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Industrial Policy: New Realities, Formation and Implementation Issues*

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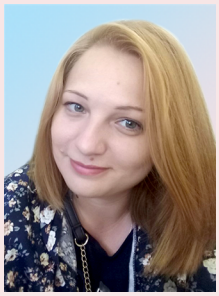

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Abstract. The article presents the conducted comparative analysis of changing target points for the industrial policy formation in the economies of developed countries and in Russia. The authors have justified that the goals of industrial policy should not be just attractive to the state and business, but also contribute to the formation of a favorable business environment, as well as to the growth of public welfare. It has been established that in conditions of "the trauma society", only short-term priorities of the industrial policy can be implemented. New realities fundamentally influencing the industrial policy priorities have been revealed. The researchers have justified the expediency of integrating the industrial policy into the general vector of Russia's strategic documents. The authors have proposed to elaborate the regional industrial policy within the framework of the Ural Federal District as one of the 12 macroregions

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in the country marked in the Strategy for spatial development of the Russian Federation for the period up to 2025. Analyzing "the Updated Strategy of the EU Industrial Policy" and numerous studies in the field of circular economy formation has allowed to justify the need for industrial policy measures to stimulate the transition to the circular economy with including the basic principles of such transition in the strategic documents regarding the development of Russia and its regions. The authors have stressed the inextricable link between the circular economy formation and digitalization. It has been shown that in the interpretation of foreign researchers in comparison to national authors the digital transformation, as well as the industrial policy, has positive qualitative changes of socially significant results as the ultimate goal. The priorities in the field of the national industry's digitalization for their support by the industrial policy instruments have been structured. The researchers have emphasized the acceleration of implementing technological solutions happening in the process of digitalization, which are based on the information systems having artificial intelligence. The authors have revealed the priority areas aimed at supporting the development of artificial intelligence by the industrial policy. It has been established that the latest technologies have an impact on changing the industrial policy priorities, and transform the state's economic role and modern business models. The interaction between the new subjects and objects of the industrial policy is the basis for the formation of the qualitatively new network industrial policy.

Key words: industrial policy, evolution of industrial policy notions, new technological trends, development strategies and priorities, circular economy, digital transformation, network industrial policy.

Introduction

Industrial policy is one of the most popular tools for creating a structurally balanced, competitive economy implementing the most modern technological and institutional trends. The expression of D. Rodrik, a classic in the field of industrial policy, is widely known: "... the challenge in most developing countries is not to rediscover industrial policy, but to redeploy it in a more effective manner." [1].

The emergence of various technological, environmental and socio-economic trends in the development of the world economy has predetermined the adjustment of target points for the formation and implementation of industrial policy. If in the period from the XIX century to the first decades of the XX century the goal of industrial policy was to create a powerful industry, then from the first decades to the 60s of the XX century it has been adjusted taking into account basic social guarantees as a prerequisite for the implementation of any technological solutions. Since the beginning of the XXI century, almost all developed countries, at the early stages of industrial policy formation and implementation, have given priority to solving social, environmental, and ethical problems as preliminary grounds for making a final verdict on the possibility of implementing any new technological changes. Modern domestic and foreign literature contains the results of numerous studies concerning the essence of industrial policy, its understanding and application in different countries [1-10]. The purpose of this article is to analyze the new realities of economic development predetermining a significant adjustment of the domestic industrial policy priorities.

To achieve the goal set, it is necessary to analyze the evolution of the concept of "industrial policy" in Russia; identify the new realities fundamentally affecting the industrial policy priorities; systematize them in the field

of the latest technological trends; establish changes in the priorities of domestic industrial policy supported by the Industrial Development Fund.

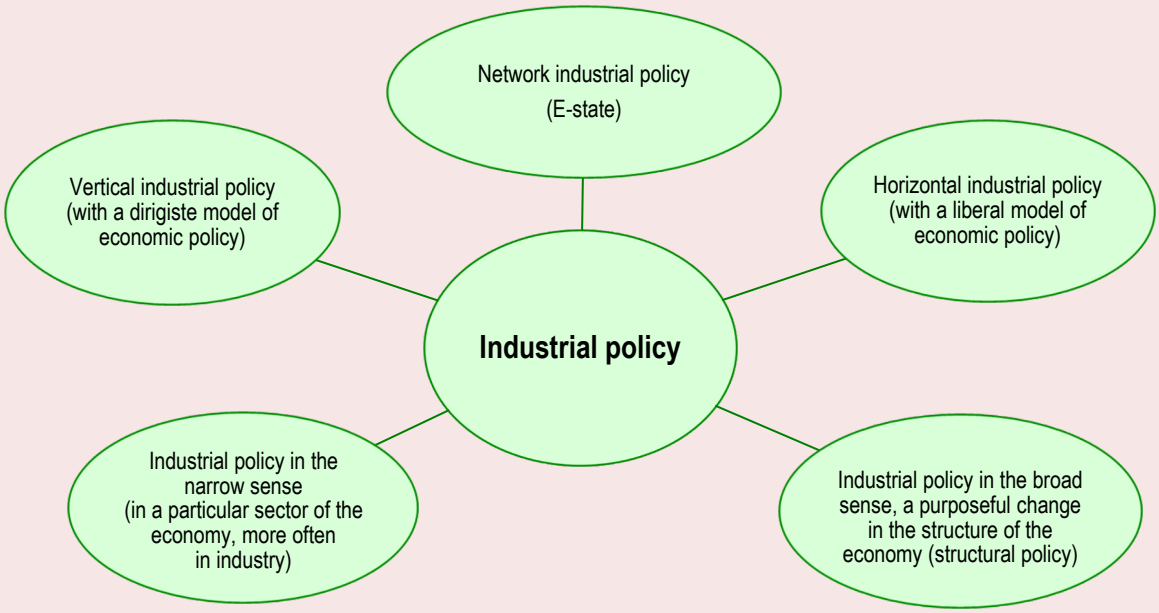
The concept of industrial policy

Despite the fact that industrial policy has been widely used in the practice of the world economy for more than a century, the discussions about the concept of "industrial policy", the interpretation of its economic content, target orientation, and possible implementation mechanisms continue until the present. There is a relative consensus on the validity of considering industrial policy as a horizontal policy implementing a system of measures to create a favorable business climate for all economic entities, and understanding it as a vertical policy supporting selected industries.

In recent years, when the formation of a network economy is increasingly being discussed, industrial policy has been interpreted as a network policy implemented by the so-called digital state (E-state). It is also widely interpreted as policy in a loose sense (aimed at changing the structure of the economy as a whole) and in a near sense (when it comes to a particular sector of the economy) (*Fig. 1*). Various industries are considered as sectors, such as production sector, agriculture, tourism, etc. The concept of industrial policy in the near sense, applied to the industrial sector of the economy, has become the most widespread in our country.

Having traced the evolution of industrial policy concepts proposed by a number of institutional actors in Russia for the period since 1998, i.e. the year of the beginning of fundamental changes in the economic and political life of the country until 2014, when the Federal law "On industrial policy in the Russian Federation" was approved, one may conclude that the object of its regulation consistently shrinks from the structural proportions of the economy as a whole to just the industrial sector. In addition, if the initial interpretations focused on the development of human potential, the

Figure 1. Types of industrial policy



Source: compiled by the authors based on [4; 8; 10; 11; 12; 13].

Figure 2. Evolution of the concept of "industrial policy" (1998–2014)

country's socio-economic development, the law "On industrial policy in the Russian Federation" completely lacks any aspects in the field of personal potential and social welfare development (*Fig. 2*).

The analysis of publications [4; 8; 9; 10; 12] makes it possible to identify the most complete interpretation of the concept of "industrial policy" that integrates various definitions, corresponding to the concept proposed by UNIDO and the OECD.

"Industrial policy is a public policy aimed at improving the business environment or the structure of economic activity by sectors and technologies providing better prospects for economic growth and social well-being compared to the absence of such intervention" [10]. The advantage of this definition is, in our opinion, the understanding of industrial policy not just as a set of legal, economic, organizational and other measures aimed at developing the country's industrial potential. It is emphasized here that industrial policy is a state policy, which means that, like any policy, it reflects the system of relations between the state, business, and civil society institutions regarding the achievement of the agreed goals. This definition identifies such goals as both improving the business environment and enhancing the structure of economic activity by sectors. This brings together the positions of researchers who support both horizontal and vertical industrial policies. In addition, it is important to emphasize the need to ensure the public welfare growth, which fully corresponds to the evolution of the concept of "industrial policy" in the world economy over the past two centuries.

The understanding of industrial policy as a system of relations between the state and various actors in its economic and social life mainstreams the problem of choosing the industrial policy priorities of any state. In general, this choice is determined by the level of civilizational, socio-economic and technological development of society, and the peculiarities of the population's mentality.

An important condition for this is the state of society in which it is located. During the period of the state's evolutionary development, the long-term priorities of industrial policy can be formed and implemented; revolutionary development usually involves a radical break in the previously formulated directions with the subsequent development of short-term priorities. A special approach to the selection of industrial policy priorities is required in states characterized by the existence of the so-called "trauma society" [14]. It is characterized by a long state of uncertainty in the transformation of social relations; serious deformation of economic, social, political and spiritual and cultural processes; inconsistency in the actions of political and economic actors, who often represent corporate or group egoistic interests; the transition of power resources to capital and the mutual transition of capital to power resources; a sharp increase in social inequality, etc. In this regard, the following hypothesis arises: the "trauma society", the main features of which can be observed in modern Russia, lacks the necessary conditions for developing long-term industrial policy priorities. This state of affairs largely explains the frequent change of development priorities declared by the government.

Raising the issue of development priorities inevitably leads to an adjustment of industrial policy goals. Solving economic, socio-environmental and humanitarian problems becomes mandatory within its framework, which fully corresponds to the above-mentioned concept of industrial policy formulated by UNIDO and the OECD. At the same time, it is very important that the goals would be attractive not only for business, government and society, but also their achievement would lead to significant results in terms of creating a favorable business environment for economic and industrial development and the growth of public welfare [15].

New realities having a fundamental impact on the industrial policy priorities

The rapidly changing political and economic situation in the world, the emergence of new technological trends characteristic of the fourth industrial revolution, which not only transform the macroeconomic structural proportions, but can also lead to unpredictable changes in the field of social and ethical relations, indicate the need for a fundamentally different approach to management decision-making, especially in the field of industrial policy. It should be integrated into the overall vector of strategic documents. Moreover, the adjustment of industrial policy priorities depends on the increasing importance of taking into account the latest development trends, forming the so called "new reality", which involves the focus on spatial development of the economy, the formation of circular economy, digital transformation, the development of artificial intelligence technologies.

Industrial policy integration into the overall vector of strategic documents. An ambiguous assessment of the prospects and consequences of the implementation of some of the above directions determines a fairly high probability of various risks. The most significant of them are noted in the annual report of The World Economic Forum (Davos 2020), where five global risks are highlighted: slowing

economy and social tensions, climate change, species biodiversity declining, cybersecurity issues, and new challenges in public health[1]. As you can see, three of the five global risks are directly related to the environment, and one is related to increasing social tensions. This confirms the mandatory requirements to the new principles of industrial policy formation related to the system of measures for regulating economic, technological, social and environmental development.

In these conditions, the vector of industrial policy formation cannot be considered as the preferred direction of industrial development (in accordance with the Federal law "On industrial policy in the Russian Federation") without taking into account social and environmental factors. It should be integrated into the overall system of strategic documents that determine the future of the country, so the task of forming a new industrial policy configuration (multidimensional policy) arises. It is the result of high risks from the allocation of sectoral priorities, the possibility of identifying erroneous technological priorities and the likelihood of unreliable estimates of the expected effectiveness of their implementation. To level the potential risks, it is advisable to form the so-called "pilots" of industrial (i.e. structural) policy [16]. In some studies, industrial and structural policy are considered as synonymous concepts [5; 16; 17].

The integration of industrial policy into the general vector of strategic documents forming the future of the state makes it necessary to comment on the most important, recently adopted strategic documents regulating Russia's development, forming the "new reality". We are talking about such policies and programs as "Strategy for Spatial Development of the Russian Federation for the Period up to 2025", "Strategy of Environmental Security of the Russian Federation for the Period up to 2025", National Program "Digital Economy of the Russian Federation", "National Strategy for the Development of Artificial Intelligence for the Period up to 2030". The most important provisions of these documents have become a significant component of national projects.

Spatial development of the economy. The Federal law "On industrial policy in the Russian Federation" does not actually address the spatial aspect of economic development, although for Russia, one of the largest countries in the world by territory, this is a very important area that is subject to mandatory state regulation. The Strategy for spatial development of the Russian Federation for the period up to 2025 is designed to solve this problem in many ways. In our opinion, this Strategy should be considered not only as a tool for allocating the limited resources needed to implement the identified priorities, but primarily, as the basis for the country's preferred future, expressed in the relationship of spatial and industrial development. In addition, it is obvious that it should offer the management solutions necessary to achieve this future, including those in the field of industrial policy. The Strategy for spatial development of Russia identifies 12 macro-regions, and points the creation of investment platforms as a new mechanism for territories' development. A special feature of the Strategy is the priority of supporting the interregional investment projects.

At the same time, it has to be said about the poorly researched justification of the priorities formulated in the Strategy for the selected macroregions; insufficient elaboration of the

[1] *The Global Risks Report 2020*. Available at: http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf (accessed 30.01.2020).

issues in the area of economic and institutional support for the implementation of federal and regional priorities; lack of information about investment and other resources required for the strategic priorities implementation. It does not contain any proposals for the formation of institutional innovations related to the status of the macroregions. The weak point, in our view, is that there is no reasonable opportunity to make changes more predictable for all the participants of the Strategy development and implementation, and there is no clear system for coordinating the actions of all the parties.

Vagueness, indistinctness, or rather, the complete lack of justification for the priorities proposed in the Strategy, make us analyze the existing foreign experience of developing various strategic documents defining state development priorities more closely. The concept of "smart specialization" for choosing development priorities in the EU countries is of particular interest from this point of view. The most important institutional innovation of the EU in the field of choosing development priorities is the formation of the *Smart Specialization Platform* (S3 Platform)[2]. Its main purpose:

- informational, methodological and expert support to regional authorities in selecting development priorities;
- promoting mutual learning and interregional cooperation;
- creating a bank of priorities, systematized by separate categories for clarification by the regions of their specialization;
- systematization of industrial policy tools supporting the territories' competitive advantages when working out their development strategies.

[2] How can regions and countries join the S3 Platform? Available at: https://s3platform.jrc.ec.europa.eu/registration (accessed 27.01.2020).

Thus, industrial policy that encourages the implementation of the territories' priority competitive advantages is a distinctive feature of smart specialization strategies of the EU countries. It is important to emphasize that such strategies support those development areas that are fully compatible with the business needs.

Russian researchers of the Higher School of Economics conducted a comparative analysis of the compliance of eight strategies for innovative development of the constituent entities of the Russian Federation with the criteria of smart specialization strategies [18], which allowed to identify the elements of smart specialization that are not present in the domestic strategies for the regions' innovative development. The main ones of them are related to the insufficient analytical work, lack of interregional comparisons and clear allocation of state priorities and global technological trends. Innovations are considered without proper connection with the socio-economic context. But the main difference is that the Russian regions do not form a vision of the region's future when creating appropriate strategies. The main conclusion which should be taken into account when working out domestic regional strategies for innovative development is as follows: a strategy formed at the level of a particular region cannot be successful, as it needs deep external knowledge and general rules for selecting and synchronizing priorities.

As previously noted, the Strategy for spatial development of Russia for the period up to 2030 does not define the institutional status of the 12 macroregions, which makes it difficult to implement the interregional investment projects proposed by the territories. At the same time, one of the macroregions, namely the Ural-Siberian region, fully corresponds to the structure of the Ural Federal district in

terms of its constituent entities. This may be the basis for the development of regional industrial policy not only for individual subjects of the Federation, but also for the Ural Federal district as a whole, because in this case a specific subject of industrial policy arises. The macroregion's industrial policy as a tool for implementing interregional investment projects will allow:

- to ensure the concurrency of business entities' actions within each macroregion with the macroregion's interests as a whole;
- to develop interregional cooperation chains;
- to increase interaction between large, small and medium-sized businesses within the macroregion;
- to ensure the coordinated development of industry, regional science, and higher and secondary vocational education between the subjects of the Ural-Siberian macroregion.

However, the success of its industrial policy can only be achieved if the priorities of the Federal industrial policy and the specifics of the industrial policy of the regions forming the Ural-Siberian macroregion are properly taken into account.

Formation of a circular economy. The formation of a circular economy or a closed-loop economy occupies a special place among the new realities having a fundamental impact on the identification of industrial policy priorities. Its concept is at the initial stage of development. At the same time, the EU adopted an action plan to encourage Europe's transition to a circular economy in 2015 already. In 2017, the "Updated EU industrial policy strategy" was adopted, the goal of which is formulated as "strengthening Europe's leadership in a circular and low-carbon economy". All strategic documents in European countries must contain provisions related to the circular economy.

The significance of improving environmental safety and the formation of a closed-cycle economy have predetermined the development of the Strategy for environmental safety of the Russian Federation for the period up to 2025, and the Strategy for the development of industry for processing, recycling and neutralization of production and consumption waste for the period up to 2030, approved respectively in 2017 and 2018. Currently, the Main directions of the strategy for the long-term development of the Russian economy with a low level of greenhouse gas emissions until 2050 are being formed. The national project "Ecology", implemented in the period from 2018 to 2024, should play a special role in the formation of a closed-loop economy. The 11 Federal projects envisaged in it are aimed at eliminating the negative technogenic impact on the environment, reducing pollution of natural resources, and efficient disposing of production and consumption waste. In our opinion, the dubious possibility of attracting extra-budgetary funds, accounting for almost 80% of the total amount of financial support for this national project (NP), is a great danger in achieving the goals laid down in the NP "Ecology"[3].

A special role of industrial policy in the implementation of this NP is associated with the implementation of one of the 11 Federal projects, namely the project "Introduction of the best available technologies". The number of complex environmental permits issued is considered to be the main indicator of the

[3] *Report on the results of the expert-analytical event "Monitoring of the national project "Ecology" implementation including the timeliness of their financial support, achievement of goals and objectives, control points, as well as management quality"*. Available at: http://www.audit.gov.ru/upload/iblock/697/6974665033576448bae98baa0e9626e4.pdf (accessed 20.02.2020).

Federal project's goal achievement. However, the permits only apply to the first category items. At the same time, the legislation in the field of industrial policy is not adjusted properly in order to achieve the goals of the NP "Ecology", as well as the requirements of the circular economy. Currently, the industrial development Fund is the main industrial policy tool that can be used to encourage the modernization of industrial enterprises in order to achieve their performance parameters that meet the requirements of the best available technologies (BAT). More than 60% of all investments in the budget of the NP "Ecology" are provided for the implementation of this very Federal project laid down in this NP. Achieving the goals of this Federal project could allow to harmonize the process of implementing BAT with the norms of international law in Russia.

Thus, the instruments of industrial policy should be increasingly reconfigured to apply measures ensuring the implementation of the NP "Ecology" goals and stimulating the transition to a circular economy. The main principles of this transition should be included into the strategic documents for the development of Russia and its regions.

Digital transformation. Circular economy formation is inextricably linked to digitalization. Digital technologies development is one of the most important tasks of the EU industrial policy. Its industrial policy supports the formation of a single digital market and a favorable institutional environment, the implementation of Industry 4.0 technologies, the training of a skilled workforce focused on the activities in digital economy and labor productivity growth. In Russia, the development of digital technologies will be facilitated by the implementation of the national program "Digital economy of the Russian Federation" approved in 2017, as well as the National project "Digital economy" approved in 2018 with implementation dates from 2018 up to 2024. Six Federal projects related to the development of the digital information environment are envisaged within the framework of the NP.

One of the most important Federal projects is a project related to the digital technologies' development, which will have a serious impact not only on all spheres of the economy, but also on the life of society as a whole. These end-to-end digital technologies include artificial intelligence, big data, virtual and augmented reality, new production technologies, industrial Internet, and so on. It is appropriate to use industrial policy tools to stimulate the development of these technologies. Despite the indisputable importance of production digitalization, budget execution for the "Digital economy" NP appeared to be the lowest of all 13 national projects. As of the end of December 2019, the execution of expenditures for the implementation of this project made up only 53.6%[4].

The development of the national project "Digital economy" was largely predetermined by the formation of digital transformation as a global key trend[5] [19–21]. Digital transformation of public administration is taking place all over the world more actively, but with varying degrees of effectiveness [22]. This aspect is particularly significant from the point of view of forming industrial policy in the new reality. It is known that the state is one of

[4] Implementation of national projects: first results. Available at: http://www.audit.gov.ru/audit-national/9508 (accessed 20.02.2020).

[5] Bondar K. What is in reality Industry 4.0? *InnovaCima,* November 9, 2017. Available at: http://innovacima.com/en/2017/11/09/what-is-industry-4-0 (accessed 30.01.2020).

the leading actors in both the formation and implementation of industrial policy. However, we believe that successful digital transformation in this context can only be achieved if digital technologies are used not so much to support the processes of interaction between government structures as to achieve significant results in the industrial policy implementation. Such results should be characterized by progressive structural transformations, the creation of a favorable business climate, and the acquisition of additional public value as the results of state initiatives in the field of digitalization [23].

In accordance with the previously adopted recommendations of the OECD, the basis of digital government is an ecosystem including not only public authorities, but also business structures, institutions and associations of civil society. Such a government consider the use of digital technologies as "an integral part of strategies to modernize public administration in order to improve the delivery of public goods"[6]. Thus, in the foreign authors' interpretation, both digital transformation and industrial policy have the ultimate goal of positive qualitative changes in socially significant results. However, in contrast to this approach, the concept of industrial policy, enshrined in the Federal law "On industrial policy in the Russian Federation", does not even mention the receipt of socially significant results. A similar situation is typical for the domestic understanding of digital transformation. Its interpretation proposed by the Center for strategic development focuses only on the optimization of processes, the appearance of fundamentally new properties, and the economy of resources used. This is not about getting any results that could be significant from the point of view of public value here.

In general, in order to support the digital transformation in Russia, the Federal law "On industrial policy in the Russian Federation" provides for an increase in the programs funded by the Industrial Development Fund, the main tool for implementing industrial policy priorities, by means of including the program "Industry digitalization" into their composition. Its participants can get a loan amount from 20 to 50 million rubles at an interest rate of 1 to 5% and a loan term of up to 5 years. New priorities in the field of industrial digitalization, the implementation of which is funded by the Industrial Development Fund, can be structured as follows:

- formation of a mechanism for retargeting the tool for subsidizing the pilot batches of equipment with a shift in emphasis on digitalization tasks;
- clarification of the software list subsidized by the Ministry of industry and trade of the Russian Federation;
- expanding support measures for software products required for industrial Internet technologies;
- inclusion of the high-tech sector of the economy in the number of recipients of discounts for large companies;
- creating a legal framework for regulating the digital economy;
- engineering and technological systems' reorientation to the environmentally friendly ones.

It should be emphasized that the greatest effect of digitalization will be achieved in an economy where not only traditional industries and services are developed and the cooperative

[6] *OECD Recommendation of the Council on Digital Government Strategies*. 2014. Available at: http://www.oecd.org/gov/digital-government/Recommendation-digital-government-strategies.pdf (accessed 03.02.2020).

Investments in the development of artificial intelligence technologies, 2018

Country	Number of transactions concluded	Amount of investment, million dollars	Investment per transaction, million dollars
USA	429	6398.61	14.92
China	53	5505.22	103.87
UK	124	569.49	4.59
Canada	34	285.17	8.39
Israel	42	278.40	6.63
Compiled by: Artificial intelligence (global market). Available at: http://www.tadviser.ru/a/425392 (accessed 20.11.2019).			

ties between them are formed, but also the personnel with relevant competencies are trained. This problem can be solved with the coordinated implementation of the Federal project "Personnel for the digital economy" included in the NP "Digital economy", and one of the three Federal projects under the NP "Science" ("Development of human resources in the field of research and development"). The implementation of the latter will not only create 50 centers for accelerated training of specialists, 5 international scientific and methodological centers based on universities, but also organize the work of 15 satellite universities for research, training, retraining and internship of advanced digital economy personnel[7].

Artificial intelligence. In the process of economy digitalization, the introduction of technological solutions based on information systems and artificial intelligence (AI) is accelerating. The global market for AI technologies is constantly growing. If in 2013 it was 0.7 billion dollars, in 2017 – 13.4 billion dollars, then by 2022 the volume of this market is going to increase up to 52.5 billion dollars[8]. There is a sharp increase in the number of countries that have adopted national strategies for AI development: 5 in 2017, and 30 in 2018–2019. In 2019, Russia also adopted the "National strategy for the development of artificial intelligence for the period up to 2030"[9].

The Strategy aims to make Russia one of the international leaders in the development and use of AI technologies by 2030. It can be noted that the goal of the AI development Strategy in the US is to maintain leadership in this field by 2030, and in China it is to become a leader in the field of artificial intelligence by 2030[10]. In order for Russia to become one of the international leaders in AI, it requires not only technological, human, and institutional resources, but also significant financial resources. The cost of implementing the Strategy in Russia is estimated at 90 billion rubles for 6 years [24] and is not comparable to the costs of implementing similar goals in all the above-mentioned 30 countries of the world, where the financial support of strategies, determined by annual investments from the state budget, amounts to at least 1 billion dollars per year, and in developed countries it is from 5 to 10 billion dollars per year[11]. The amount of investment in AI in a number of developed countries is shown in the *table*.

[7] *Passport of the national project "Science"*. Available at: https://rulaws.ru/acts/Pasport-natsionalnogo-proekta-Nauka/ (accessed 21.02.2020).

[8] Artificial intelligence (global market). Available at: http://www.tadviser.ru/a/425392 (accessed 20.11.2019).

[9] *National strategy for the development of artificial intelligence for the period up to 2030*, approved by the decree of the President of the Russian Federation no. 490, dated 10.10.2019. Available at: http://publication.pravo.gov.ru/Document/View/0001201910110003?index=2&rangeSize=1 (accessed 20.11.2019).

[10] Artificial intelligence (global market). Available at: http://www.tadviser.ru/a/425392 (accessed 20.11.2019).

[11] *Ibidem*.

The table shows that the largest amount of investment directed to the development of AI technologies is recorded in the United States, but the maximum amount of investment per transaction is observed in China. It is seven times higher than the US equivalent. At the World Economic Forum (Davos, 2020), they noted a high probability that it is currently impossible to assess both the full potential and risks of artificial intelligence. It was emphasized that according to the forecasts, the global gap between countries in investment in digital infrastructure may amount to 1 trillion dollars in the period up to 2040. This, of course, will have a serious impact on increasing social and financial inequality and economic instability[12]. Besides, it is important to take into account the necessary correspondence between the applied technologies and the level of cultural development of the nation. The absence of such a correspondence, according to K. Schwab, leads to serious catastrophes. He also notes that the most advanced technology has limits of its application, and it can cause damage exceeding the positive effect when this limit is gone over [25].

Systematization of analytical materials on the AI development allows to identify the following trends in this area, which, in our opinion, should be supported by industrial policy tools:

- increasing hardware availability;
- developing domestic high-speed and energy-efficient processors;
- producing software and hardware complexes using mainly domestic electronic component base;
- creating and developing special centers for collective use aimed at developing prototypes of promising elements of the electronic component base;
- creating high-performance data centers.

However, an effective industrial policy can only be implemented if the development and use of AI is provided in a timely institutional manner. The main areas of such support can be structured as follows[13]:

- formation of an institutional structure that analyzes changes in management systems under the influence of AI technologies;
- establishment of a Technical Committee for the AI standardization;
- creation of experimental platforms for testing AI technologies and organizing the interaction of business, government, science and universities;
- emergence of competence centers for AI;
- introduction of a new educational platform in the field of AI (creation of 100 regional universities);
- formation of a broad consortium in the field of AI technology development;
- attracting large businesses to develop and apply AI technologies based on PPP principles.

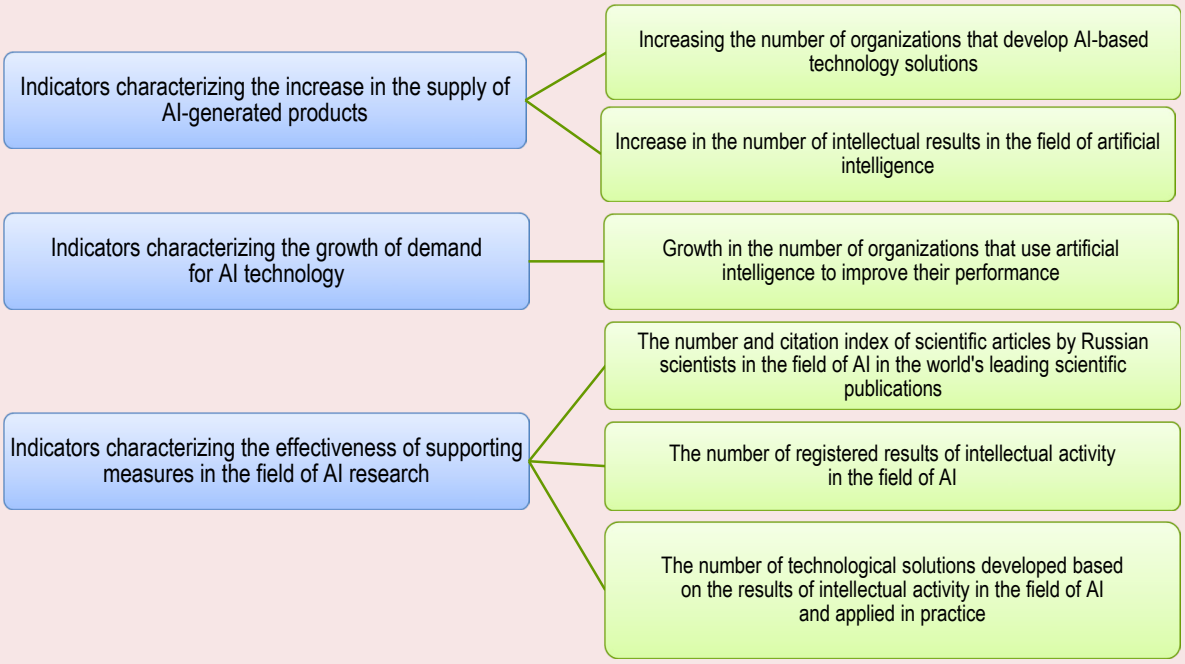
The success of the "National strategy for the development of artificial intelligence for the period up to 2030" implementation is estimated by a number of indicators that can be combined into three groups (*Fig. 3*).

As shown in figure 3, all indicators relate to the so-called target effectiveness or performance. There are no indicators that characterize the cost-effectiveness of the AI technologies developing and using. It can be

[12] *The Global Risks Report 2020*. Available at: http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf (accessed 30.01.2020).

[13] *National strategy for the development of artificial intelligence for the period up to 2030*, approved by the decree of the President of the Russian Federation no. 490, dated 10.10.2019. Available at: http://publication.pravo.gov.ru/Document/View/0001201910110003?index=2&rangeSize=1 (accessed 20.11.2019).

Figure 3. Indicators reflecting the success of the national strategy for the development of artificial intelligence



Compiled by the authors on the basis of: National strategy for the development of artificial intelligence for the period up to 2030: approved by decree of the President of the Russian Federation dated 10.10.2019 No. 490. Available at: http://publication.pravo.gov.ru/Document/View/0001201910110003?index=2&rangeSize=1 (accessed 20.11.2019).

noted that even in high-tech enterprises, the goal of digitalization is most often formulated as the creation of digital technologies, much less as their serial implementation, but there are practically no indicators that would reflect the effectiveness of digital technology implementation for the consumer. This situation is only one of the problems of the generally ineffective system of strategic planning in Russia. The accounting chamber notes an increase in the indicators highlighting the interim results of the Federal Executive bodies' work, with a decrease in indicators characterizing the final results of their activities[14].

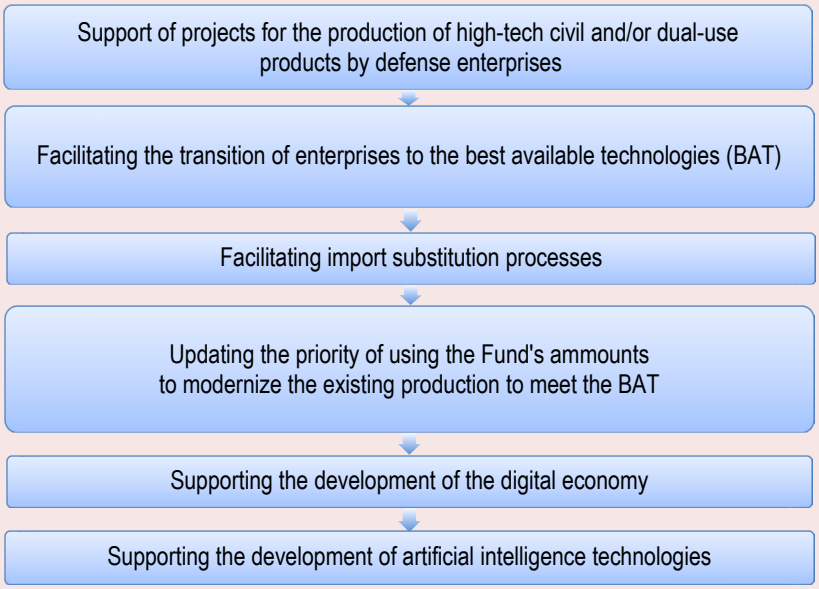
It seems appropriate to update the list of performance indicators of these processes adding the indicators that characterize the cost-effectiveness of the latest technologies as far as the AI Development Strategy is implemented. Despite the urgency of this task, its solution is quite problematic. To date, no clear criteria have been developed to determine the feasibility of specific digital technologies implementing both in the practice of evaluating various types of public policies, and in the real sector of the economy.

Systematization and analysis of the latest strategic documents of Russia's development which form the "new reality" allow to identify the frequent change of priorities supported by industrial policy (*Fig. 4*).

Between 2014 (the adoption of the Federal Law "On industrial policy in the Russian Federation") and 2019, inclusive, the development priorities supported by industrial policy changed six times. On the one hand, this confirms the previously stated hypothesis that the "trauma

[14] Sapozhkov O. Almost everything went wrong. *Kommersant*, 06.02.2020, no. 21, pp. 1–2.

Figure 4. Changing industrial policy priorities supported by the Industrial Development Fund[15]



society" cannot develop long-term priorities for industrial policy. On the other hand, the unprecedented fast pace of global technological development determines the need for timely adjustments in the directions supported by industrial policy.

The strategic vector of such priorities has shifted from supporting the projects for the production of high-tech products for civil and/or dual-use by defense enterprises and the transition of the enterprises to the best available technologies (2014–2015) to support digital economy and AI technologies by the Industry Development Fund (2017–2019).

Conclusion

The research results allow us to conclude that the latest technologies not only affect the change of industrial policy priorities, but also have a transformative impact on the state's economic role and on the latest management technologies implemented by businesses. This leads to the emergence of new industrial policy objects that arise on the basis of integration of information technologies and technologies for processing raw materials and semi-finished products. This situation determines the reconfiguration of production chains, which are becoming a new object of industrial policy. The possibility of formation of the so-called digital state fundamentally affects the subject of industrial policy. Politics becomes multi-subject, including, in addition to the state, business and various institutions of civil society. The changing nature of interaction between the subjects and objects of industrial policy is the basis of a qualitatively new, the so-called network industrial policy. The further direction of

[15] The special investment contract is the most important instrument of industrial policy which is not considered due to changes in the terms of its conclusion in accordance with the Draft Federal Law "On protection and promotion of capital investments in the Russian Federation and amendments to certain legislative acts of the Russian Federation" (prepared by the Ministry of Finance of the Russian Federation) (as of 26.10.2018). Available at: http://www.consultant.ru/cons/cgi/online.cgi?base=PRJ&dst=&n=177555&req=doc#06504714466027548 (accessed 30.01. 2020).

our research is determined by the need to clarify the economic content, essence and principles of network industrial policy development. This will require coordinated interdisciplinary efforts of specialists in the field of economic and technological, socio-ecological, humanitarian and ethical development.

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