

## INNOVATIVE POTENTIAL AND PROBLEMS OF SUSTAINABLE DEVELOPMENT OF THE SPHERE OF CIRCULATION IN THE RUSSIAN FEDERATION

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### ABSTRACT

**Objective:** The purpose of the study is to identify the potential, problems, and likely directions of innovative development of the sphere of circulation. Like other sectors of the Russian economy, it is facing increased competitive pressure from innovatively active multinational trading companies and accelerating changes in the global market environment.

**Methods:** The methods used in the study include general scientific methods such as situational, complex, system, tabular, and graphical methods, as well as the method of comparative analysis and index methods, such as the indices of internal innovation activity. These methods were used to collect primary information and assess the internal innovation potential of the Russian economy in the context of open innovation.

**Results:** This article solves the problem caused by the lack of innovative potential, knowledge, and competencies necessary for Russian companies in the sphere of circulation to apply innovative business models adapted to global changes taking place in the world economy under the influence of innovative processes.

**Conclusion:** The article evaluates the innovative potential of individual sectors of activity and the Russian economy as a whole, provides a comparative analysis of the innovative activity of the Russian Federation and the countries of the world, and global trends in the development of innovation and digital processes.

**Keywords:** Digital economy. Globalization. Innovative business model. Open innovation.

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## POTENCIAL INOVADOR E PROBLEMAS DE DESENVOLVIMENTO SUSTENTÁVEL DA ESFERA DE CIRCULAÇÃO NA FEDERAÇÃO RUSSA

### RESUMO

**Objetivo:** O objetivo do estudo é identificar o potencial, os problemas e as prováveis direções do desenvolvimento inovador da esfera da circulação. Como outros setores da economia russa, ela está enfrentando uma pressão competitiva crescente de empresas comerciais multinacionais com atividade inovadora e mudanças aceleradas no ambiente do mercado global.

**Métodos:** Os métodos utilizados no estudo incluem métodos científicos gerais, como os métodos situacional, complexo, sistêmico, tabular e gráfico, bem como o método de análise comparativa e métodos de índice, como os índices de atividade de inovação interna. Esses métodos foram usados para coletar informações primárias e avaliar o potencial interno de inovação da economia russa no contexto da inovação aberta.

**Resultados:** Este artigo resolve o problema causado pela falta de potencial inovador, conhecimento e competências necessárias para as empresas russas na esfera da circulação aplicarem modelos de negócios inovadores adaptados às mudanças globais que ocorrem na economia mundial sob a influência de processos inovadores.

**Conclusão:** O artigo avalia o potencial inovador de setores individuais de atividade e da economia russa como um todo, fornece uma análise comparativa da atividade inovadora da Federação Russa e dos países do mundo e tendências globais no desenvolvimento da inovação e digital processos.

**Palavras-chave:** Economia digital. Globalização. Modelo de negócio inovador. Inovação aberta.



## POTENCIAL INNOVADOR Y PROBLEMAS DE DESARROLLO SOSTENIBLE DE LA ESFERA DE CIRCULACIÓN EN LA FEDERACIÓN DE RUSIA

### RESUMEN

**Objetivo:** El propósito del estudio es identificar el potencial, los problemas y las direcciones probables del desarrollo innovador de la esfera de la circulación. Al igual que otros sectores de la economía rusa, se enfrenta a una mayor presión competitiva por parte de empresas comerciales multinacionales innovadoramente activas y cambios acelerados en el entorno del mercado global.

**Métodos:** Los métodos utilizados en el estudio incluyen métodos científicos generales como los métodos situacional, complejo, de sistema, tabular y gráfico, así como el método de análisis comparativo y métodos de índice, como los índices de actividad de innovación interna. Estos métodos se utilizaron para recopilar información primaria y evaluar el potencial de innovación interna de la economía rusa en el contexto de la innovación abierta.

**Resultados:** Este artículo resuelve el problema causado por la falta de potencial innovador, conocimiento y competencias necesarias para que las empresas rusas en el ámbito de la circulación apliquen modelos de negocios innovadores adaptados a los cambios globales que tienen lugar en la economía mundial bajo la influencia de procesos innovadores.

**Conclusión:** el artículo evalúa el potencial innovador de los sectores de actividad individuales y la economía rusa en su conjunto, proporciona un análisis comparativo de la actividad innovadora de la Federación Rusa y los países del mundo, y las tendencias globales en el desarrollo de la innovación y digital. procesos.

**Palabras llave:** Economía digital. Globalización. Modelo de negocio innovador. Innovación abierta.

### 1. INTRODUCTION

The overwhelming majority of company executives are aware of the expediency of carrying out innovation activities. In particular, D. Manceau and co-authors (2011) proved that the profit share of companies whose business is based on innovation is significantly higher than their share in the industry. Meanwhile, many researchers conclude that under the prevailing conditions the concept of open innovation has become widespread (Chesbrough, 2005). They prove its potential usefulness in the development of products and goods, high-tech industries, and small and large companies (Vanhaverbeke & Roijackers, 2015). Many see it as a prerequisite for the adoption of Industry 4.0 technologies (Hizam-Hanafiah & Soomro, 2021) and highlight its ability to create efficient and sustainable business models (Alvarez-Meaza et al., 2020b) and improve the competitiveness of companies (Skordoulis et al., 2020).



Business models based on the principles of open innovation allow companies to successfully develop their activities in emerging markets, and emerging markets, in turn, gain the necessary experience and knowledge to build effective business models. Thus, M. Bogers and co-authors (2021) prove that companies from emerging economies should attract external partners to use the potential of open innovation to overcome institutional and other constraints. They point to the high efficiency of investments in innovative activities of enterprises from developing countries. C. Corsi and A. Prencipe (2019) prove that the impact of venture capital on the innovation of high-tech companies is stronger in countries with underdeveloped capital markets. In-Jin Yoo and co-authors (2018) prove that small and medium-sized enterprises with limited resources can use the technologies and resources of external companies based on the concept of open innovation. In addition, E.M. Gimenez-Fernandez and co-authors (2019) point to a relatively greater benefit from open innovation for startups compared to existing companies due to the breadth of cooperation.

Open innovations based on the formation of shared knowledge become especially relevant and in demand in times of crisis. In particular, researchers K.S. Al-Omouh and co-authors (2020) revealed that joint knowledge had a significant impact on the activity of e-business and the flexibility of the organization in a crisis, including related to the pandemic. L. Zapata-Cantu (2021) proves that leadership's commitment and openness to innovation are essential for creating and supporting the knowledge and human capital formation that make innovation possible. Companies that previously competed with each other are moving from competition to cooperation in the open innovation space (Iqbal & Hameed, 2020).

The Russian Federation also has a certain potential for economic development, creating business models based on the principles of the open innovation concept. Thus, M. Gershman and co-authors (2019) prove the existence of high innovation potential in the Russian Federation, formed mainly by state-owned enterprises by stimulating research and technology organizations and leading universities to develop open innovations. Analysts point to various mechanisms for implementing the concept of open innovation in the economy, in particular, through the creation of large innovation clusters, innovative territories, etc. (Ioda, 2011), involving the innovative potential of closed cities in an open innovation space (Kirko et al., 2012), attracting foreign investment in the country's open innovation space (Grasmik, 2010), forming a coworking space for startups (Lestari, 2020), encouraging investment in venture capital (Pinkow & Iversen 2020), coordination of internal assets of companies with assets at the level of the regional innovation system (Isaksen et al., 2020), and features of regulation in the field of trade (Karashchuk et al., 2019).



Analysts largely associate the prospects of the modern economy with the level of development of digital technologies, and digital transformation can lead to a change in the configuration of international trade and the emergence of new formats operating in the global digital environment (Spartak, 2018). For example, S.V. Panasenko (2019) points to the role and importance of neuro-innovations in the Russian economy. A. Isaksen and co-authors (2021) note that digital transformation will lead to various forms of innovation and the development of activities in the region. A.N. Mayorova and co-authors (2018) point out the need for mandatory consideration of regional differences in the process of innovation implementation. In addition, digitalization as an innovative process also occurs in traditional fields of activity (Isaksen et al., 2020). As noted by T. Abbate and co-authors (2022), digital platforms of open innovation create new interactive opportunities necessary for the implementation of joint activities of firms in the space of open innovation. A similar opinion is shared by T.A. Golovina and co-authors (2019), who consider ecosystems on digital platforms as the basis for the innovative development of the Russian economy. However, as noted by O.S. Komarcheva and E.A. Lysenko (2020), in many regions of the Russian Federation there is a low level of readiness of trading companies for digitalization, except for some large companies, and digital transformation is not considered as a strategic direction of activity. E.I. Inshakova and I.V. Mitrofanova (2020) consider the digital transformation of the country as a necessary condition for obtaining transactional advantages. S.S. Kudryavtseva (2018) points to the significant potential of the digital economy based on open innovation systems on the GDP of the Russian Federation. E.R. Bostoganashvili (2018) points to the lag of the Russian Federation in the process of digital transformation of the retail trade services market in comparison with developed countries and China, in the presence of higher rates of transition to digital formats in trade. Open innovations combined with digital globalization, as noted by D.I. Filippov (2018), contribute to the transformation of the economy into more efficient business models, but there is a need to find a balance between the benefits of openness and the risks associated with digital transformation.

Researchers and practitioners prove the close connection and dependence of innovation on knowledge, which have a significant positive impact on innovation in the company (Ode & Ayavoo, 2020), and improving knowledge management have a positive impact on the process of open innovation (Hassan & Iqbal, 2020). However, the creation of business models based on open innovations is associated with the problem of intellectual property protection. They point out significant problems in the joint creation of knowledge for innovation and are concerned about knowledge leakage in open innovation networks (Giusti et al., 2020). As M. Da Silva



(2019) proves, with the weakening of the patent system, which is the main mechanism for protecting intellectual property, the intensity of the dissemination of information about innovations and the effectiveness of business models based on open innovations decreases, and with its strengthening, on the contrary, the dissemination of information accelerates and the reliability of business models based on the principles of the open innovation concept increases.

Studies by several authors indicate the synchronous spread of innovations and the development of the globalization process. In particular, J.P. Schnorr (2018) points to the existence of a close connection between digitalization and the globalization of the economy and the innovative development of retail trade in the Russian Federation. A similar opinion is shared by E.V. Nalivaichenko (2019). I.A. Ramazanov and co-authors (2019) point out the need to take into account the features of the formation of the information society in the process of introducing innovations. O.S. Andreev (2019) associates the emergence of new types of innovations in Russia with the use of the advantages of technological globalization, and A.V. Alalykin and co-authors (2013) associate the prospects of innovative development of Russia with its inclusion in the global innovation ecosystem of the open type.

One of the aspects stimulating the adoption of the open innovation concept is the complementarity of technological and non-technological innovations. In particular, E. Bartoloni and M. Baussola (2018) prove that organizational innovations together with technological innovations act as driving forces of productivity, profitability, and sustainability of innovation.

The available information about the innovative potential of the development of the Russian economy is contradictory. According to some researchers, a certain innovative environment is being formed in the country, which is necessary for the transformation of the economy into Industry 4.0. In particular, G. Afanasiyadis and E.I. Kochubei (2020) note the presence of positive dynamics in innovation spending and the growth in the number of innovative projects and products. I.S. Prokhorova (2020) notes that the technological structure of the Russian economy is a weak side of the innovative potential, and investments in the branches of the new technological order are not sufficient for the innovative development of the Russian economy.

Researchers of innovative potential and innovative activity in the field of trade mainly pay attention to marketing and organizational innovations. In particular, V.F. Volodko (2020) points to the expediency of introducing event marketing, geolocation Internet marketing, a single commodity distribution trade and service network, and other marketing innovations. E.I. Gamanov (2016) points to the need to adopt new formats for the organization of retail trade and



the integrated implementation of online and offline sales by stores based on the experience of foreign retail chains. In recent years, there have been studies (Olifirov et al., 2019), proving the effectiveness of innovative solutions based on the digital transformation of trading activities into omnichannel business models. In addition, they emphasize the innovative advantages of iBeacon technology (Sidorov, 2019) used in omnichannel retail chains. K.A. Sannikova and E.V. Shemyakova (2020) point to the insufficient attention of researchers to the theory of the problem of transformation of retail trade into omnichannel formats in the Russian Federation. However, according to K.A. Sannikova and co-authors (2020), retail chains themselves are making great efforts to switch to omnichannel formats, overcoming technological, operational, integration, and other problems for innovative development. N.V. Ereemeeva and V.V. Panyukova (2020) also consider the problem of digital transformation and omnichannel as promising areas of research for the innovative development of retail trade.

Researchers, in particular M.A. Abuzyarova (2015), associate the further development of the Russian economy with an increase in the innovative activity of companies based on the concept of open innovation and, as noted by I.A. Tronina and co-authors (2020), the formation of appropriate innovation infrastructure in the country. However, intersectoral interaction of companies based on innovative openness in the Russian Federation, as a rule, is limited only at the level of relations between manufacturers of high-tech products, while weak interaction with the distribution channels of these products is detected. Although, as N.V. Barsegyan (2018) proves, companies commercializing innovations through innovative interaction are an important component of open innovation.

Entry into the space of open innovation for modern companies that operate in a complex and unstable environment, and innovations themselves are becoming more complex every day and intersect with many fundamental discoveries and applied sciences, it becomes the more obvious and reliable direction of development of companies. D. Manceau and co-authors (2011) note that through open innovation, companies can increase the number of potential partners, ensure long-term results, increase the efficiency of using limited resources, reduce the risks of innovation, and expand internal innovation. W. Vanhaverbeke and N. Roijackers (2015) believe that the open innovation model is effective even if there are sufficient resources for the development of internal innovations. Also, as M. Da Silva (2019) proves, the patent system not only provides legal protection of intellectual property but also promotes a more active exchange of technological and other information between participants in an open innovation project.

However, a review of the scientific literature allows concluding that in the sphere of circulation, including retail trade services, innovations in general and open innovations are



given much less attention compared to most other industries. A similar opinion is also shared by Djellal and co-authors (2013), S.V. Panasenko and co-authors (2021), and other researchers.

This article for the first time explores the innovative potential of the sphere of circulation, as well as the problems and prospects of its innovative development in the context of the involvement of the Russian Federation in the global economic space, global innovation and information, and communication interaction, digital development of the world economy.

## 2. METHODS

The methods of analysis were chosen based on the need to collect primary information and obtain derived data that contribute to solving the problems of the development of the sphere of circulation in the Russian Federation in the context of innovative processes taking place in the country under the influence of globalization and digitalization of the world economy and the development of the concept of open innovation. Special attention was paid to the selection of factors and indicators of their development, characterized by the presence of close connection and interdependence, to assess the internal innovation potential and the impact of global factors on its development based on the concept of open innovation.

The following methods were used in this study:

1) General scientific methods: situational, complex, system, as well as tabular, graphical methods;

2) The method of comparative analysis. This method was used when comparing the innovative potential of the Russian Federation with the potential of other countries and regions to identify possible prospects for innovative development of the sphere of circulation under similar conditions. The methodology of collection and primary information is presented on the websites of Patent applications to the European Patent Office (2021), Rosstat (2021a,b,c), and Rospatent (n.d.).

3) index methods:

- Indices of internal innovation activity: Index of changes in the volume of production of innovative goods, works and services (reflects the dynamics of changes in the volume of production of innovative goods, works and services, reflects the internal innovation potential of organizations); The share of innovative goods, works, services in the total volume of shipped goods, works, services (defined as the ratio of the volume of innovative goods, services and works of own production to the total volume of goods, works and services of own production); Index of changes in the number of new technologies acquired by organizations, software (shows the dynamics of changes in the total number of new technologies acquired by the organization





and individual technical achievements during the reporting year); Index of innovation activity (determined by the ratio of the number of organizations, which carried out technological, organizational, marketing innovations to the total number of organizations surveyed); Inventive activity coefficient (the number of patent applications for inventions filed in Russia per 10 thousand people of the population (reflects the inventive and rationalizing innovative ability of the population and organizations of the country, characterizes the level of the regulatory legal framework and the right to use in the field of copyright and property rights protection). These indices, individually or collectively, allow assessing: the state and prospects for the development of the internal innovation environment of the Russian economy as a whole, individual sectors of the economy and companies; the internal innovation potential necessary for the transformation of existing business models and innovative business models. Primary information can be obtained from open databases of Rosstat (2021b,c) and Rospatent (n.d.).

- Indices of the process of globalization and global innovation activity:

- KOF Index of Globalization (KOF-GI) is a combined indicator used to measure the economic, social, and political aspects of globalization. Developed by the Swiss Economic Institute based on variables that are aggregated using statistically determined weights, measured on a scale from 1 to 100. (KOF-GI) and KOF-subindexes (KOF Economic Index of Globalization (KOFecGI), KOF Trade Index of Globalization (KOFTrGI), KOF Informational Index of Globalization (KOFInGI)) They were used as indicators to measure the degree of involvement of the Russian Federation in the global process of economic, trade and information integration. The results of this analysis allow assessing the degree of global interaction of the Russian economy, including with countries and regions with high innovation activity. The methodology for collecting information and the results of the study are presented in the form of review materials and statistical reports on the website of the KOF Swiss Economic Institute (n.d.);

- The Global Innovation Index (GII) – ranks world economies according to their innovation capabilities. It is the result of joint research by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO). Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation. The information is provided in the form of annual reports on the WIPO website (Global Innovation Index 2020. Russian Federation, 2020; Global Innovation Index 2020. Who will finance innovation?, 2020, Global Innovation Index 2020 rankings, 2020);

- Indices of innovative development of the sphere of circulation: *The development index of network formats* (calculated as the ratio of retail trade turnover of retail chains to the total



volume of retail trade turnover, allows assessing the dynamics of organizational and marketing innovations in retail). *The index of provision of the population with retail space of modern formats* (calculated as the number of m<sup>2</sup> of retail space of modern formats, which uses advanced technologies for organizing trading activities and customer service and modern management methods, allows assessing the dynamics of the introduction of innovative customer service technologies into the retail industry); *The index of the development of the sale of goods via the Internet* (calculated as – the ratio of the cost of goods sold through online stores to the total volume of retail turnover. The indicator allows assessing the development of remote technologies in trade, the degree of penetration of Internet access, the development of electronic payment systems, increasing the geographical availability of goods for the population, quality (convenience) for consumers, allows evaluating the efficiency of trading companies, and also drawing conclusions about the prospects for the use of innovative digital business models in the field of trade). The methodology of information collection and the results of the annual federal statistical observation on the innovative development of the trade industry and the use of information technologies and information and telecommunication networks in the Russian Federation are publicly available on the Rosstat website (Rosstat 2021a,c).

### 3. CALCULATIONS AND INTERPRETATION OF RESULTS

The analysis of the dynamics of the cost of innovative goods, works, and services for certain types of economic activity that affect the formation of the potential of the internal innovation environment has been carried out (Table 1).

**Table 1.** Dynamics of changes in the indicators of the home innovative Russian economy

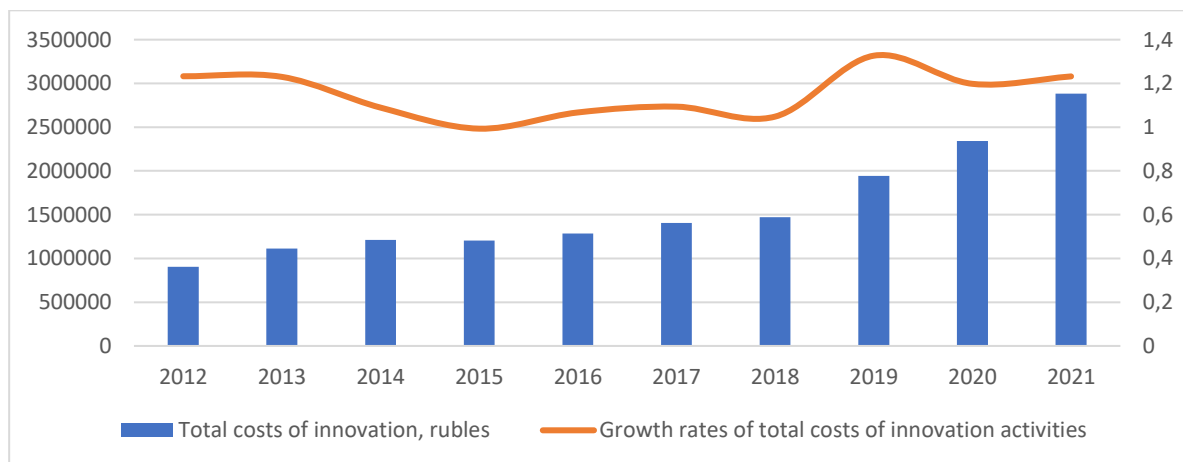
indicators of the home innovative Russian economy	2021/2017
the average for the Russian economy as a whole	1.306
transportation and storage	1.306
telecommunications activities	1.313
computer software development	7.393
information technology activities	7.914
activities in the field of law and accounting	27.070
head office activities and management	15.508
research and development	0.830
advertising activities and market research	0.999
"Engineering Services and Industrial Design Sector"	4.686
"Information and communication technology sector"	1.749
"Content and Media Sector"	1.922
"Information Technology industry"	8.834

Source of information: calculated by the authors according to Rosstat (2021a,c) and Rospatent (n.d.)



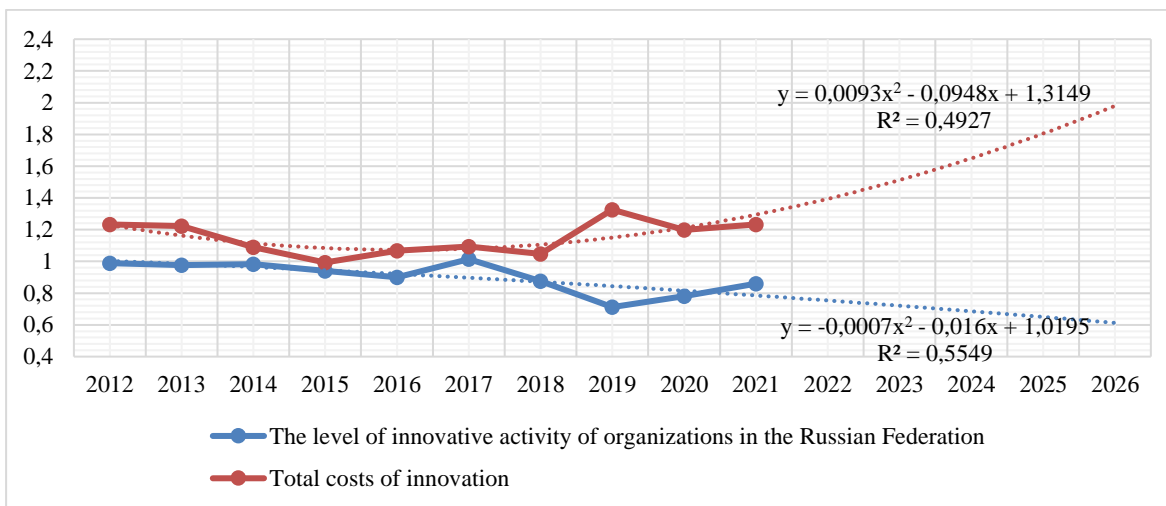
The results of the analysis show (Table 1) that there is a positive trend in the cost of innovative goods and services from 2017 to 2021 in the economy of the Russian Federation as a whole and certain types of economic activities that can influence the innovative and digital development of the sphere of circulation. The cost of innovative goods and services for such types of economic activities as "computer software development" is increasing at a particularly rapid pace – from 2017 to 2021, their cost has increased more than 7 times; "information technology activities" – 8 times; "activities in the field of law and accounting" – 27 times; "activities of head offices and management consulting" – more than 15 times; collective classification grouping of economic activities "Information Technology industry" – almost 9 times. Some types of activities demonstrated negative dynamics of the cost of innovative goods and services during this period. In particular, the innovation cost in the "publishing activities" direction in 2021 amounted to about 0.3 of the cost of 2017, in the "research and development" direction – 0.8, in the "advertising activities and market research" direction – 0.99.

The results obtained (Figure 1) indicate that companies in the Russian Federation are increasing investments in innovation activities.



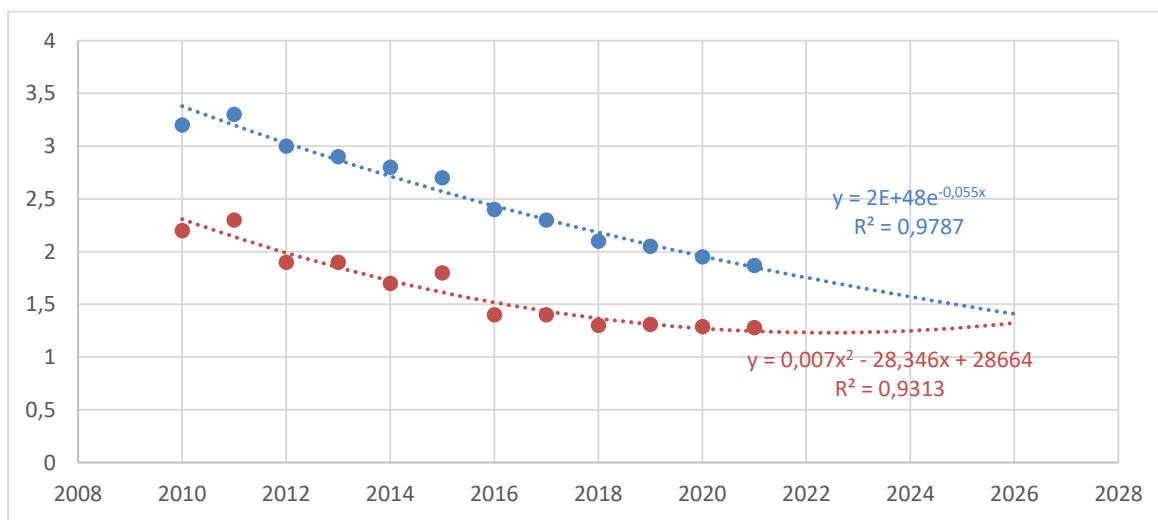
**Figure 1.** Dynamics of costs for innovative activity of companies in the Russian Federation (constructed by the authors according to Rosstat data (2021b))

Comparative analysis shows that with positive growth rates of innovation activity costs, there is a significant drop in the level of innovation activity of the organizations themselves (Figure 2).



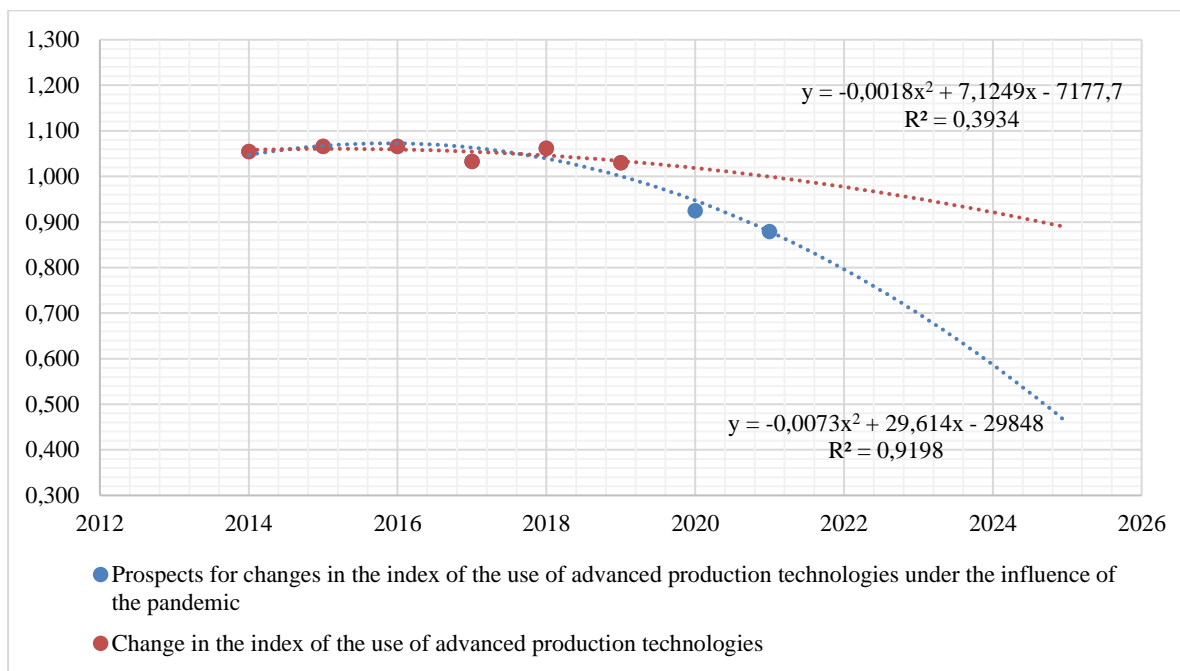
**Figure 2.** The rate of change in the costs of innovation and innovation activity of organizations

It has been revealed that the activity of Russian companies in the field of marketing innovations is falling, while there has been a slight slowdown in the decline in activity in recent years (Figure 3). If the trend of recent years continues, then a noticeable increase in activity in the field of marketing innovations among Russian companies can be expected only by 2026, and the decline in the activity of companies regarding the use of organizational innovations will continue after this period.



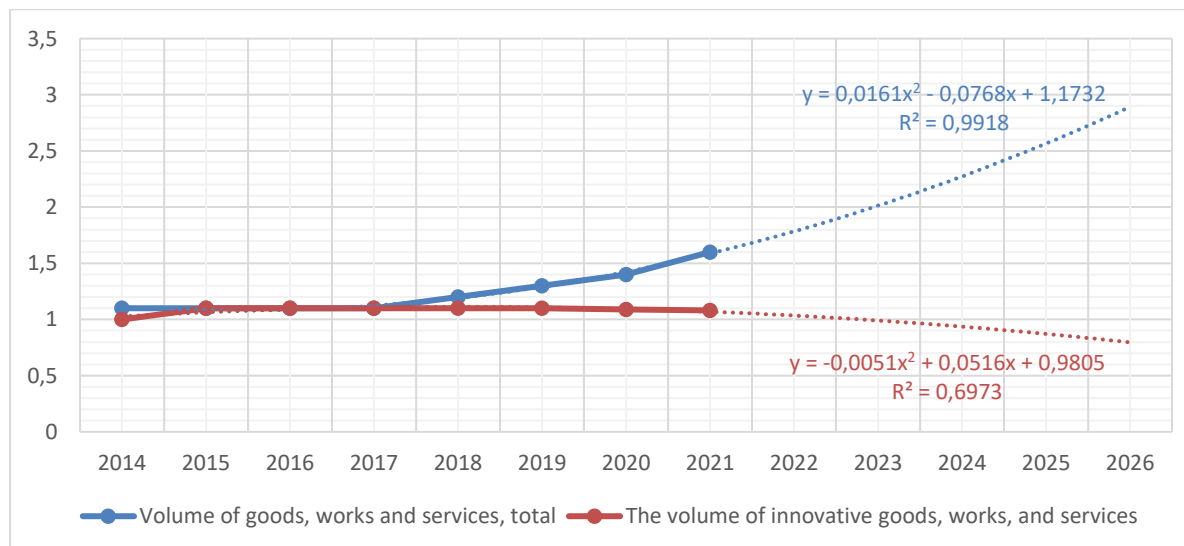
**Figure 3.** Change in the activity index of Russian companies in the implementation of organizational and marketing innovations (built by the authors according to Rosstat (2021c))

Calculations (Figure 4) indicate that the pace of application of advanced manufacturing technologies by Russian companies is slowing down, and during the pandemic, this process has accelerated.



**Figure 4.** Prospects for changing the innovation activity of Russian companies using advanced production technologies (built by the authors according to Rosstat (2021c))

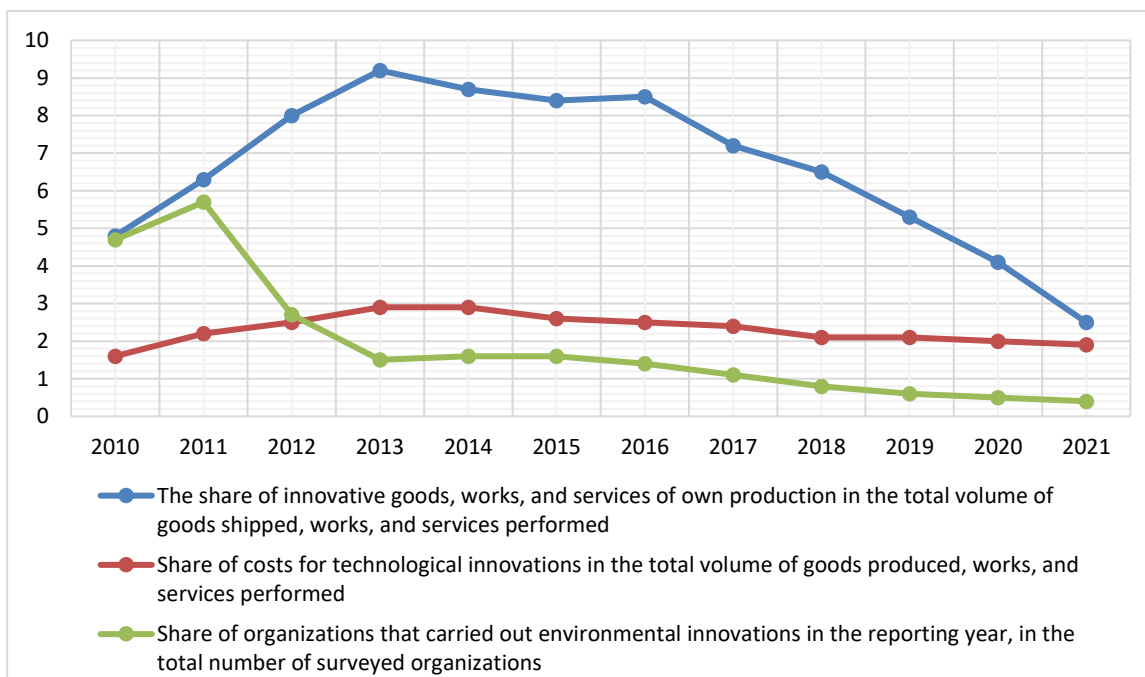
The analysis shows (Figure 5) that Russian companies in recent years have shown noticeable innovative passivity in the production of goods and services against the background of significantly high growth rates of their production as a whole.



**Figure 5.** Dynamics of the index of innovative activity of Russian companies in the production of goods, works, and services (built by the authors according to Rosstat (2021c))

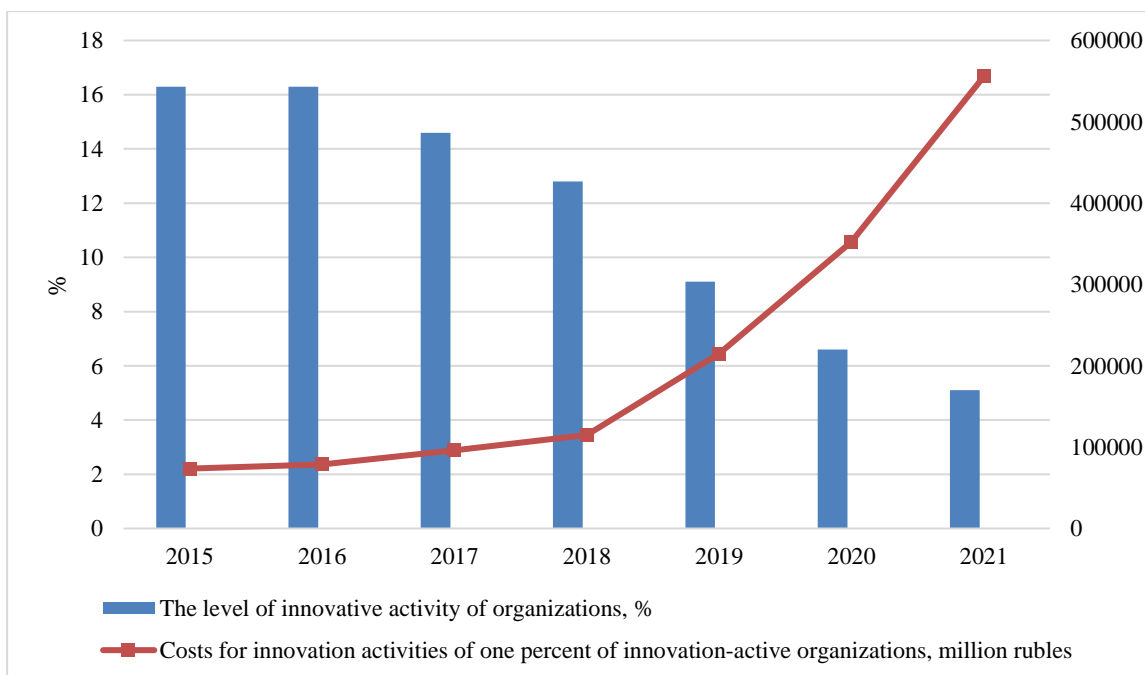
Analysis of the results of the study (Figure 6) shows that the main indicators of innovation activity are characterized by a decline in innovation activity of Russian companies in recent years. In particular, the share of innovative goods and services of own production in the total volume of their production by the beginning of 2021 decreased by 3.7 times compared to 2013,

the share of costs for technological innovations – 1.5 times, the share of organizations that carried out environmental innovations – 3.8 times.



**Figure 6.** The main indicators of innovation activity of Russian companies based on the results of a sample survey (built by the authors using Rosstat databases (2021c))

In the course of the study, an analysis was carried out of the change in the costs of innovative activity, accounting for 1% of innovatively active organizations (Figure 7).



**Figure 7.** Dynamics of innovation activity of companies and the costs of innovation activity of one percent of innovation-active companies



It has been established that the volume of costs for innovative activities by 1% of innovative-active organizations is growing at a significant pace. Thus, from 2016 to 2021, the costs of the 1st % of innovation-active organizations increased by more than 7.0 times. The share of innovative and active companies during this period, on the contrary, decreased by a factor of 3. This situation testifies to the high rates of concentration of innovative activity of Russian companies.

The analysis of patent activity was carried out to assess the innovative potential of the Russian economy (Table 2).

**Table 2.** Change in the index of patent activity of organizations in the Russian economy

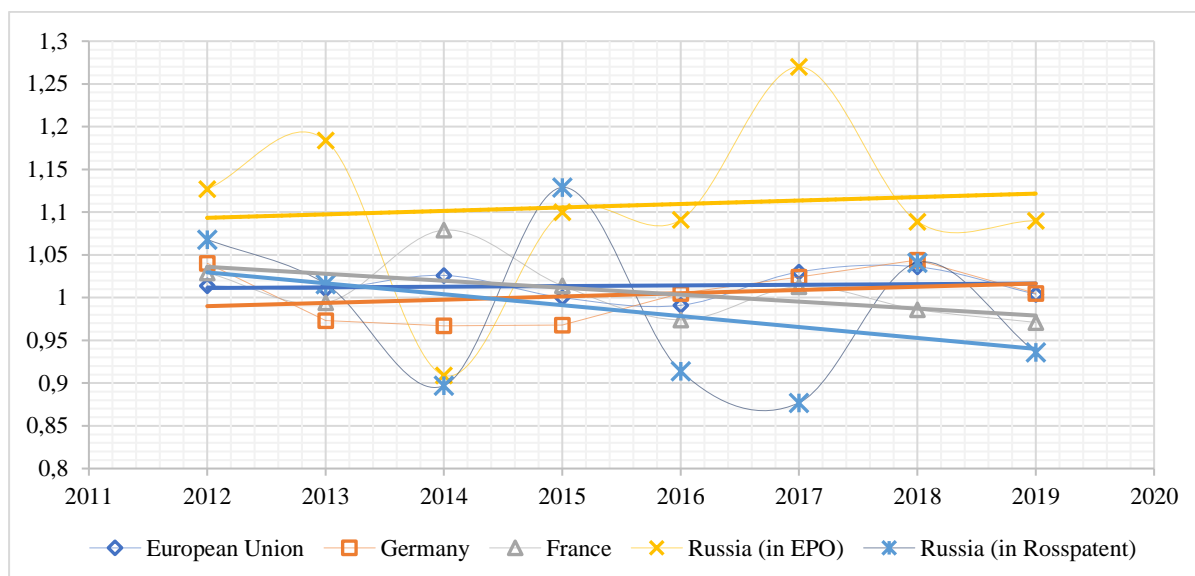
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Patent applications have been filed	1.102	0.974	1.068	1.016	0.897	1.129	0.914	0.877	1.041	0.936	0.985
Patents granted	0.871	0.989	1.096	0.962	1.073	1.022	0.966	1.021	1.044	0.951	0.847
Number of active patents	1.078	0.912	1.077	1.07	1.071	1.045	1.031	1.038	1.046	1.029	1.005

Source of information: calculated by the authors according to Rosstat (2021c), million rubles.

The patent activity of the Russian economy is gradually falling. In particular, from 2010 to 2020, the average annual number of patent applications filed decreased by 5%, the number of patents granted by 8%, therefore, the fund of existing patents remained unchanged.

The presence in the sphere of circulation of the Russian Federation of a significant number of global multinational companies from Europe, North America and other regions that show high innovation activity has necessitated a comparative analysis of the innovation potential of countries from these regions with the innovation potential of the Russian Federation. Figure 8 shows the pace of development of patent activity in the EU and the Russian Federation.

As can be seen from the graph (Figure 8), the patent activity of the EU as a whole tends to fall, and the countries of economic leaders are also the leaders of patent activity. The patent activity of the Russian Federation in the EPO also has a positive trend, when, on the contrary, there is a clear decline in it within the country.



**Figure 8.** Dynamics of patent activity in the EU and the Russian Federation (built by the authors according to Patent applications to the European Patent Office (2021) and Rosstat (2021b))

The high degree of involvement of the Russian Federation in the process of globalization has made it expedient to carry out a study of the country's innovation potential in the context of global innovation and market processes. In particular, the index of involvement in the process of globalization has been analyzed (Table 3). The results obtained indicate that the process of globalization, as an irreversible phenomenon of modernity, retains positive dynamics.

**Table 3.** Index of the involvement of the Russian Federation in the process of globalization

Countries	Rankings for the year 2018	KOFGI		KOFecGI		KOFTrGI		KOFInGI	
		2018	2018/2010	2018	2018/2010	2018	2018/2010	2018	2018/2010
Switzerland	1	91	1.022	86	1.036	82	1.093	89	0.989
China	82	64	1.032	45	0.957	44	1.023	78	1.099
Germany	6	89	1.023	81	1.038	79	1.053	93	1.011
France	10	88	1.023	79	1.039	73	1.074	88	1
United Kingdom	5	89	1.011	82	1.012	74	1.014	93	1
Japan	36	78	1.068	68	1.172	57	1.075	93	1.011
Korea, Rep	35	78	1.04	63	1.086	63	1.086	93	1.011
RF	49	72	1.029	54	1.08	49	1.256	79	1.068
USA	25	82	1.025	68	1.046	55	1	95	1.011
World	-	62	1.033	59	1.017	58	1.036	74	1.072
Europe	-	75	1.027	74	1.042	76	1.07	83	1.025

Source of information: calculated by the authors according to the KOF Swiss Economic Institute (n.d.).

The results of the analysis show that the global process of general, economic, trade, and information globalization continues irreversibly (Table 3). In particular, the KOFGI<sub>World</sub> change index and all KOF sub-indices for the analyzed period (2010 – 2018) had positive





dynamics. The Russian Federation occupies an above-average position in terms of the degree of involvement in the global process of globalization and is approaching countries and regions with a high degree of globalization at a fairly rapid pace.

The results of a comparative analysis of the innovation activity in Russia and world developing and leading economies according to GII are presented in Table 4.

**Table 4.** Comparative characteristics of the Russian Federation and the leading economies of the world according to GII

Countries	2013	2014	2015	2016	2017	2018	2019	2020	The average annual rate of change of GII
Switzerland	66.59	64.78	68.3	66.28	67.69	68.4	67.24	66.08	0.999
Sweden	61.36	62.29	62.4	63.57	63.82	63.08	63.65	62.47	1.003
USA	60.31	60.09	60.1	61.4	61.4	59.81	61.73	60.56	1.001
UK	61.36	62.37	62.42	61.93	60.89	60.13	61.3	59.78	0.996
China	44.66	46.57	47.47	50.57	52.54	53.06	54.82	53.28	1.026
Japan	52.23	52.41	53.97	54.52	54.72	54.95	54.68	52.7	1.001
RF	37.2	39.14	39.32	38.5	38.76	37.9	37.62	35.63	0.994
India	36.17	33.7	31.74	33.61	35.47	35.18	36.58	35.59	0.999

Source of information: calculated by the authors according to WIPO data (Global Innovation Index 2020 rankings, 2020).

According to the results of the analysis of the changes taking place in the global innovation environment, countries differ significantly in the rate of change of GII (Table 4). From 2013 to 2020, the average annual rate of GII change in the Russian Federation was 0.994, in advanced economies – about 1.000, and in some countries with rapidly developing economies, this indicator is much higher, in particular in China, which is the leader in the rate of GII change – 1.026. According to the WIPO report (Global Innovation Index 2020. Russian Federation, 2020), The Russian Federation in the main areas of GII has higher scores compared to the global average, but noticeably low compared to the average European and GII Top-10. The advantages of the Russian Federation are noted in such areas as Human capital & research, Infrastructure, Market sophistication, Business sophistication, Knowledge & technology outputs, and Creative outputs, and low scores on Institutions. In addition, WIPO indicates higher scores, compared with the average European indicators, in the direction of Human capital and research. In the direction of Market sophistication, "exhibits strengths in the sub-pillar Trade competition, and market scale", and "the indicator Domestic market scale" are highlighted as strengths of innovative development of the Russian economy, and in the direction of Business sophistication – "displays strengths in the indicators Knowledge-intensive employment", "Females employed w/ advanced degrees", and "Intellectual property payments".



At the final stage of the analysis of the level of innovation activity, the dynamics of the main indicators reflecting the innovative directions of trade development as a leading branch of the economy were studied (Table 5).

**Table 5.** Average annual rate of change in the innovation and digital activity of the population and organizations when buying/ selling goods

	The average annual rate of change
Import/export ratio of high-tech goods	1.013
Provision of the population with modern retail space formats per 1,000 people, sq. m.	1.891
The share of modern formats of retail trade networks in the formation of retail trade turnover	1.071
Percentage of the population who used the Internet to order goods and services, percentage	1.159
The share of organizations that had special software tools for managing purchases of goods (works, services)	1.007
The share of organizations that had special software tools for managing sales of goods (works, services)	1.051
Percentage of organizations using ERP systems	1.120
Percentage of organizations that used CRM systems	1.150
The share of organizations that used electronic document management systems	1.025
The share of organizations that used electronic data exchange between their own and external information systems by exchange formats	1.041
Percentage of organizations using SCM systems	1.122
The share of organizations that placed orders for goods (works and services) on the Internet	1.010
The share of organizations that received orders for manufactured goods (works, services) via the Internet.	1.079

Source of information: calculated by the authors from Rosstat databases (2021c).

On average, the share of imported high-tech goods exceeds their exports by a factor of 4.9, and this ratio changes in favor of imports (Table 5). The analysis also indicates that there are significant positive dynamics of the manifestation of innovative activity by trading companies in the development of retail chains with innovative formats of enterprises. In addition, the analysis of the results of the selective federal statistical observation of the Russian Federation on the use of information technologies and information and telecommunication networks by the population indicates that there is a significant positive dynamic of the manifestation of innovative digital activity by the population and organizations when buying/selling goods. The innovative digital activity of the population is formed faster than that of organizations.



## 4. DISCUSSION

### 4.1 Innovative potential and problems of innovative development of the Russian Economy

Summarizing the results of the analysis of the state of innovation activity and innovative activity of organizations (Table 1, Figure 2), we concluded that the sale of innovative goods and services in the main sectors of the economy is increasing rapidly in the Russian Federation. However, there is a significant slowdown in innovation activity in the field of research and development against the background of rising costs for innovation activities (Figure 1), which are not accompanied by an adequate increase in innovative activity of companies (Figure 2). There is a drop-in innovation activity in such important areas for companies in the sphere of circulation as "organizational innovations" and "marketing innovations" (Figure 3). The low level of organizational innovation indicates the manifestation of conservatism in the management system, which leads to a drop in the cost-effectiveness of innovative activities in the conditions of the modern market, in which changes occur very quickly, companies that can orient the management system to change withstand competition. In addition, the low activity of marketing innovations in general (Figure 3) and the fall in the cost of innovative types of advertising activities and innovative approaches to market research (Table 1) indicate that Russian companies are developing problems associated with inefficient management and poor adaptation of their goods and services to the needs of a rapidly changing market.

The weak innovation activity of Russian companies in recent years has been accompanied by a drop in the share of innovative goods and services (Figure 5) against the background of a rapidly expanding market as a whole. There is a negative impact of the pandemic on the degree of application of advanced innovative technologies (Figure 4), which is explained by restrictions on the import of such technologies.

Assessing the consequences of innovative passivity and closeness of Russian companies, it can be concluded that the results of innovation activity in the main areas are negative. In particular, the share of innovative goods and services of own production in total sales is rapidly falling, the share of costs for technological innovations in the total volume of goods and services produced and sold is decreasing, the number of companies implementing environmental innovations is decreasing (Figure 6). In addition, against the background of growing costs for innovation activities in general, the number of companies showing innovative activity is decreasing. The volume of innovation activity costs per one percent of innovation-active companies increases significantly, at the same time, the number of companies involved in the innovation process has a steady tendency to decrease (Figure 7). This is also evidenced by the



deterioration of patent activity indicators (Table 2). There is a situation that leads to a narrowing of the internal innovation environment and a weakening of competition in the market of innovative technologies, goods, and services, the need for which is constantly growing in the country and the world. Ultimately, this may lead to increased dependence on the import of innovative technologies, a drop in the competitiveness of goods and services and companies themselves, not only in foreign markets but also in the home market, where competitive pressure from global market players is growing. This conclusion is also confirmed by the results of a comparative analysis of the patent activity of the Russian Federation, the EU, and European economic leaders (Figure 8).

Examining the state of the innovative environment of the sphere of circulation, we concluded that the population of the Russian Federation has a fairly high level of readiness to perceive innovative technologies, goods, and services. In particular, the innovative digital activity of the population when buying/selling goods has increased by a factor of 2.5 in just 5 years (Table 5). There is positive dynamics in the formation of innovative activity of organizations and the corresponding information infrastructure in the field of circulation, but not sufficient for the successful transformation of existing business models into innovative business models and ensuring stable competitive positions not only in the global market of trade services but also in the Russian market. In addition, as the research shows (Table 5), the prospects for innovative development of the sphere of circulation continue to be significantly dependent on imports of high-tech goods, the share in imports of which is growing faster than their share in exports.

#### **4.2 Innovative potential of global interaction of the Russian economy**

Considering the innovative activity of Russian companies in the context of the global globalization process, we conclude that the Russian Federation is deeply involved in the processes of general, economic, trade, information, and other forms of globalization (Table 3). This can not only have a significant impact on the transformation of the Russian economy into the global innovation space, the formation of the market of innovative technologies, goods, and services but also exacerbate competition in this direction. Countries that demonstrate high rates of involvement in the process of globalization also demonstrate high rates of innovation activity motivated by increased competition in the global market space. However, the innovative activity of Russian companies and the economy as a whole is assessed as relatively innovative and conservative compared to other countries (Table 5), which demonstrate innovative activity



and innovative openness. The Russian Federation has a significant potential necessary for the innovative development of the economy, but it is not being implemented effectively.

#### **4.3 Global interaction and innovative openness as a necessary condition for the development of the sphere of circulation**

Global interaction and innovative openness can become factors that can compensate for the shortcomings of the internal innovation potential of the Russian Federation for the transformation of the Russian economy as a whole and the sphere of circulation, including, into a global innovation space based on knowledge exchange. However, based on a review of scientific research, one of the main barriers to the dissemination of knowledge and the transformation of trading companies into an open innovation space is not only the weak innovative activity of service companies and the lack of their breakthrough innovations, but also the unwillingness of trading companies to share their knowledge and innovations with other companies due to competition. This, in turn, has a restraining effect on the development of the trade industry and the Russian economy as a whole. In these conditions, universities and other scientific institutions, based on which this knowledge is formed, could act not only as centers for the formation and dissemination of knowledge but also as the main link and coordinator of innovatively open business models. However, as shown by S.K. Patra and V.V. Krishna (2015), in emerging markets in the field of open innovation, there is a problem associated with the fact that most foreign companies cooperate with suitable foreign or local companies, and universities and state research institutes are less preferable for them, although these institutions accumulate vast knowledge and have great innovation potential and the most innovative human resources. This situation is less effective for intensive dissemination of the experience of creating business models based on open innovations. Researchers prove that the participation of universities and research institutes in the creation of open innovation networks is the most effective way of innovative economic development. Thus, the creation of open courses at universities contributes to the formation of knowledge, increases the potential of open innovation, and the development of the economy as a whole (Allal-Chérif et al., 2016). Technology transfer through joint licensing consortia involving universities can play a crucial role in understanding the prospects for the development of the region (Donegan & Feldman, 2020). According to T. Abbate and co-authors (2013), intermediary organizations in open innovation networks accelerate the formation of knowledge and competencies necessary to solve innovative problems. In addition, as noted by M.J. Janssen and coauthors (2020), systemic



innovation intermediaries can mitigate the constraints associated with the formation of Research and Advanced Development partnerships and the geographic distance of partners.

In our opinion, universities and research institutes can act as the most effective intermediaries in open innovation networks in the Russian Federation. M. Gershman and co-authors (2019) also come to a similar opinion showing that the efficiency of investments in innovation activities of state-owned companies turns out to be higher than that of private companies due to the inclusion in an open innovation network of research and technology organizations and universities. The advantages of universities as the main intermediaries in the process of knowledge exchange in an open innovation environment are also evidenced by the research of I. Alvarez-Meaza and co-authors (2020a).

Being participants in a large number of innovation networks, universities gain vast experience, improve knowledge, expand and update competencies, etc., which turn them into centers for the dissemination of innovations and the development of the knowledge economy.

## 5. CONCLUSION

This study substantiates the need to increase the competitiveness of Russian companies in the field of circulation in the conditions of the modern market based on increasing the efficiency of internal innovation potential, expanding global innovation interaction, forming an innovation-open ecosystem, and transforming traditional business models into innovation-open business models.

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