

# Absorptive capacity of Kazakhstani enterprises

Satpayeva Zaira

Institute of economics of Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Almaty, Kazakhstan

E-mail: [satpayeva.zaira@ieconom.kz](mailto:satpayeva.zaira@ieconom.kz)

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## Abstract

Today there are no high-tech corporations in Kazakhstan, and small innovative business is not developed. The Kazakhstani economy has low susceptibility to innovation. One of the reasons for the low susceptibility of the Kazakhstani economy to innovation can be the low absorptive capacity of national enterprises. The aim of this research was to analyze the Kazakhstani enterprises' absorptive capacity. The conceptual framework of this research is measuring firm's absorptive capacity by their economic activity in technological innovations, especially by analysis of transfer of technologies. Statistical analysis was the main research method used. The information base was the statistical data of the Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan from 2015 and 2020. The research identified a low level of absorptive capacity in Kazakhstani enterprises and the need to form and develop a national system of absorptive capacity in Kazakhstan. To improve the absorptive capacity of Kazakhstani enterprises it is necessary to develop their ability to acquire, assimilate, transform and exploit knowledge, including foreign technologies. Research findings may serve as the theoretical and methodological basis for the implementation of effective policy to create a diversified, technological economy and national system of absorptive capacity management strategy.

**Keywords:** Technological entrepreneurship, National absorptive capacity system, Technological innovations, Technology transfer, Research and development.

**JEL codes:** M10, O32, O38.

## 1 Introduction

Kazakhstan's strategic course towards joining the top 30 most developed countries of the world is impossible without a knowledge-based economic base, non-resource production and export, and new high-tech sectors of the economy. In the Message of the First President of the Republic of Kazakhstan N.A. Nazarbayev noted that work in this direction should be based on the support of research and innovation, the commercialization of scientific developments, and foreign investments for the transfer of

knowledge and new technologies to the republic (Nazarbayev, 2014). This topic is still relevant today. Head of State K.-Zh. Tokayev noted in his Message that «the creation of a diversified, technological economy is not just a necessity, this path has no alternative» (Tokayev, 2020).

For the transition to new technologies, the country has two ways: independent development and borrowing of available in other countries. However, today there are no high-tech corporations in Kazakhstan, and small innovative business is not developed. The Kazakhstani economy has low susceptibility to innovation (Kireyeva et al., 2021).

One of the reasons for the low susceptibility of the Kazakhstani economy to innovation can be the low absorptive capacity of national enterprises. So, an objective study of the national firm's absorptive capacity will reveal the existing strengths and bottlenecks, develop effective mechanisms for increasing the absorptive capacity, which will contribute to the increase in the complexity and manufacturability of the Kazakhstani economy, and, as a result, the creation of a diversified and technological economy. So that is why the goal of this research is an analysis of Kazakhstani enterprises' absorptive capacity.

## **2 Literature review**

According to the theory of resources and possibilities, absorptive capacity is a distinctive resource and an opportunity for firms, a source of competitive advantage. It is also part of dynamic opportunity theory, which studies the learning process that leads to the creation of new organizational capabilities (Berger, 1982; Hurtado-Ayala & Gonzalez-Campo, 2015).

In 1990, the concept of absorptive capacity was developed, where it served as a characteristic of the company - the ability «to identify the value of new external information, its assimilation and commercial use» (Cohen & Levinthal, 1980). In the 2000s, there was a reconceptualization of its provisions, according to which the absorptive capacity is «a set of organizational procedures and processes by which a company acquires, assimilates, transforms and uses knowledge to create dynamic organizational capabilities» (Zahra & George, 2002; Samovoleva, 2018a; Samovoleva, 2018b; Suleimenov & Alibekova, 2018; Paliokaitė, 2019).

In recent years, began to highlight the country's absorptive capacity or national absorptive capacity (Narula, 2004; Chandra & Clarke, 2010), which is often considered according to the concept of national technological capabilities. Initially, it meant «the ability to study and implement technologies and related practices of already developed countries» (Perkins & Koo, 1995; Crespo-Cuaresma et al., 2004). Now the absorptive capacity is being studied using the example of developing countries (Khordagui & Saleh, 2013; Omoregie, 2015), as well as its relationship with technological and

innovative development (Polterovich, 2009; Dnishev & Satpayeva, 2017; Samovoleva, 2019; Alzhanova et al., 2020). In this vein, the increase of absorptive capacity level leads to the development of technological innovations (Del Carpio Gallegos & Miralles Torner, 2018). Investments in the formation and development of absorptive capacity contribute to the increase of innovation and productivity (Mowery & Oxley, 1995; Sousa et al., 2021).

It should be noted that today there is no generally accepted definition of an absorptive capacity as an economic indicator. This is due to the difficulties in measuring it, as well as the complexity of the concept of knowledge and the assessment of tacit knowledge. It can be determined by the level of technological separation of foreign firms from national ones: the larger is the gap, the lower is the absorptive capacity (Kadochnikov et al., 2011). It also can be measured by economic activity of the subjects starting from small firms to large businesses in technological innovations, i.e. the share of enterprises providing development and implementation of technological innovation (percentage ratio of the total number) (Isaenko, 2012).

According to the literature review, it should be concluded that the above studies indicate the presence of scientific interest in the study of absorptive capacity, which contributed to the creation of a certain theoretical and practical basis. Hence, the concept of absorptive capacity is the part of the theory of dynamic opportunities. The concept is developing dynamically and currently its theoretical framework is not completely formed. To this date, there is no clear definition of the absorptive capacity and acknowledged methodology for its analysis. Upon that, the issues of assessing the absorptive capacity are insufficiently studied in Kazakhstan. Therefore, there are practically no studies with statistical measurement of Kazakhstani enterprises' absorptive capacity, algorithms and methods for its analysis.

### **3 Methodology**

There are two research questions:

1. What is the state (the level of development) of Kazakhstani enterprises' absorptive capacity?
2. What mechanisms are required for Kazakhstan's enterprises to increase their absorptive capacity and the technological development of the country as a whole?

The hypothesis of the research is as follows: the level of Kazakhstani enterprises' absorptive capacity is low, which requires the development of new and improvement of existing mechanisms for its development.

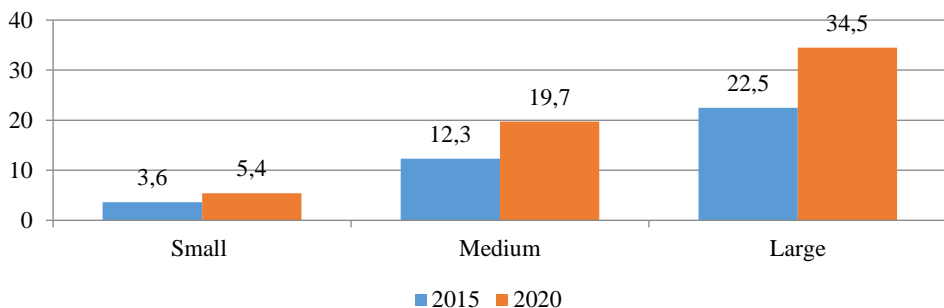
The research was conducted in a cabinet way. It used descriptive research methods. The concept principal provisions of absorptive capacity

were the theoretical and methodological basis of the research. The conceptual framework of this research is measuring firm's absorptive capacity by their economic activity in technological innovations, especially by analysis of transfer of technologies on the example of Kazakhstani enterprises. There is the structured approach was the main using the following methods: systematization, generalization, comparison, analysis, synthesis, economic and statistical analysis. The following research forms were used for data visualization: bibliographic, graphic, and groupings.

Within the framework of the research, secondary data on technological entrepreneurship development were used, the source of which was the statistics of the Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan for 2015 and 2020. The data were processed using Microsoft Excel.

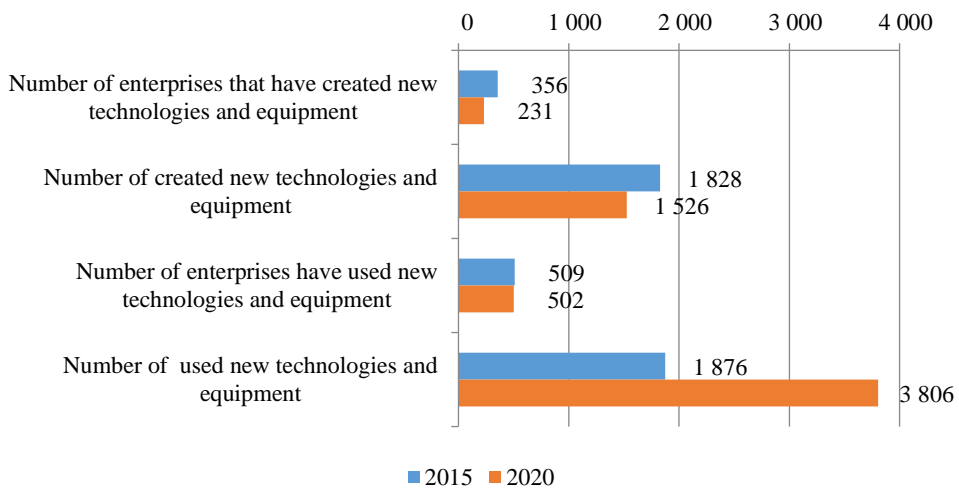
#### 4 Results and Discussion

At present, the innovation business in Kazakhstan is not developing, there is a lack of high-tech corporations. The innovative activity of Kazakhstan's enterprises is at a low level. In 2020, innovative activity in the field of technology amounted to 8.6%, which increased by 2 percentage points compared to 2015, including in terms of the size of enterprises (Fig. 1).



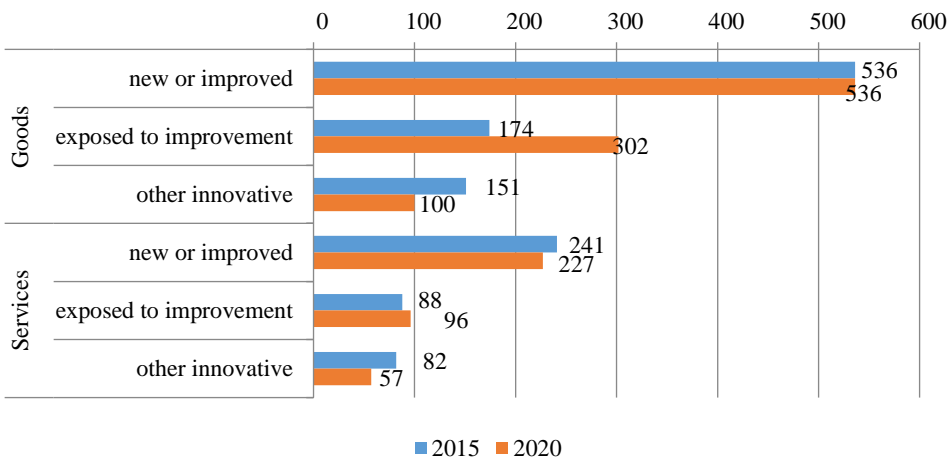
**Fig. 1.** Technological activity of Kazakhstani enterprises, %, 2015-2020

So, the innovative activity of large enterprises (34.5%) is higher than that of medium-sized (19.7%) and small (5.4%) enterprises. It should be emphasized that the number of enterprises, which have created new technologies is fewer than enterprises, which have used them. During the period, 2015-2020 there is observed a reduction in the number of both categories of enterprises. However, it must be considered, that for the studied period the number of used new solutions and equipment has increased two times, while the number of created ones decreased by 16,5% (Fig. 2).



**Fig. 2.** Information about the created and used new technologies and objects of equipment, units, 2015-2020

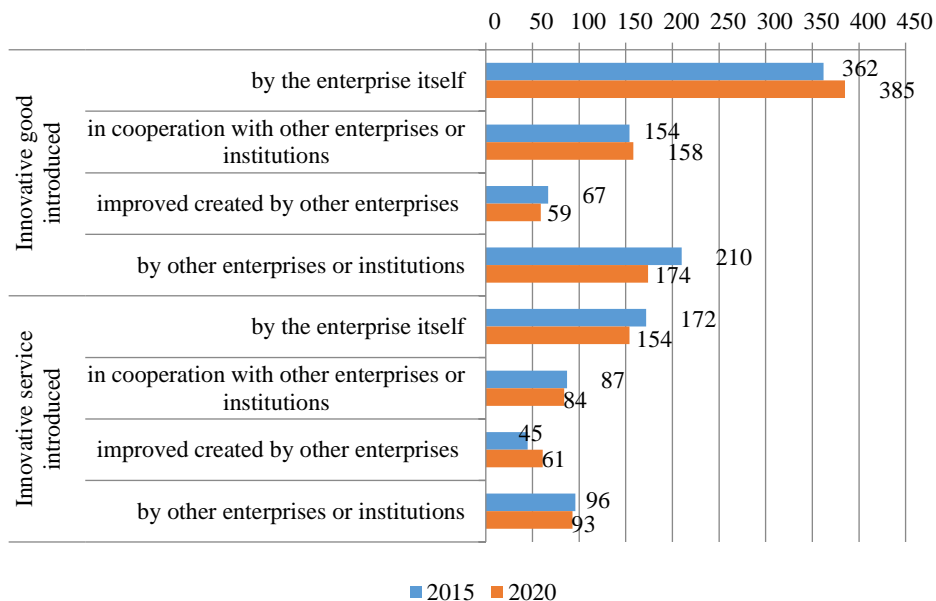
This suggests that the low level of absorptive capacity of Kazakhstani enterprises and its growth over the studied period, however, is at a slow pace. Kazakhstani enterprises mostly introduce new or improved goods and services, however, the number of the latter enterprises decreased from 2015 to 2020. During this period, there was an increase in the number of enterprises using improved goods and services (Fig. 3).



**Fig.3.** Number of Kazakhstani enterprises that introduced innovative goods and services, units, 2015-2020

The introduction of innovative goods and services was mainly carried out by the enterprise itself against the background of a decrease in the number

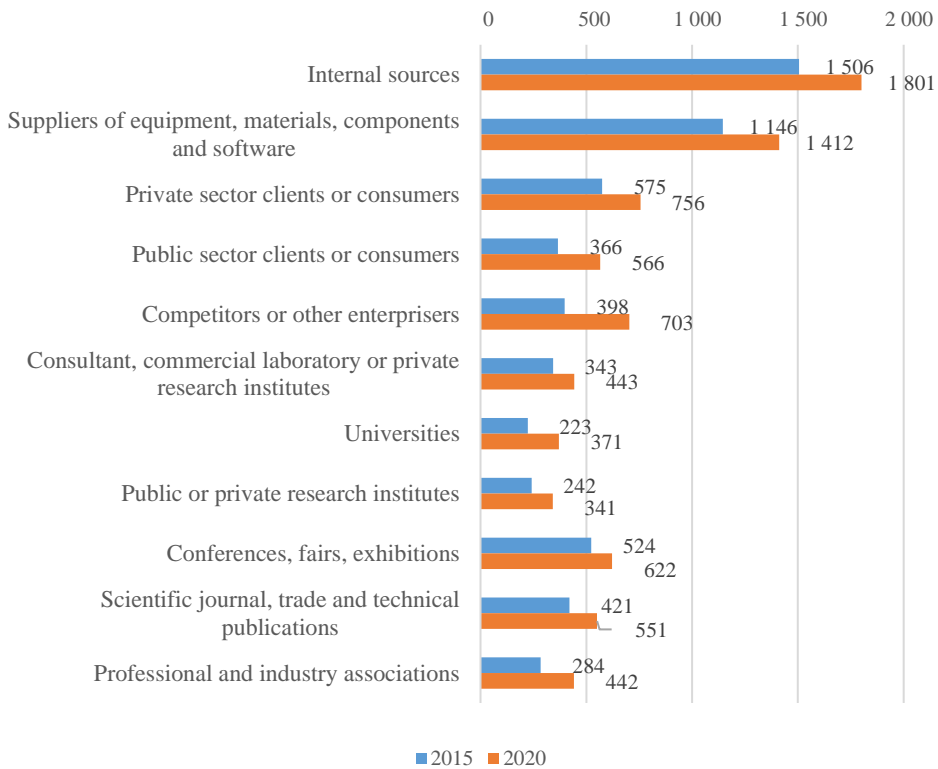
of enterprises that improved goods created by other enterprises. The situation with services is the opposite (Fig. 4).



**Fig. 4.** Sources of introduced innovative goods and services at Kazakhstani enterprises, units, 2015-2020

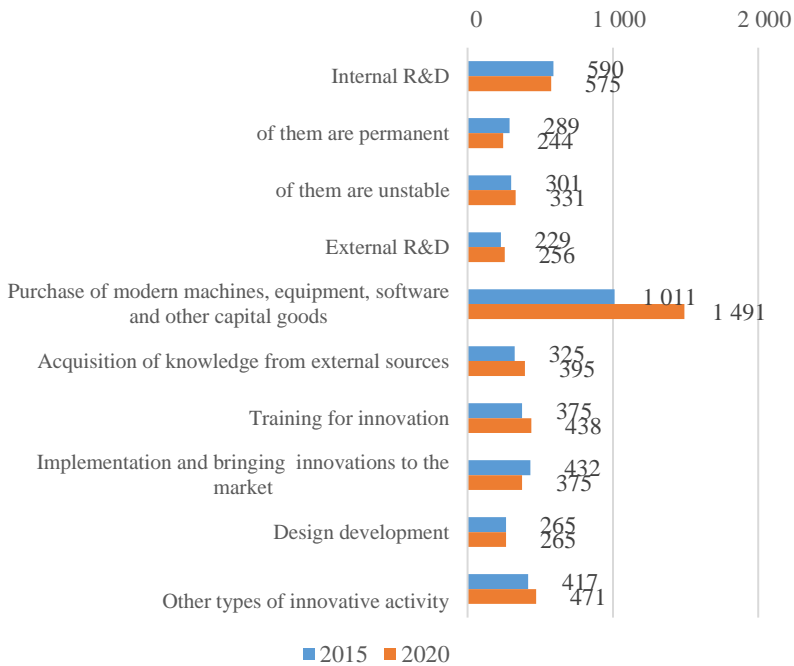
The presence of knowledge transmission channels is among essential components of absorptive capacity since when the necessary knowledge and technologies are found, there is a possibility of failure to obtain them from the external environment. The absence of established knowledge transmission channels and technologies can become a barrier to the technological and innovative development of an enterprise.

So, in Kazakhstani technological enterprises the primary sources of information for new projects are internal sources and suppliers, clients and consumers, conferences, fairs, exhibitions as well. Universities, public or private research institutes, and professional and industry associations are little used as sources of information. It must be noted that during the studied period, the appeal to all sources of information increased (Fig. 5).



**Fig. 5.** Distribution of the importance of sources that provided information for new projects, %, 2020

The transfer of foreign technologies by Kazakhstani enterprises is conducted in its simplest forms and in fact comes down to the supply of machinery and equipment. It is obtaining modern machines, equipment, software, and other capital items that most of the innovation-active firms of the republic are engaged in (Fig. 6).



**Fig. 6.** Number of Kazakhstani enterprises that carried out activities to create technological innovations, units, 2015-2020

The number of Kazakhstani enterprises that created technological innovations based on internal R&D decreased by 2.5%. It should be noted that over this period their number engaged in R&D permanently decreased by 15.6%, on a non-permanent basis - vice versa, increased by 10%. The number of enterprises which activities are aimed at obtaining knowledge has increased.

Acquisition of modern machines, equipment, software, and other capital items is the main cost of technological innovation. In 2020, they comprised 495,057 million tenges (an increase of 48.5%). Their share in the cost structure was 50.9% in 2015 and 63.7% in 2020. External costs for R&D doubled and made up 20,679.5 million tenges in 2020. While internal costs for R&D increased only by 9.7% and amounted to 44,534 million tenges. The cost of acquiring knowledge from external sources increased 2.5 times and amounted to 2,780 million tenges, while the cost of design, marketing research, training, and other related activities decreased fourfold and amounted to 10,035.1 million tenges. It is important to stress that the disadvantage of financial means and high expenditures for technological innovation are the primary reasons for enterprises' low technological activity, along with the lack of demand for innovations and their need due to earlier innovations.



Thuswise, the analysis of Kazakhstani enterprises' technological activity, in particular in technological innovation showed low absorptive capacity and its slow growth. One of the main reasons for absorptive capacity low level can be the focus of Kazakhstani enterprises on the purchase of equipment, rather than on the results of R&D and the acquisition of knowledge, as well as the low level of collaboration between firms and with universities and research organizations of the country.

To increase the absorptive capacity of enterprises following mechanisms and measures can be used (Polterovich, 2016): training and internships, including abroad; mastering of new methods of organizing production; purchasing of licenses and patents, including abroad; encouragement and stimulation of research to identify promising areas and effective borrowing mechanisms; prevention of "brain drain"; invitation of foreign teachers and researchers as consultants in production; conducting joint research with domestic and foreign scientists; development of the practice of joint ventures organizing with foreign capital; stimulating outsourcing; stimulating the development of research departments and design bureaus at enterprises, etc. Considering that technological enterprises constitute a part of innovative ventures, a national innovation system and a national absorptive capacity system should be developed, especially the gap between matching elements must be cut to a minimum by means of development of specialized infrastructure that contributes to the development of the ability of Kazakhstani companies to adapt, develop, use and imitate new knowledge and technologies.

## **5 Conclusion**

The aim of this research was achieved: the level of development of Kazakhstani enterprises' absorptive capacity was analyzed. The results show that enterprises of Kazakhstan have a low level of absorptive capacity and it is growing slowly. So, it requires the development of new and improvement of existing mechanisms.

Kazakhstani enterprises adhere to the strategy of technological inertia. Transitioning to the strategies of creation on new technological niches and technological breakthrough requires increasing their absorptive capacity. To improve the absorptive capacity of Kazakhstani enterprises it is necessary to develop their ability to acquire, assimilate, transform and exploit knowledge, including foreign technologies. Technological absorptive can become an effective tactic instead of the creation of new technologies which is associated with huge financial and time costs. The priority direction in this area is the formation and development of an interactive growth management system with a focus on the development of technology transfer mechanisms in combination with other borrowing policy measures. The obtained results are

useful in formulating effective policy to create a diversified, technological economy and national system of absorptive capacity management strategy.

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## References

Alzhanova, F.G., Kireyeva, A.A., Satpayeva, Z.T., Tsoy, A.A. & Nurbatsin, A. (2020). Analysis of the level of technological development and digital readiness of scientific-research institutes. *Journal of Asian Finance, Economics and Business*, 7(123), 1133–1147. <https://doi.org/10.13106/jafeb.2020.vol7.no12.1133>

Berger, F. (1982). The concept of absorptive capacity: origins, content and practical relevance. *Intereconomics*, 3, 133-137. <https://doi.org/10.1007/BF02927883>

Chandra, R. & Clarke, R. (2010). Developing a national absorptive capacity system for transition countries. *Academy of International Business MENA*, 24.

Cohen, W.M. & Levinthal, D.A. (1980). Absorptive-capacity: a new perspective on learning and innovation. *Administrative science quarterly*, 1, 128-152. <https://doi.org/10.1016/B978-0-7506-7223-8.50005-8>

Crespo-Cuaresma, J., Foster, N. & Scharler, J. (2004). On the determinants of absorptive capacity: evidence from OECD countries. *Proceedings of OeNB Workshops*, 2, 58-81.

Del Carpio Gallegos, J.F. & Miralles Torner, F. (2018). Absorptive capacity and innovation in low-tech companies in emerging economies. *Journal of technology management & innovation*, 2, 3–11. <http://dx.doi.org/10.4067/S0718-27242018000200003>

Dnisev, F.M. & Satpayeva, Z.T. (2017). Kazakhstan’s innovation system: search for development paths based on SWOT analysis. *Economics: strategy and practice*, 1, 20-32. (In Russian)

Hurtado-Ayala, B. & Gonzalez-Campo, C.H. (2015). Measurement of knowledge absorptive capacity: an estimated indicator for the manufacturing and service sector in Colombia. *GCG Georgetown university – Universia*, 2, 16-42. <https://doi.org/10.3232/GCG.2015.V9.N2.01>

Isaenko, O. (2012). *Institutionalization of technology diffusion in the context of formation of a new economy*: dis. abstract ... c.e.s.: 08.00.14. Moscow: State university of management, 25. (In Russian)

Kadochnikov, S.M., Drapkin, I.M., Davidson, N.B. & Fedyunina, A.A. (2011). Efficiency of national companies and diversification of the region's industry as factors of external effects from foreign direct investment in the Russian economy. *Russian journal of management*, 2, 3–26. (In Russian)

Khordagui, N.H. & Saleh, G. (2013). FDI and absorptive capacity in emerging economies. *Topics in Middle Eastern and African economies*, 1, 141-172.

Kireyeva, A, Kangalakova, D., Kredina, A., Satpayeva, Z. & Urdabayev, M. (2021). Managing research and development process in conditions of economic growth of Kazakhstan: methods and analysis. *Problems and Perspectives in Management*, 19(3), 185–196. [http://dx.doi.org/10.21511/ppm.19\(3\).2021.16](http://dx.doi.org/10.21511/ppm.19(3).2021.16)

Mowery, D.C. & Oxley, J.E. (1995). Inward technology transfer and competitiveness: the role of national innovation systems. *Cambridge journal of economics*, 19, 67-93.

Narula, R. (2004). Understanding absorptive capacities in an «innovation systems» context: consequences for economic and employment growth. *DRUID Working Paper, 04-02*, 51.

Nazarbayev, N. (2014). Message from the President of the Republic of Kazakhstan to the people of Kazakhstan “Kazakhstani way - 2050: common goal, common interests, common future”.

Omoregie, U. (2015). A developing country’s absorptive capacity: the link between FDI and economic growth in Nigeria. *Open access library journal*, 2, 1-10. <https://doi.org/10.4236/oalib.1102137>

Paliokaitė, A. (2019). An innovation policy framework for upgrading firm absorptive capacities in the context of catching-up economies. *Journal of entrepreneurship, management and innovation*, 15(3), 103-130. <https://doi.org/10.7341/20191534>

Perkins, D.H. & Koo, B.H. (1995). *Social capability and long-term growth*. Basingstoke: Macmillan Press, 356.

Polterovich, M. (2009). The innovation pause hypothesis and the modernization strategy. *Economic issues*, 6, 4-22. (In Russian)

Polterovich, M. (2016). Institutions of catch-up development (to the project of a new model of economic development of Russia). *Economic and social changes: facts, trends, forecast*, 5, 34-56. (In Russian)

Samovoleva, S.A. (2018a). Characteristics of the absorptive capacity of companies: import of technologies in materialized and non-material forms in *Heterodoxia versus economic reductionism: micro-, meso-, macro-: Proceedings*, S. G. Kirdina-Chandler, and V. I. Mayevsky, Eds. M.: IE RAS, 268-276. (In Russian)

Samovoleva, S.A. (2018b). Transfer of foreign technologies as a component of the implementation of the absorptive capacity of innovatively

active organizations in *Systemic problems of domestic mesoeconomics, microeconomics, enterprise economics: materials of the second conference of the Department of modeling production facilities and complexes of the CEMI RAS (Moscow, January 12, 2018)*, G. B. Kleiner, Eds. M.: CEMI RAS, 84-92. (In Russian)

Samovoleva, S.A. (2019). Problems of a national innovation system formation: opportunities and limitations of interaction between business and science. *Science management: theory and practice*, 2, 70–89. (In Russian)

Sousa, R.D., Boranbayeva, A., Satpayeva, Z. & Gassanova, A. (2021). Management of successful technology transfer in agriculture: The case of Kazakhstan. *Problems and perspectives in management*, 19(3), 488-501. [http://dx.doi.org/10.21511/ppm.19\(3\).2021.40](http://dx.doi.org/10.21511/ppm.19(3).2021.40)

Suleimenov, E.Z. & Alibekova, G.Zh. (2018). The economic nature and essence of commercialization objects and processes”. *Ilm-fan va innovation rivozhlanish*, 4, 78-84. (In Russian)

Tokayev, K.-Zh. (2020). Message from the Head of the state to the people of Kazakhstan “Kazakhstan in a new reality: time for action”

Zahra, S.A. & George, G. (2002). Absorptive capacity: a review, reconceptualization, and extension. *Academy of management review*, 27, 185–203. <https://doi.org/10.5465/AMR.2002.6587995>