at digital enterprise ecosystems and the economics of digital platforms in terms of their positive impact on job creation and economic growth. Srinivasan and Venkatraman (2017) noted the growth of entrepreneurship on digital platforms with a network-centric configuration, displaying complex connections between platforms, various services and consumers. Their theoretical research was able to justify the conditions for entrepreneurship success given coordination within and between platforms.

Hsieh and Wu (2019) explored various platform innovations in digital evolution for entrepreneurs and looked at their introduction in detail with examples of real-world practice. They showed how entrepreneurs can take advantage of the innovation ecosystem by using a platform in the entrepreneurial innovation process (inventions and commercialization). Naumkin, Grosheva and Shekshayeva (2018) separately note that the developed national innovation system (NIS) is built by integrating regional innovation systems. As a rule, regional innovation systems are formed with the participation of university departments, and the degree of their development determines the maturity of NIS of a specific country. Under these conditions, digital platforms for scientific research and competences in various fields of activity are being formed everywhere. Modern scientific and educational digital platforms are a conglomerate of competence center, high-performance data center and a set of scientific services (analytical, educational, library, computing and other demanded services).

Zatsarinny, Gorshenin, Kondrashev, Volovich and Denisov (2018) note that technically scientific services are represented in modes of software (SaaS), platform (PaaS) and infrastructure (IaaS) services. Also technically scientific services are presented with the help of specific technologies of provision of scientific service as a service in the form of subject-oriented programs (RaaS, Research as a Service). Evtyanova (2017) sees the benefits of the digital economy for the competitiveness of small and medium-sized businesses. Small and medium-sized businesses will be able to organize around a digital platform, introduce platforms into existing business models (projects). This will allow for optimization, cost reduction and better planning for sustainable operation and profit maximization. Sergeyev (2019) notes the

influence of industrial digital platforms on the organic structure of capital, acceleration of reproduction processes, achievement of market equilibrium and optimization of the structure of production factors.

In Russia, the transition to the digital economy is complicated by the absence of its own global digital platforms. Today there are very few companies operating in new high-tech markets on the market. Companies in the sector of information and communication services, finance, trade, housing and communal services are an exception (Kovalenko, 2019). High competition in the mode of direct client-oriented interaction with the target market encourages them to accelerate development. Focusing on examples of leading countries of the world, it is necessary to quickly involve maximum sectors of the economy in these processes. However, the costs of more than half of Russia's industrial enterprises do not exceed 1% of their annual budget for digitalization. Research of Coreynenab, Matthyssensab and Van Bockhavenb (2017) has shown the importance of digitizing the production activities of companies. Dynamic resource reconfiguration enables competitive advantage in market expansion and further integration of customers into production consumption processes while reducing input barriers. Research Satish Nambisan (2017) has shown that new digital technologies have changed the nature of uncertainty and risk of entrepreneurial processes and outcomes. At the same time, digital technologies have expanded the theory of success of digital entrepreneurship.

Modern concepts of market relations between suppliers and consumers of goods and services are implemented on so-called platform business models within the framework of the development of the digital economy. The efficiency of platform business models is achieved by reducing time and resource losses on interaction between participants. Efficiency is achieved through open cooperation and the creation of new products and services. It is possible to build appropriate ecosystems based on end-to-end technologies. The main purpose of creating platform business models is:

- Creation of conditions for carrying out qualitative changes in the field of science and education;
- Increasing the capacity of the State to respond effectively to so-called big challenges, not only through the quantitative increase of resources.

It should be noted that progress in this area is a crucial factor in the successful development of the nation and is a supplier of sovereign technologies. Industrial platforms integrate elements of different levels. You can represent their relationship as a matrix (Figure 01).

Schools of sciences	Innovation system of department 1	Innovation system of the university	Innovative system of the region	National innovation system of the State	Innovation and education	Innovative products	International competitiveness
Laboratories							
Certain researchers							
.....							
Schools of sciences	Innovation system of department N						
Laboratories							
Certain researchers – natural persons							
Organizations and enterprises of infrastructure of innovation system of the region							
Social, political and legal, information and communication, economic and other environment							
Innovators and innovators, research infrastructure, existing digital research platforms, national technological initiatives							
Array of interested digital platform users, industrialists and businessmen							

Source: authors.

Figure 01. Matrix for building competitiveness of enterprises based on university innovation production systems

Scientific and educational departments, scientific schools and laboratories are the core of this matrix. They form a body of competences in a certain subject field of science and technology, organization of production. The Digital University platform is designed to build scientific, educational and technological paths, to form communications in the management of resources for these activities. The restructuring of educational and research processes should take place in the near future. This should contribute to the development of various technological and engineering centers on the basis of the university, create a professional environment for the development of the maximum number of competent specialists. At the same time, it is important to give new knowledge not only to current students in the broad sense of this concept, but also to those specialists who now work in traditional enterprises undergoing digital transformation.

These digital platforms can support scientific services that support publication activity, business planning, information support for research, and a platform for joint development. They can support educational, library services for searching, accessing and obtaining information from a wide range of electronic libraries of different countries, as well as computer services for scientific calculations. We'll look at some successful examples of a modern university digital platform. Ural Federal University has established a regional center of digital technologies in the field of mechanical engineering. This center starts working with enterprises that need to be helped first. Since these enterprises have large obligations to previous strategies and have large amounts of traditional assets of heavy industry.

Siberian Federal University together with leading universities of the region and at the request of the Ministry of Education and Science of the Russian Federation is implementing a project for the creation and launch of a digital platform of knowledge exchange and copyright management "IP University." The project is aimed at simplifying procedures in the field of intellectual property management of business structures, through the use of blockchain technology.

7. Conclusion

Important goals of intensification of scientific and technological development of Russia require introduction of modern methods of organization of research and development. They can be achieved with the active participation and interaction of departments of management, scientific and educational organizations, industrialists and entrepreneurs. The result of such joint activities will be the creation of digital platforms for scientific research, the formation of scientific services of collective use in the field of big data, analytics, computing and design of innovative goods. At the same time, the factor of achieving competitive time for operational digital transformation and acquisition of new competences by personnel is important.

References

- Apatova, N. V., & Korolev, O. L. (2017). Problems of formation of innovative infrastructure of the region in conditions of digital economy. *Scientists Notes of Krym Federal University Named After V.I. Vernadsky. Economy and Management*, 3(69), 3–11.
- Coreynenab, W., Matthyssensab, P., & Van Bockhavenb, W. (2017). Boosting servitization through digitization: Pathways and dynamic resource configurations for manufacturers. *Industrial Marketing Management*, 60, 42–53. DOI: 10.1016/j.indmarman.2016.04.012

- De Reuver, M., Sorensen, C., & Basole, R. C. (2018). The digital platform: A research agenda. *Journal of Information Technology*, 33(2), 124-135.
- Ershova, T. V., & Khokhlov, Y. E. (2017). Digital platforms for research and development. *Information Society*, 6, 17-24.
- Evtyanova, D. V. (2017). Criteria for digital economic management platforms. *Economic Systems*, 10(38), 54-63. [in Rus.].
- Hsieh, Y. J., & Wu, Y. J. (2019). Entrepreneurship through the platform strategy in the digital era: Insights and research opportunities. *Computers in Human Behavior*, 95, 315-323.
- Kovalenko, A. (2019). From idea to implementation. *Expert Ural*, 27(802). Retrieved from <https://expert.ru/ural/2019/27/ot-idei-do-vnedreniya/> Accessed: 14.12.2019. [in Rus.].
- Nambisan, S. (2017). Digital entrepreneurship: toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, 41(6), 1029-1055.
- Nambisan, S., Siegel, D., & Kenney, M. (2018). On open innovation, platforms, and entrepreneurship. *Strategic Entrepreneurship Journal*, 12(3). <https://doi.org/10.1002/sej.1300> Accessed: 12.12.2019.
- Naumkin, N. I., Grosheva, E. P., & Shekshayeva, N. N. (2018). Research of innovation subsystem of university department as substrate of regional innovation system. *Regionology*, 26(3), 474-489.
- Program "Digital economy of the Russian Federation" approved by the order of the Government of the Russian Federation of July 28, 2017. № 1632-p. Retrieved from <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf> Accessed: 14.12.2019.
- Sahut, J. M., Iandoli, L., & Teulon, F. (2019). The age of digital entrepreneurship. *Small Business Economics*. <https://doi.org/10.1007/s11187-019-00260-8>
- Sergeyev, L. I. (2019). Economic features of information and communication technologies. *Vestnik of the Samara State University of Economics*, 8(178), 43-56. [in Rus.].
- Srinivasan, A., & Venkatraman, N. (2017). Entrepreneurship in digital platforms: A network-centric view strategic. *Entrepreneurship Journal*, 12(1), 54-71.
- Zatsarinny, A. A., Gorshenin, A. K., Kondrashev, V. A., Volovich, K. I., & Denisov, S. A. (2018). Toward high performance solutions as services of research digital platform. In A. Diveev, I. Zelinka, F.L. Pereira, E. Nikulchev (Eds.), *XIIIth International Symposium «Intelligent Systems», INTELS'18. Procedia Computer Science*, 150 (pp. 622-627). Cham: Springer.