Industrial Policy Strategy: A Case of Changing National Priorities in Russia

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Abstract: - New technology trends, mainly related to the development of Industry 4.0 and the digital economy, have created significant prerequisites for changing the priorities of industrial policy. This topic is particularly relevant for countries with economies in transition or developing economies, including Russia. The accumulated structural gap, expressed in the level of industries' digitalization, indicates a low willingness of industrial enterprises to introduce digital and related advanced technologies. The data obtained show that this gap is especially pronounced (more than 50% of the average for the EU countries) in the manufacturing industry, oil and gas industry, and transport. In mining, this gap approaches 70%. These circumstances predetermined the need to identify the strategic vector of Russian industrial policy against the background of the developing modern technologies that predetermine the adjustment of industrial policy priorities. To assess the potential of industrial transformation, the authors conducted a comparative analysis of changed targets for the formation of industrial policy in the developed countries and Russia. The analysis showed a sharp evolution in the priorities of industrial policy in Russia – those changed six times during the period from 2014 through 2019. The strategic policy focus has shifted from supporting projects in the production of high-tech civilian and/or dual-use products by enterprises of the military-industrial complex and the transition of enterprises to the best available technologies to supporting the digital economy and artificial intelligence technologies. Based on the results, the researchers suggested the development of industrial policy instruments adapted to the new priorities.

Key-Words: - industrial policy, Industry 4.0, digital economy, industrial policy tools, technology trends, global production chains.

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1 Introduction

New technological trends are a powerful driver for changing the global industrial landscape, which requires the abolition of the previously universal principle of industrial policy formation aimed at increasing the economies of scale [1]. These conditions transform the understanding of industrial policy in general [2]. Although its new image does not exclude the use of protectionism tools, it implies the increasing importance of tools that simplify external coordination effects, overcome information externalities, and support network entrepreneurship. This industrial policy may be called network policy [3-4].

The importance of structural transformations makes the search for growth impulses particularly significant, as a simple redistribution of resources between sectors loses its significance in the new production processes. The need to intensify structural industrial policy in Russia is determined by numerous factors. First, there was a sharp decrease in the average annual GDP growth rate. In 1999–2008, this indicator amounted to 6.9%. The global systemic crisis of 2008 had a painful impact on the Russian economy – that year marked the highest decline in key economic indicators. In 2009–2017, the GDP growth rate decreased to 0.7% [5]. In the past decade, Russia has seen a steady increase in output in traditional commodity sectors. This contributes to an

ever deeper and inefficient integration of Russia into global value chains, mainly as a supplier of raw materials [6]. This creates a cyclical problem in the transition to the next technological stage of development.

These conditions fostered research to identify the priorities of industrial policy, the implementation of which could, on the one hand, reduce the impact of crisis factors, and on the other hand, create the basis for future sustainable development. These circumstances predetermined the need to identify the strategic vector of Russian industrial policy against the background of the developing modern technologies that predetermine the adjustment of industrial policy priorities. We will attempt to systematize the milestones of industrial policy in Russia and its change in the main strategic priorities.

2 Literature review

Modern literature contains the results of scientific discussions about the nature of industrial policy, features of its understanding and implementation in different countries [2, 7-11]. The history of its formation has more than two hundred years. Throughout this time, the very concept of industrial policy, its priorities, forms, and methods of implementation, along with the mechanisms of its implementation, have changed significantly.

The traditional perception of industrial policy is related to its role in compensation for market failures [12], in the allocation of priorities for the development of the national economy at the national level, in the implementation of direct support measures for individual sectors [13-14], in creating conditions for economic growth and increasing competitiveness [10, 15], in tariff regulation, and the allocation of subsidies and special preferences, in explicit protectionism [2, 7], etc.

In the increasing economic instability, modern industrial policy acquires new features associated with the creation of the image of a "good economy" [16-17]. The importance of supporting business and technology initiatives is growing, the priority of human capital is being established [18]. Developing relations between agents of the innovation process promote continuous innovation and improvement of the production chain. Thus, competitiveness is achieved in the implementation of comparative advantages [19].

A review of the world practice of changing the vector of industrial policy indicates the presence of a pronounced humanization trend. New features indicate a request to ensure an "acceptable" level of social standards through economic progress [20-22]. It is possible to single out the three most characteristic stages of such changes. At the first stage – from the end of the 19th to the first decades of the 20th century – the only vector of industrial policy was aimed at creating a strong industry, considering social aspects only in terms of preventing serious disasters in the social sphere. At the second stage – from the first decades to the 1960s-1970s – in addition to the above vector, the vector of industrial policy appeared, determining the possibility of industry development in compliance with the most significant social guarantees. The third, modern stage of industrial policy, differs from the previous ones in that in developed countries, the observance of dominant social interests is a prerequisite for the implementation of industrial policy.

Widespread digitization has become an essential attribute of economic transformation, characterized by the introduction of information and communication technologies in all spheres of society. Several conceptual features of the digital economy principles implementation are presented in Table 1. This transformation can lead to the emergence of a new type of economy, sometimes called the "result economy" [23], or "sharing economy" [24].

Table 1
Features of digital economic transformation in different countries

Country/region	Defining the conceptual principle
EU	The strategy of a single digital market, implemented in three areas: facilitating the access of consumers and businesses to goods and services via the Internet; creating favorable conditions for the development of digital networks and services; promoting the maximum growth potential of the digital economy
Germany	Industry 4.0; transition of the economy to digital production, the introduction of digital technologies in the daily life of society (DE.DIGITAL)
France	Factory of the Future (Usine du Futur)
Netherlands	Smart Factory
Great Britain	High Value-Added Products (High-Value Manufacturing Catapult)

Country/region	Defining the conceptual principle
USA	Leadership in the development of standards and playing field in the framework of multilateral formats; Industrial Internet
China	"Internet Plus" action plan – combining the Internet, cloud computing, big data, and the Internet of Things with modern production for the development of industrial networks and electronic commerce
Japan	Creating a new society through human-centered information technologies
India	Digital society and knowledge economy

Source: [25-28].

It may be emphasized that in many developed countries, the most important tasks of industrial policy are the formation of a single digital market and the consolidation of strategies for developing the domestic market, as well as the formation of a favorable institutional environment. In contrast to such trends, current economic imbalances in Russia emphasize the existence of a significant gap between social interests and government policy. This structural mismatch (the ratio of the military-industrial complex to the consumer sector) was noted in the works of Yaremenko [29], Lin [19], Sychev [30]. Therefore, the search for the best industrial policy priorities, which could offset structural imbalances, effectively integrate Russia into international production chains and, accordingly, ensure sustainable economic growth acquires a new urgency.

3 Results

The systematization of strategic documents of Russia's industrial development reveals the frequent change of priorities. During the period from 2014 to 2019, the priorities supported by industrial policy changed six times (Fig. 1). New directions of industrial policy were indicated in the updated strategies and programs of socio-economic development for this period. On the one hand, this confirms the assumption that the "trauma society" [31] is not conducive to the development of long-term targets for industrial policy. On the other hand, the unprecedentedly high rates of global technological progress determine the need for timely adjustment of directions supported by industrial policy.

The strategic vector of such priorities has shifted from support by the Russian Industry Development Fund to the projects in the production of high-tech civilian and/or dual-use products by the military-industrial complex and the transition of enterprises to the best available technologies (in 2014–2015) to support of the digital economy and artificial intelligence technologies (in 2017–2019). Let us examine the implementation of these priorities and the effectiveness of industrial policy in these areas.

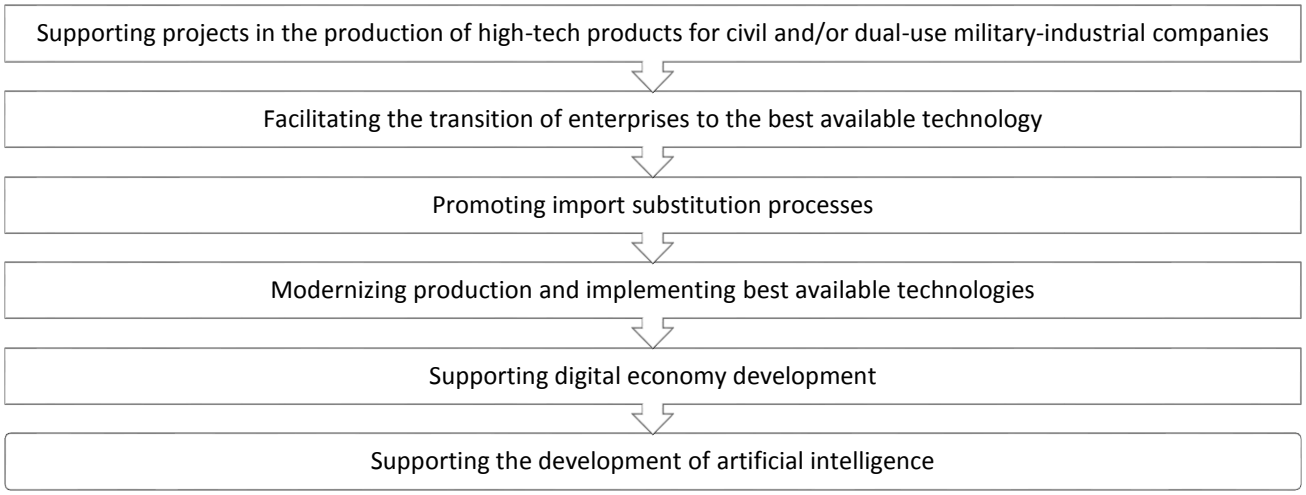

Fig. 1. Changing industrial policy priorities in Russia

Industrial policy can be successful only with the comprehensive incorporation of scientific achievements. Unfortunately, in Russia, the share of total research and development costs remains virtually unchanged. In 2007–2017, the indicator has increased from 1.04% to 1.10%, while in South Korea it has grown from 3.00% to 4.30%, in Germany – from 2.45% to 3.02%, and in the USA – from 2.63% to 2.83% [32]. High-tech and knowledge-intensive solutions, including

information and communication technologies, artificial intelligence, machine vision, etc., are becoming more pronounced trends in the development of the world economy. Eg, the Chinese government has announced the country's transformation into a global ICT center; the annual costs of the largest US corporations in the field of artificial intelligence are estimated at $20 billion. In general, worldwide ICT spending increases by approximately 50% per year [33]. However, digitalization in Russia is progressing much slower.

It is known that to date, the contribution of the digital economy in Russia's GDP is quite modest. According to various estimates, it ranges from 1.2 to 4.5%. There is a significant gap between Russia and the EU countries in terms of economy digitalization (Fig. 2).

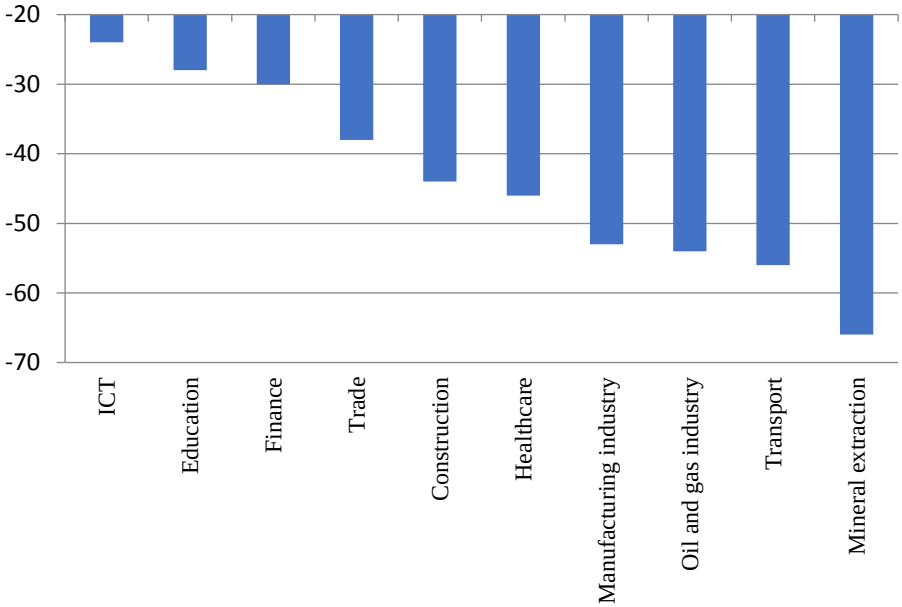

Fig. 2. Difference in the digitalization of Russian economic sectors as compared to the leading EU countries, %
Source: [34].

The data obtained show that this gap is especially evident (over 50%) in the manufacturing industry, oil and gas industry, and transport. In mineral extraction, the gap amounts to 70%. This indicates a low readiness of industrial enterprises to introduce digital technologies. A survey of more than two hundred enterprises conducted by the Ministry of Industry and Trade of the Russian Federation showed that as of mid-2018, 55% of companies spent less than 1% of their budget on digitalization and IT infrastructure development. Only 20% of the surveyed industrial enterprises had automated production planning systems, which indicates only a minimum starting basis for digital readiness.

In these conditions, support for digital transformation becomes an important vector of Russian industrial policy. However, the conservation of structural characteristics of the economic development in 2008–2017 has initiated the transition of economic dynamics to the stagnation phase, which resulted in a "trap" of a lightweight economy with underdeveloped technologies [35].

The digital agenda was reflected in strategic policy documents – the national program named "Digital Economy of Russia" (2017) and the "Digital Economy" national project (2018). Furthermore, there are six federal projects related to the development of information infrastructure, digital technologies, digital public administration, personnel for the digital economy, information security and regulatory framework for the digital environment. Despite the indisputable importance of production digitalization, budget execution for the corresponding national project has been the lowest of all 13 national projects. By the end of December 2019, the execution of costs for the implementation of the Digital Economy project has amounted to only 53.6% [36]. It is clear that the implementation of the planned activities requires new tools [37]. The project for financing national projects in Russia for the next three years is presented in Table 2. As can be seen, the share of budget expenditures on the national project "Digital Economy" will increase from 6.26% in 2020 to 9.59% in 2022.

Table 2
Financing national projects from the federal budget of Russia in 2020–2022

National projects	2020		2021		2022	
	billion rubles	%	billion rubles	%	billion rubles	%
Total for all national projects, including:	1982.7	100.00	221.7	100.00	2690.9	100.00
Digital economy	124.2	6.26	177.9	4.89	258.04	9.59
Ecology	88.0	4.44	123.0	5.59	146.25	5.43
Labor productivity and employment support	6.9	0.35	6.9	0.31	7.48	0.28

Source: Passport of the national project "Ecology", Passport of the national program "Digital Economy of the Russian Federation", Passport of the national project "Labor Productivity and Employment Support", approved by the Presidium of the Presidential Council for Strategic Development and National Projects (Protocol No. 16 of December 24, 2018).

Maintaining digital transformation involves increasing funding from the Russian Industry Development Fund. The new priorities supported by the Fund can be structured as follows: formation of the mechanism for reconfiguring the instrument for subsidizing pilot batches of equipment with a shift in focus to digitalization; clarification of the list of software acquired using the subsidies from the Ministry of Industry and Trade of Russia; expanding support measures for software products needed for industrial Internet technologies; inclusion in the number of recipients of discounts of large companies in the high-tech sector of the economy; reorientation of engineering and technological systems to environmentally friendly ones. The formation of a circular or a closed-loop economy stands out among the new realities, which have a fundamental impact on the identification of industrial policy priorities. Its concept is in its initial stage of development. At the same time, in 2015, the EU has adopted a program of action favoring the transition to a circular economy.

In 2017, the Industrial Development Fund financed 98 projects in the loans valued at 21.7 billion rubles. At the same time, the largest amount of 13.6 billion rubles was spent on development projects offering solutions in the field of import substitution, the best available technologies, and export. On the one hand, the export structure has an apparent connection to the dynamics of economic growth [38]. On the other hand, support was mainly aimed at the export of goods to developing countries in Latin America, Asia, and Africa, which indicates an insufficient quality level of products for developed countries [6]. Support for projects in the development of the machine tool industry amounted to 2.1 billion rubles (9.7%), in the development of conversion projects – 0.9 billion rubles (4%). On the results of 2018, the Foundation provided financing to 8 programs of industrial development (Table 3).

Table 3
Priority financing programs of the Russian Industry Development Fund in 2018

Financing programs	Loan amount, million rubles	Interest rate	Loan period
Industry digitalization	20–500	from 1 to 5%	up to 5 years
Development projects (import substitution, best available technologies, export support)	50–500	from 3 to 5%	up to 5 years
Machine-tool construction	50–500	from 1 to 5%	up to 7 years
Conversion	80–750	from 1 to 5%	up to 5 years
Component parts	50–500	from 1 to 5%	up to 5 years
Increasing labor productivity	50–300	1%	up to 5 years
Leasing projects	5–500	1%	up to 5 years
Drug labeling	5–50	1%	up to 2 years

Source: [39].

In 2019, in all areas of support, 452 projects received a loan in the amount of 98.9 billion rubles. The sectoral distribution of projects is presented in Fig. 3.

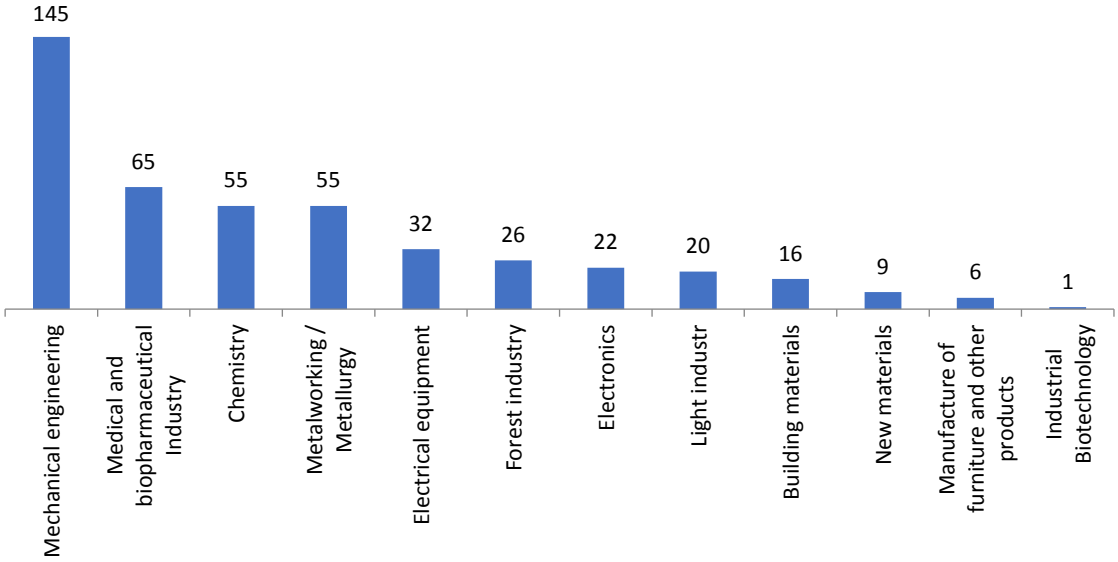

Fig. 3. Sectoral distribution of projects that received funding from the Russian Industry Development Fund (as of February 2, 2019)

As of the beginning of 2020, the Russian Industry Development Fund has supported 559 projects, with a total budget of 119.5 billion rubles. Of these, 43.1% (181 projects) are projects implemented in mechanical engineering, 15.1% (69 projects) – in chemistry, and 14.5% (70 projects) – in metallurgy [39].

Such an instrument as a Special Investment Contract has become a fundamental innovation in the industrial policy of Russia. Its practical implementation started in 2015. This tool proved to be an effective mechanism for implementing capital-intensive investment projects. By the 3rd quarter of 2019, the Fund signed 45 contracts with the total investment of 807.8 billion rubles, the volume of expected tax deductions – 1112 billion rubles, and the number of jobs created – 23,989. In terms of the sectoral structure, the largest share of contracts belongs to the automotive industry (14), the chemical complex ranks the second (8) and pharmaceuticals/medicine is the third (7). The distribution of contracts is shown in Fig. 4.

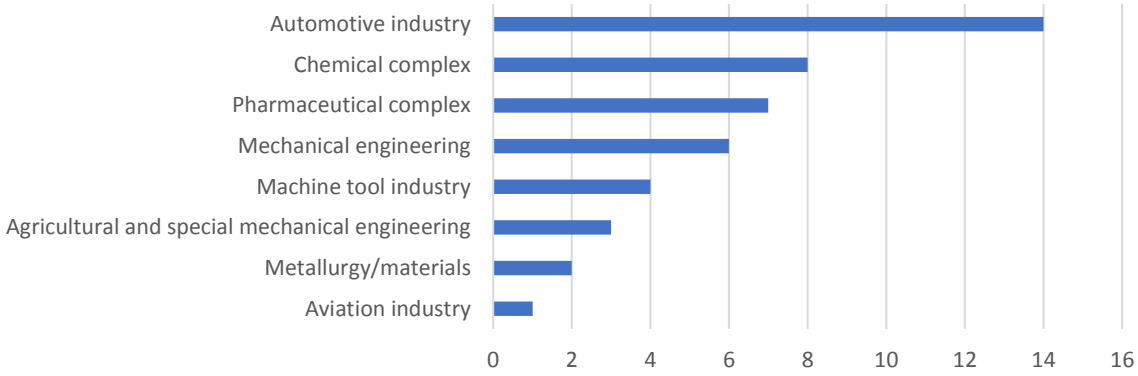

Fig. 4. Sectoral distribution of Special Investment Contracts (as of August 2, 2019) Source: [39].

The digitalization of the economy accelerates the introduction of technological solutions developed based on information systems and artificial intelligence. The global market for AI technology is constantly growing. In 2013, it amounted to $0.7 billion, in 2017 – $13.4 billion; by 2022, this market is projected to increase to $52.5 billion [40]. The number of countries around the world that have adopted national AI development strategies has increased significantly – in 2017, there were only 5 such countries, while in 2018–2019, their number amounted to 30. Furthermore, in 2019, Russia has

adopted the National Strategy for the Development of Artificial Intelligence for the Period until 2030 [53]. The implementation costs are estimated at 90 billion rubles for 6 years [41] and are not comparable with the costs of implementing similar goals in all of the above 30 countries of the world, where financial support for strategies amounts for at least $1 billion per year, and from 5 to 10 billion dollars per year in the developed countries [40]. The amount of investment in AI in several developed countries is shown in Table 4.

Table 4.
Investments in the development of artificial intelligence technologies in 2018

Country	Number of deals	Amount of investments, mln dollars	Investments per deal, mln dollars
USA	429	6398.61	14.92
China	53	5505.22	103.87
Great Britain	124	569.49	4.59
Canada	34	285.17	8.39
Israel	42	278.40	6.63

Source: [40].

The World Economic Forum [42] noted that today, it is impossible to assess the entire potential and risks of artificial intelligence. Participants noted that according to forecast estimates, by 2040, the global gap between countries in investments in digital infrastructure could amount to $1 trillion. This would undoubtedly have a serious impact on increasing social and financial inequality and on the growth of economic instability [42-44].

The increasing uncertainty and risks in the Russian economy are associated by many researchers with external factors such as sanctions, volatility in commodity prices, etc. [45-46]. Due to high uncertainty of implementation the choice of industrial policy priorities in the field of supporting new technological solutions requires new approaches. In addition to the "pilots" of industrial policy, the format of experimental, strategic project initiatives might become a promising model for the implementation of such priorities, the implementation of which will require the creation of special project offices [27].

4 Discussion

We discuss the results obtained in the context of the possibilities of using industrial policy tools that could help improve the situation. For this, it is important to understand the background of the formation of modern industrial policy in Russia.

The success of the industrial policy depends on the quality of the tools used. The initial formation of industrial policy tools in Russia in 1994–2019 generally happened in the format of large-scale experiments. Institutional practices for the industrial policy had also been changing. In 1994–2009, a federal target program was a particularly significant form of industrial policy, which evolved into a government program by 2010. It can be noted that state programs have now transformed from a strategic planning tool, which allowed for certain flexibility in decision-making, into a tool for strict cost management.

The adoption of public-private partnership (PPP) law in 2015 allowed considering it as a new institutional mechanism for the implementation of industrial policy [47]. However, despite the economic feasibility, public-private partnerships did not bring the expected effect at that time [48]. The creation of state corporations at the next stage was in fact one of the consequences of the state's practical refusal to search for effective PPP methods. That is, industrial policy has lost one of the most important and promising mechanisms, namely, the institute of PPP. As a result, industrial policy was locked within the public sector of the economy.

The effective tools of industrial policy in 2009–2011 involved state guarantees, financial support, and demand support for strategic organizations. During this period, the stimulation of innovation continued. The list of main stimulation tools included projects of national importance, venture capital funds, programs to support innovation in universities, creation of innovation infrastructure, including Skolkovo innovation center, establishment of "technological valleys" in the regions, that is, scientific and technological centers. The innovative development programs of state-owned corporations and state-owned companies operating in high-tech industries were tools designed to increase the level of technological development of the economy. The costs of technological innovation in industrial production owned by state corporations increased

significantly. This indicator increased by more than 25 times in 2010–2016 [27]. This trend finds its empirical evidence in other studies [49].

Under these conditions, industrial policy should support not industrial branches, but entire industries, considering the associated sectors and the preferences of various consumer groups [50-51].

The authors suggest creating project technological consortia, which prove to be successful in developed economies. Creating a consortium of research and production profile, which should integrate the capabilities of the real sector of the economy, science and education, also seems to be promising. The positive effects of such collaboration can be observed in many cases [52]. The widespread experience in the formation of consortia indicates that they successfully solve the development issues of individual high-tech areas. Their activities allow for the release of globally competitive high-tech products and services and creating flexible organizational structures for network interaction. The further direction of research is determined by the need to clarify the economic content, nature, and principles of the network industrial policy development.

5 Conclusion

The emergence of various technological trends in the development of the global economy has predetermined the adjustment of targets for industrial policies of many countries. Russia is not an exception. The analysis has allowed systematizing the most significant priorities supported by industrial policy. Those include the preservation of industrial and technological potential for future growth (a refusal to preserve inefficient industries); the support for domestic demand; a change in the model of economic growth (a transition from "oil" to innovative growth); development of the digital economy and artificial intelligence technologies. Targeted adjustment of industrial policy tools will allow improving the attractiveness of the digital economy for business and society. The strategic vector of the industrial policy aimed primarily at structural modernization of the economy, reducing its dependence on the export of raw materials is of particular importance.

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