



ANALYZING KEY FACTORS INFLUENCING STATE POLICY PLANNING FOR ACHIEVING INDUSTRIAL GROWTH

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ABSTRACT

Contextualization: In the context of Russia's evolving industrial landscape and the global drive towards Industry 4.0 and beyond, understanding the current trends and challenges in the country's industrial development has gained paramount significance.

Objective: This work's purpose is to study industrial development current trends and features from systematic approach viewpoint, as well factors analysis that contribute to a more effective state industrial policy

Methods: The research employs a multifaceted methodology, including the development of industrial policy formation methods and principles, and the creation of an indicator system for monitoring industrial development.

Results: The study proposes a methodology for country's industrial development analysis, which includes industrial policy goals determination stage, key monitoring indicators formation, relevant information search and processing, data normalization, aggregated indicators synthesis, indicators interaction analysis results evaluation. Within this framework, country's industrial development level assessment mechanism is proposed. Statistical data analysis according to the developed methodology made it possible to identify that many indicators fail to achieve their target values. Moreover, negative trend presence in industrial development integral indicator, proofed with relevant data. The paper identifies and presents effective state policy development factors important for industrial growth.

Keywords: industrial development; industrial policy; monitoring; indicators system; generalized indicator; industrial development factors; systemic approach.



ANÁLISE DE TENDÊNCIAS DE DESENVOLVIMENTO DA INDÚSTRIA RUSSA COM BASE NO MONITORAMENTO DE FATORES DE POLÍTICA INDUSTRIAL EFICAZ

RESUMO

Contextualização: No contexto do cenário industrial em evolução da Rússia e do impulso global em direção à Indústria 4.0 e além, a compreensão das tendências e desafios atuais no desenvolvimento industrial do país ganhou importância primordial.

Objetivo: O objetivo deste trabalho é estudar as tendências e características atuais do desenvolvimento industrial do ponto de vista de uma abordagem sistemática, bem como a análise de fatores que contribuem para uma política industrial estadual mais eficaz.

Métodos: A pesquisa emprega uma metodologia multifacetada, incluindo o desenvolvimento de métodos e princípios de formação de políticas industriais e a criação de um sistema de indicadores para monitorar o desenvolvimento industrial.

Resultados: O estudo propõe uma metodologia para análise do desenvolvimento industrial do país, que inclui etapa de determinação de metas de política industrial, formação de indicadores-chave de monitoramento, busca e processamento de informações relevantes, normalização de dados, síntese de indicadores agregados, avaliação de resultados de análise de interação de indicadores. Neste quadro, é proposto um mecanismo de avaliação do nível de desenvolvimento industrial do país. A análise dos dados estatísticos de acordo com a metodologia desenvolvida permitiu identificar que muitos indicadores não conseguem atingir os seus valores-alvo. Além disso, presença de tendência negativa no indicador integral de desenvolvimento industrial, comprovada com dados relevantes. O artigo identifica e apresenta fatores eficazes de desenvolvimento de políticas estaduais importantes para o crescimento industrial.

Palavras-chave: desenvolvimento industrial, política industrial, monitoramento, sistema de indicadores, indicador generalizado, fatores de desenvolvimento industrial, abordagem sistêmica.

ANÁLISIS DE TENDENCIAS DEL DESARROLLO DE LA INDUSTRIA RUSA BASADO EN UN SEGUIMIENTO EFECTIVO DE LOS FACTORES DE POLÍTICA INDUSTRIAL

RESUMEN

Contextualización: En el contexto del cambiante panorama industrial de Rusia y el impulso global hacia la Industria 4.0 y más allá, comprender las tendencias y desafíos actuales en el desarrollo industrial del país ha adquirido una importancia primordial.

Objetivo: El propósito de este trabajo es estudiar las tendencias y características actuales del desarrollo industrial desde un enfoque sistemático, así como el análisis de factores que contribuyen a una política industrial estatal más efectiva.

Métodos: La investigación emplea una metodología multifacética, que incluye el desarrollo de métodos y principios de formulación de políticas industriales y la creación de un sistema de indicadores para monitorear el desarrollo industrial.

Resultados: El estudio propone una metodología para el análisis del desarrollo industrial del país, que incluye la etapa de determinación de los objetivos de la política industrial, la formación de indicadores clave de seguimiento, la búsqueda y procesamiento de información relevante, la normalización de datos, la síntesis de indicadores agregados y la evaluación de los resultados del análisis de interacción de indicadores. En este marco, se propone un mecanismo de evaluación del nivel de desarrollo industrial del país. El análisis de datos estadísticos según la metodología desarrollada permitió identificar que muchos indicadores no logran alcanzar sus valores objetivo. Además, presencia de tendencia negativa en el indicador integral de desarrollo industrial, comprobada con datos relevantes. El artículo identifica y presenta factores de desarrollo de políticas estatales eficaces que son importantes para el crecimiento industrial.

Palabras clave: desarrollo industrial, política industrial, seguimiento, sistema de indicadores, indicador generalizado, factores de desarrollo industrial, enfoque sistémico.

INTRODUCTION

The context of this study is devoted to Russian industry modern trends analysis, which plays an important role on the world stage. The country ranks fourth in the world in terms of industrial production, second only to China, the United States and India, shows leading positions in the fields of energy, engineering, defense industry, chemical industries, metallurgy, etc.

World economy vector is focused on further Industry 4.0 development, based on information technologies massive introduction, business processes automation artificial intelligence spread and Industry 5.0 transition (Albychev, Kudzh, 2023). However, in many countries, at the moment it is not clear exactly how this transition will occur, and there is no well-established theoretical, methodological and instrumental basis for transforming the country's economy in the long term. Russian Federation is certainly among such countries. Although Russia has significant potential in the industrial sector, its development in many sectors lags behind the world's leading economies.

The nature and scope of the industrial policy pursued by states have changed over time. Historically, technologically advanced countries' national governments played a major role in industrial policy implementation, providing private companies from emerging industries with large amounts of public money in financial subsidies form. In today's world, economic development requires a combination of market forces and government support. At present, along with market processes, the



government, on the industrial policy basis, promotes economy transformation and its diversification, modernization, innovative and competitive development. Moreover, some new industries require coordinated action with others, which private organizations cannot always organize on their own. Such a public-private partnership gives new effects in industrial development (Felipe, 2015).

The concept of industrial policy has changed significantly over time, and a single generally accepted industrial policy definition has not yet been formed. In an OECD study published in 1975, industrial policy promotes industrial growth and efficiency (Objectives and Instruments of Industrial Policy: A Comparative Study, OECD, 1975). The definitions that were given at the end of the 20th century meant economy's direct intervention. C. Johnson believes that industrial policy is aimed at initiating and coordinating government initiatives to improve the productivity and competitiveness of the entire economy and individual industries in it (Johnson C., 1984). In other sources, industrial policy determines the relationship between government and business (Wachter, 1981). It is aimed at encouraging structural changes to certain sectors (Curzon-Price, 1981; Tyson et al., 1983), industries or services (Graham H., 1986) through the redistribution of resources, which government perspectives are important for future economic growth (Krugman P., Obstfeld M., Melitz M., 1991).

At the beginning of the 21st century, economists are redefining the rationale for industrial policy as transformation instrument. Syrquin considers industrial policy in the context of anticipating and facilitating change by removing obstacles and correcting market failures (Syrquin M., 2008). Hausmann R. and Rodrik D. note that modern industrial policy consists not only in choosing promising sectors, but also in jointly identifying obstacles to economic restructuring and types of intervention that can remove obstacles (Hausmann R., Rodrik D., 2006; Rodrik D., 2007). According to A.A. Ambroziak, industrial policy, on the one hand, is seen as restructuring equivalent and is aimed at economy structure changes towards growth and development; on the other hand, it is used to interfere in the market, disrupting competition (Ambroziak A.A., 2017). Cimoli, M., Dosi, G. and Stiglitz, J. E. argue that industrial policy is oriented towards knowledge-based development (Cimoli M., Dosi G. and Stiglitz J.E., 2009).

Russian researchers consider the relevance of industrial policy as a tool to overcome the crisis, as well as to ensure economy sustainable competitive





development. (Arsakhanov Z.A., Aliev B.Kh., Sultanov G.S., 2015). Idrisov G.I. characterizes industrial policy by some integral effect of influencing the economy as a whole, contributing to competitive advantages development and growth (Idrisov G.I., 2016). Buzgalin A.V., exploring state's economic life possible transformations and substantiates an active industrial policy as public regulation with selective state influence based on strategic planning and programming (Buzgalin A.V., 2019). Ipatova A.V. and Shitova A.S. come to the conclusion that industrial policy ensures number of factors effective implementation for accelerating economic growth (Ipatova A.V., Shitova A.S., 2018).

Changes in the role of the state and authorities have made adjustments to the ideas about industrial policy role as creating prospects not only for economic growth, but also for public welfare (Warwick K., 2013) and prerequisites for building a “good economy” (Tambovtsev V.L., 2017 ; Romanova O.A., 2018; Romanova O.A., Ponomareva A.O., 2020; Cutter B., Litan R., Stangler D., 2016). Romanova O.A. will determine that modern industrial policy should be focused not only on a purposeful change in economic activity structure and meeting persons growing needs, but also on structurally balanced humanitarian and technological space formation. (Romanova O.A., 2018). Cutter B., Litan R. and Stangler D. define a “good economy” as an economy that provides people with economic justice sense, equality and mobility, while the “good economy” is based on information technology and what it allows (Cutter B., Litan R., Stangler D., 2016). In recent years, "green economy" studies have been very relevant, aimed at overcoming the reductionist approach, which considered the gross domestic product as a measure of progress and social welfare (Senchakova P.D., 2022). D'Amato D. and Korhonen J. define this economy as natural ecosystems possibility that can be used in human activities (D'Amato, Korhonen, 2021).

Based on industrial policy views generalization as an effective tool for maneuvering to ensure readiness for unpredictable challenges, we highlight the industrial policy importance contexts (Fig. 1).





Finding ways to grow after the crisis	Economy structural transformation
Overcoming stagnation in economy sectors	Overcoming structural imbalances and imbalances in the economy
Other economies rapid growth successful responding	Encouraging firms and the innovation processes creation
Increase in production volumes	Increasing technological capacity

Figure 1. World industrial policy main reasons for the importance (Warwick K., 2013)

There are several more industrial policy benefits, which are not obvious, yet vital for the economy, listed below:

- it stimulates educational and scientific segments development, especially fundamental and applied science;
- it systematize economic agents and stimulates their mutual development;
- it manifest advanced development, allowing individual industrial sectors to achieve economically significant positions in the world market, contributing to economic influence spheres redistribution between countries.

This study problem lies in state industrial policy formation for industrial ecosystems transition in Russia towards reindustrialization and import advance. To develop such a policy, first of all, current trends analysis and industrial development features is required. It implies the study of an object as a complex and interconnected system from various angles. In addition, it is advisable to answer the question of what factors exist today that contribute to effective state industrial policy formation in Russia. At the moment, there are several reasons that make it difficult to develop and implement an effective industrial policy in the Russian Federation. The main reason is fundamental document absence that determines industrial sectors role in stabilizing and raising the national economy (Fomicheva E.V., Basovskaya E.N., Basovsky L.E., 2020). This document should identify industrial ecosystem key components, which, under current conditions, have the greatest opportunities for an innovative "breakthrough". At the same time, it should be noted that over the past three years, Russian Government has carried out systematic work to create a legal and regulatory framework for new industrial policy, such as new tools, mechanisms and procedures (Gorodetsky A.E., Mityakov S.N., 2023). Another significant reason is that according to Russian Federal State Statistics Service there is an imbalance in spatial development, bringing unequal resources distribution and industrial



production concentration. In this regard, state's economic development new paradigm problem based on new industrial policy becomes even more urgent.

Today it is quite obvious that effective industrial policy on the basis of an exclusively sectoral or regional approach is practically impossible. In modern realities, it is necessary to use proactive approaches to manage the industry, taking into account investment climate specifics and the institutional environment. In accordance with this, country's industrial development modern is an urgent task in theoretical and applied aspects.

LITERATURE REVIEW

From the economic methodology viewpoint, industrial ecosystems are of particular interest, encapsulating economic and social systems concepts. Industrial policy implementation mechanism involves a system of various measures: legal, economic, organizational, etc. These measures can contribute to the formation of a competitive industrial complex and ensure its effective functioning. Classification is given in Table 1.

Table 1. Industrial policy formation methods

Methods	Methodical explanations
Economic Methods	Tax policy, subsidizing, creating incentives and tax incentives to support and develop the industrial sector; specialized credit programs creation and development, funds and guarantees for organizations in the industrial sector and innovative projects; stimulating exports, providing superiority over imported counterparts and industry competitive development basis.
Regulatory Methods	Such methods сузщыу laws adoption and implementation, rules that regulate the industry sector and create an appropriate environment for its development. Also, regulatory methods include enterprises licensing, certification and supervision.
Institutional methods	Suppose new organizational and legal forms formation, state or quasi-state institutions creation, agencies or committees responsible for industrial policy development and implementation. This implies ensuring an increase in industry efficiency, primarily through flexible innovation-active enterprises that ensure high-tech processes and technologies introduction.
Innovation activity regulation methods	Basic and applied research support, innovations and technological development stimulating, facilitating technologies transfer and commercialization.

Source: compiled by the authors based on articles (Tatarkin A.I., Romanova O.A., 2014; Kalinin A., 2012; Milskaya E.A., Babkina N.I., 2014).





Another possible industrial policy forming methods classification is their division into methods of direct and indirect influence (Moshkov A.A., Zherebov E.D., Zdolnikova S.V., 2016). The former include financial support, investment in infrastructure, direct regulatory measures, government orders, tax incentives, etc. The latter include strategic and regulatory documents development, favorable business environment creation, etc. In our opinion, industrial policy should not only be internally consistent within its components, but should also take into account the relationship with other state policy types, including macroeconomic, foreign economic, regional, social, environmental, etc. Thus, when forming an industrial policy, all methods from Table 1 should be used.

Traditionally, there are territorial approaches and those, utilizing economy's sectors, to industrial policy (Kostyrev A.P., 2017; Gainanov D.A., Ataev D.M., 2021). The first implies focuses on industrial policy development and implementation at territorial units or regions level. When using this approach, it is necessary to take into account the specifics and development potential of each region. Relevant industrial policy measures are focused on industrial sector development and competitiveness enhancement in specific territorial entities. Sectoral approach is based on the analysis, measures development and implementation for industries and takes into account the specific needs and characteristics of each economy sector. A mixed approach can also be used, acting as a combination of territorial and sectoral. Industrial policy principles may vary depending on specific conditions and goals, but in general, a set can be distinguished, presented in Table 2.

Table 2. Industrial policy formation principles

Principles	Methodical explanations
Consistency	Industrial policy is an integral part of state policy and intersects with other areas in common goals implementation. This means that when implementing industrial policy, it is advisable to take into account state policy requirements.
Innovation	Based on innovation and technology development in the industry, it aims to create the right conditions and effective mechanisms to promote research, development and new technologies and innovations in the industrial sector.
"Green" principle	Includes measures to reduce emissions, energy efficiency, use of renewable energy sources and other environmental aspects. Not only consumers, but also investors react to environmental policy today. The concept of responsible investment, which is increasingly spreading around the world, requires compliance with ESG criteria.
Program and project	Focus on achieving the end result, not the process itself. Principle's characteristic is that it lends itself to standardization, including breaking





management	down into stages, identifying responsible persons, allocating resources and drawing up roadmaps. The combination of project management with software allows to algorithmize, operationalize processes from the moment a goal is set to the final, predetermined result.
Cluster principle	It consists in industrial clusters support and promotes synergies in related industries. It is based on geographically close objects analysis, employed in the same area and complementing each other, which allows to strengthen their competitive advantages and create a synergistic effect. An important aspect is conditions formation for territories self-development by expanding their financial independence.
Public-private partnership	Acts as an institutional and organizational alliance created between government agencies and private sector enterprises in order to implement projects of public importance. These areas range from economy's strategically important sectors development public services provision throughout the country or at individual local levels. Currently, many leading and developing economies of the world recognize public-private partnerships as one of the key tools for implementing large-scale industrial projects.
Horizontal hierarchy principle	Focuses on general principles and tools that can be applied in various industries and regions, focuses on creating a common institutional and economic environment that contributes to the development of the industry as a whole.
Proactivity principle	During industrial policy formation consists in active and proactive measures to stimulate and develop the industrial sector. This means not only responding to current challenges and problems, but also anticipating future changes and creating an enabling environment for innovation, growth, and outpacing imports.

Source: compiled by the authors based on the article (A.A. Moshkov, E.D. Zherebov, S.V. Zdolnikova, 2016).

As a rule, in industrial policy formation, the principles presented above are combined, which helps to achieve a more complete and balanced industrial development, taking into account its multifaceted needs and challenges. Within this study framework, it seems expedient to use systematic approach principle to form Russian Federation industrial policy. The fact is that this principle is the most general and to some extent encapsulates the rest. It implies industry as a complex holistic system, including various elements, relationships and interactions between them. Within systematic approach framework, industrial policy is state policy integral part and intersects with other areas in common goals implementation. This means that when implementing industrial policy, it is advisable to take into account other state policy type requirements. A systematic approach in industrial policy assumes that the state should: provide support to specific economic entities, identify priorities; determine structural reforms; create industry necessary conditions (Moshkov A.A., Zherebov E.D., Zdolnikova S.V., 2016). The article proposes a method for analyzing





industrial development, which is aimed at Russian industrial policy key factors identification and monitoring.

MATERIALS AND METHODS

The study provides Russian Federation industry development current trends analysis, factors that can contribute to a more effective state industrial policy are given. The study presents key methods and principles for industrial policy formation, an analysis methodology based on statistical reporting data accumulation to various aspects of industrial policy, converting these data into numerical indicators, standardizing and aggregating information.

Industrial development analysis method

In order to analyze state industrial policy, the paper proposes index method. It involves synthetic indices creation that combine several indicators into a single one in order to identify system's aggregate properties. Integral indices can be used for comparison between different subjects, countries, regions, etc. They help visualize and analyze data and identify general trends. In our case, the method allows to evaluate state industrial policy effectiveness and efficiency by developing and using indices or generalized indicator and guide decision-making to further improve the policy and achieve the goals. The technique is based on reporting data statistical collection and analysis related to industrial policy various aspects and its transformation into numerical indicators. The algorithm of the technique can be reduced to the following step-by-step procedure:

1. Industrial policy goals and objectives determination, immanent tools and requirements definition.
2. Industrial development key directions (factors groups or spheres) formation.
3. Indicators (factors) definition within industrial development directions, which are used to measure and evaluate industrial policy.
4. Necessary up-to-date information search, indicators selection and target values evaluation.
5. Data normalization, i.e. indicators conversion to single measurement units or dimensionless form, which opens up the possibility to analyze them within the same segment, compare with each other and calculate objects similarity;
6. Aggregated indicators synthesis, ensuring industrial policy integrated assessment possibility;
7. Industrial indicators interaction and patterns analysis, forecasting problem solution;
8. Obtained indices and indicators evaluation in order to determine state industrial policy effectiveness and efficiency, as well as its development directions.





The algorithm of the methodology is universal and suitable for industrial ecosystems of various hierarchies' studies.

Normalized and generalized indices industrial development study

For joint analysis, indicators are reduced to a dimensionless form and possible changes limits uniform through the normalization procedure. In the future, this will make it possible to calculate generalized indicators, as well as analyze the dynamics and the current situation in the same axes on a single graph (Senchagov V.K., Mityakov S.N., 2011):

$$y = \begin{cases} 2^{-\frac{a}{x}} & \text{for maximizing indicator,} \\ 2^{-\frac{x}{a}} & \text{for minimizaing indicator.} \end{cases} \quad (1)$$

The following designations are used: x is the initial industrial development indicator value, y is the converted indicator, a is the target. Projection (1) choice can be explained by the following circumstances. If $x = a$, then $y = 1/2$ (segment $[0, 1]$ mean). For other x values, y will be below or above the mean.

If the target value is positive and the actual value is negative or both the target value and the actual value are negative, relation (1) does not give the expected results. A primitive way to solve the problem is to assign a normalized value of 0 to indices that have negative values, but such a simplification is not always justified and reduces evaluation results information content in dynamics. Guided by correct adaptation complex normalization need, the following algorithm was formed based on formula (1) transformation:

1. Actual value from the target value deviations are calculated as k .
2. One time period indices are divided into two groups: those that deviate to the safe area and those that deviate to the dangerous.
3. For both groups, we apply a new formula:

$$y = \begin{cases} 2^{-\frac{|a|}{|a|+|k|}} & \text{for the indicator, deviating to safe area} \\ 2^{-\frac{|a|+|k|}{|a|}} & \text{for the indicator, deviating to dangerous area} \end{cases} \quad (2)$$

Formula (2) under the conditions $x > 0$, $a > 0$, come to the form of functions (1).

Further, for information aggregated analysis on various industrial development factors, integral indices can be calculated for each group of factors:

$$Z_i = \sum_{j=1}^m w_j y_{ij}; \sum_{j=1}^m w_j = 1, \quad (3)$$

where y_{ij} is the j – th indicator of the industrial development factors i – th group of, w_j is its weight coefficient, m is index number in the group of factors.

The generalized industrial development index was calculated as the sum of all integral indices, taking into account their significance:

$$Z = \sum_{i=1}^l s_i Z_i; \sum_{i=1}^l s_i = 1, \quad (4)$$

where s_i is the weight of the i – th group of factors, l is factors groups number.

Indices, as well as normalized indicators, have a range of valid values from 0 to 1, while the index value equal to 0.5 acts as some generalized benchmark.

RESULTS

Indicator system

After macroeconomic statistics transition from GDP structuring sectoral principle to structuring by economic activity type, industry concept in the Russian Federation as a whole disappeared (Valentik O.N., 2020). In addition to manufacturing industries, in official statistical documents, the industries of mining, electricity and water supply are included. In our opinion, the last three spheres are rather providing. Of course, they are important, but they cannot be the basis for an industrial breakthrough. Therefore, this paper will consider generalized statistics for the manufacturing industries of the Russian Federation, as the most characteristic area that promotes reindustrialization and import advance.

In order to form an effective state industrial policy, track trends, problems and factors during effective state industrial policy in Russia formation, it is important to create a monitoring system that will regularly examine indicators, update its set and target values. Economic monitoring is based on a certain indicators system analysis. In Russian industrial policy, factors that determine the need for its state regulation are identified firstly. Factors are internal and external elements that can influence industrial development. Table 3 shows indicators system developed by authors, which can be used to assess country's industrial development, as well as these indicators values for the manufacturing industry in 2017-2023. When forming such a

system spheres were used to form targets for industrial development. The system consists of 15 indicators and is subdivided into 5 groups: dynamics, resources, innovations, finances and ecology. At the same time, three indicators are included in each projection. In this context, the group of factors is an enlarged area, which is taken into account in industrial policy analysis and formation. Each group of factors is characterized by several indicators and their targets (right column in Table 3). These benchmarks separate industrial development required level from the insufficient one. In our case, their use is justified by the fact that in industrial development monitoring and managing tasks, there is often a need to determine system's required state boundaries. Indicators target values were chosen according to various methods (for example, in accordance with domestic and international experience). The further indicator deviates from the target value for the worse, the lower economic system industrial development level.

Table 3. Russian Federation system industrial development analysis indicators (statistics is presented for the manufacturing industry)

No	Index	Calculation technique	2017	2018	2019	2020	2021	Target value
Dynamics								
1	Industrial production growth	Industrial production index - 100, %	5,7	3,6	3,6	1,4	7,4	>5
2	Labor productivity growth	Using added physical volume value index and changes in total labor costs index, %	3,9	3,9	3,1	3,8	3,7*	>5
3	Industrial goods manufacturers prices rise	Industrial Producer Price Index - 100, %	4	10	-3,4	6	23,5	<6
Resources								
4	Fixed assets depreciation degree	Depreciation amount / fixed assets initial price, 100, %	49,6	50,6	51,4	51,8	52,2	<40
5	Investments in fixed assets	Investments / revenue · 100, %	5,91	5,63	5,71	5,89	5,45	6
6	Wages ratio to economy's average	Average monthly salary in industries / average salary in the economy	1,2	1,14	1,16	0,91	0,96	1,1
Innovations								
7	Innovation activity level	Innovation-active organizations share in surveyed organizations total number of, %	26,2	23,2	20,5	21,3	23,1	>25
8	Innovation spending intensity	Innovation costs / revenue · 100, %	1,9	1,7	1,9	2,4	2	>2,5
9	Innovative products share	Innovative products revenue / revenue · 100, %	8,6	7,7	7,7	8,5	7,1	>15
Finance								

10	Sales profitability	Profit / revenue · 100, %	10,9	12	11,5	11,6	11,5*	>12
11	Current liquidity ratio	Current assets / current liabilities · 100, %	129	129,2	125	137,6	130,2*	>150
12	Coefficient of provision with own working capital	(Equity - non-current assets) / current assets · 100, %	-53,1	-49,6	-45,4	-40,4	-47,1*	>10
Ecology								
13	Waste utilization and neutralization	Calculated as production amount and consumption waste percentage	49,5	52,6	59,8	53,5	48,3	>67**
14	Pollutants emissions	Emissions from stationary sources, million tons	5,8	3,76	5,87	3,9	3,68	<3
15	Polluted wastewater discharge	Emissions to water bodies, billion cubic meters	2,4	2,28	2,09	1,87	1,72	<2

* Data obtained by imputation with the average value for the period from 2017 to 2020.

** Targets change annually in accordance with the Industry Development Strategy for Wastes Production and Consumption Processing, Recycling and Neutralization for the period up to 2030 (Decree of the Government of the Russian Federation dated January 25, 2018 No. 84-r). Target values presented for 2021

In all calculations, for simplicity, corresponding indicators and factors groups weights were assumed to be equal. Russia's industrial development normalized indicators dynamics is shown on fig. 2-6.

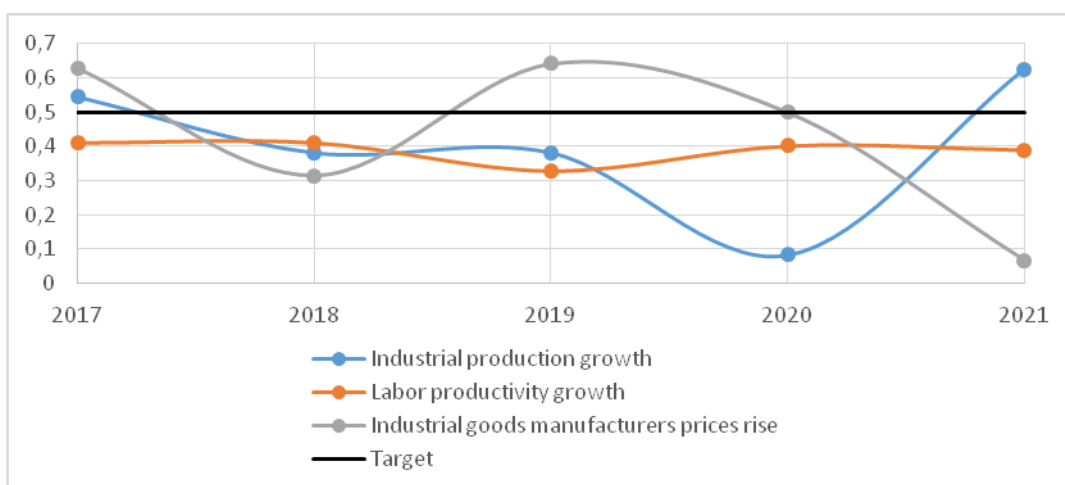


Figure 2. "Dynamics" factor group normalized indicators

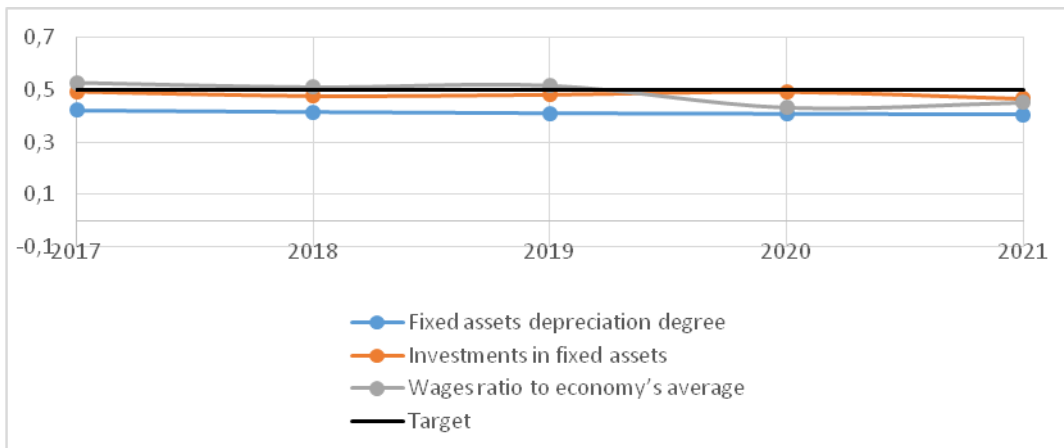


Figure 3. "Resources" factors group normalized indicators

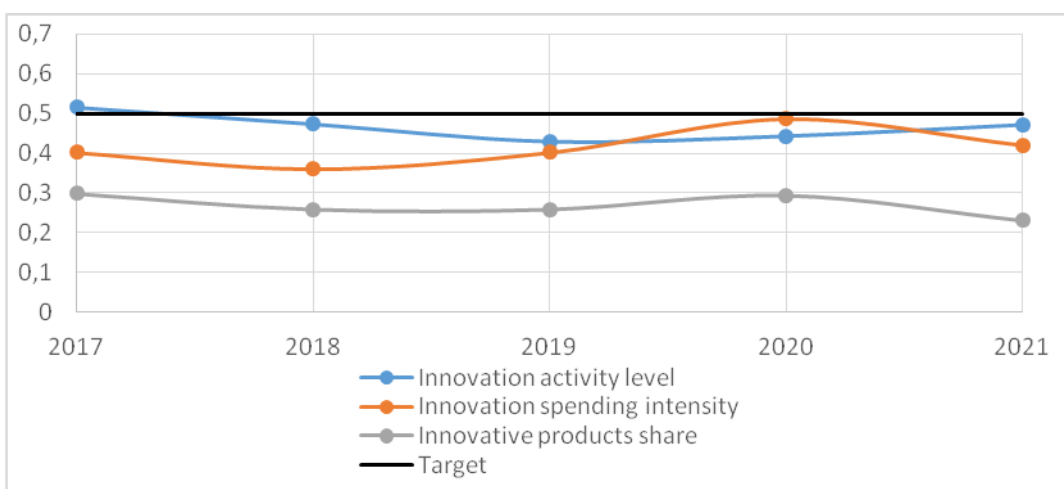


Figure 4. "Innovation" factors group normalized indicators

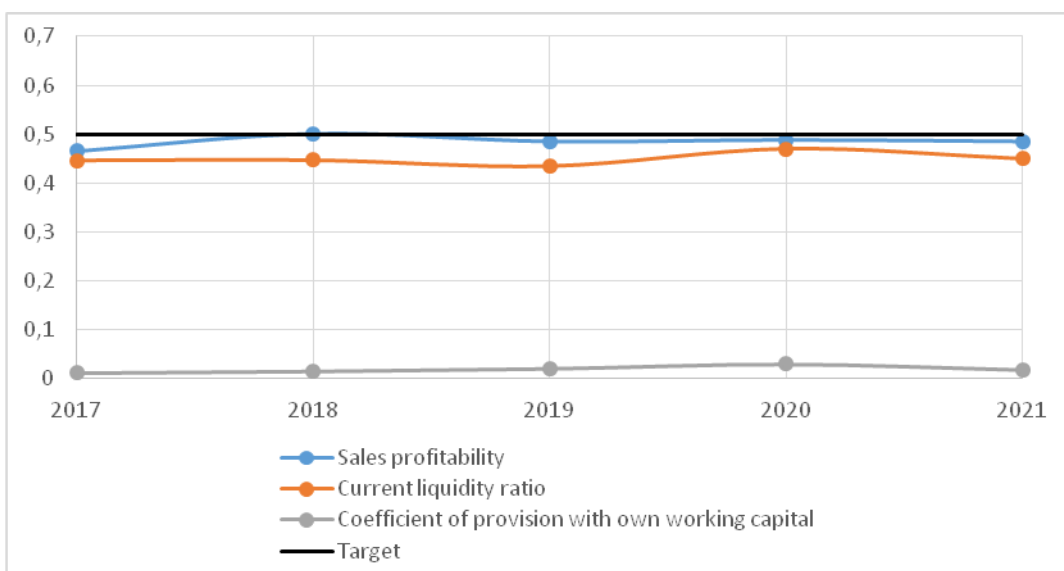


Figure 5. "Finance" factors group normalized indicators

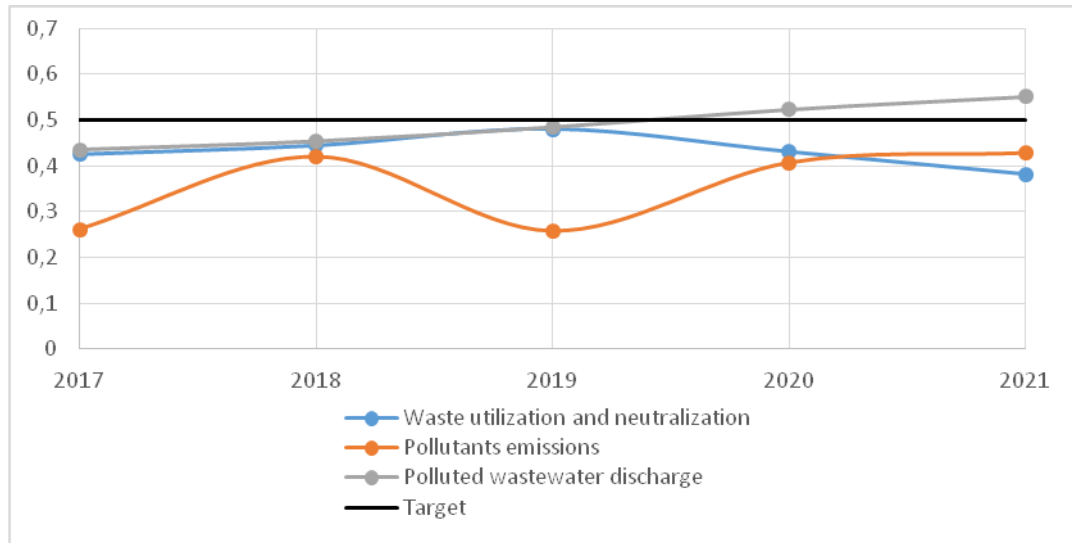


Figure 6. "Ecology" factors group normalized indicators

Figures 2-6 analysis allows to conclude that most industrial indicators have not reached the target. Separately, anomalously low values of the manufacturing enterprises coefficient of provision with own working capital. Coefficient negative value means own sources for economic assets formation lack. Next, we present generalized indices dynamics for various industrial development factors groups (Fig. 7), obtained by normalized indicator arithmetic mean calculating (formula 3).

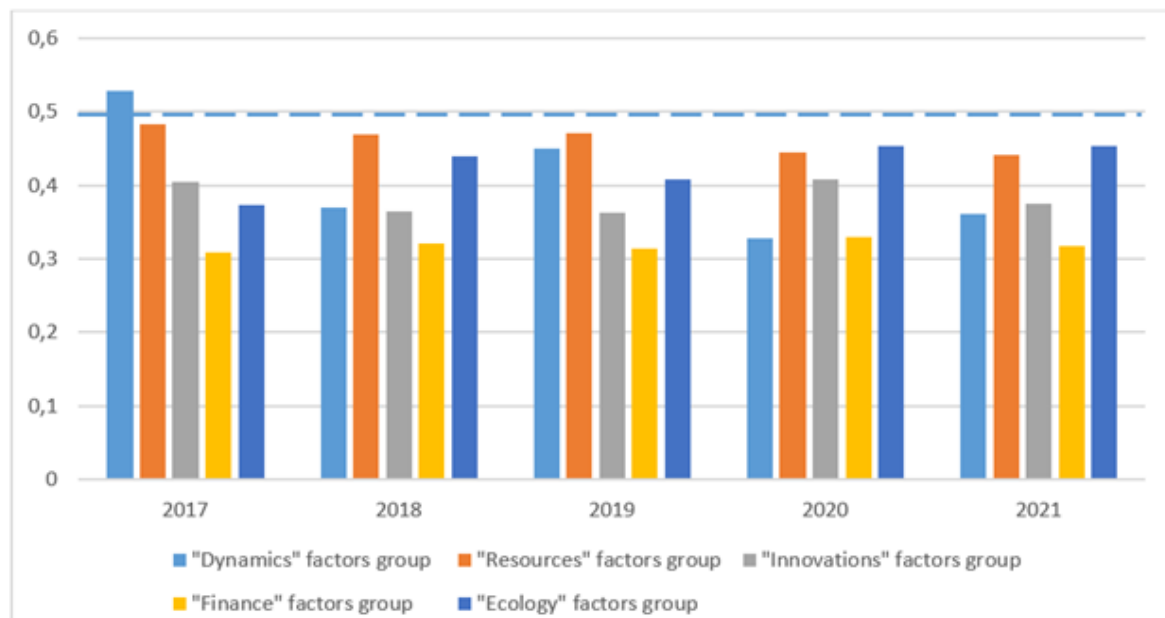


Figure 7. Russia's industrial development generalized indicators dynamics

Figure 7 analysis allows to state that synthetic indicators for various industrial development factors groups demonstrate fairly uniform dynamics. The target value (represented in the figure by a horizontal dotted line) was not achieved for any of



factors groups. In the "Dynamics", "Resources" and "Innovations" groups there is trend line negative slope, built on generalized indicators values for 2017-2021. Despite the fact that trend line slope for "Finance" and "Ecology" groups is positive, slope coefficient values are not high enough (0.0028 and 0.0173, respectively). This allows to speak if not about systemic crisis in Russia, then at least of its economy insufficient growth. Figure 8 shows industrial development generalized index dynamics, constructed by arithmetic mean generalized indices calculation for all groups of factors (formula 4).

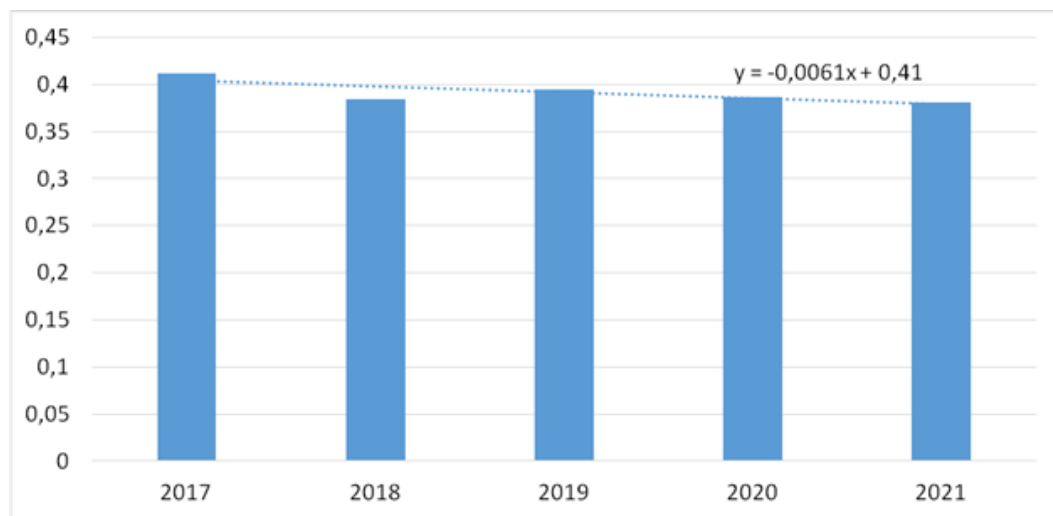


Figure 8. Russia's industrial development generalized index dynamics

Generalized index analysis notes that it didn't reach the target level and negative presents. This suggests that, in general, Russian industry is still in an unstable zone.

DISCUSSION

Industrial policy formation methods and principles given in the article, the step-by-step procedure and indicators system for industrial development level analysis are important elements of a systematic approach to the country's strategic management. The proposed indicators system is quite universal and can be applied to other countries, as well as objects of other hierarchical levels (region, industry, enterprise), taking into account their characteristic features and specifics. This system was developed taking into account this work purpose and reflects manufacturing sector development current state in five groups: dynamics, resources, innovation, finance and ecology. At the same time, indicators list should be flexible and adoptable.

Monitoring indicators composition should be constantly improved, based on the current situation in the industry. Industrial development negative generalized trend can be explained by insufficient labor productivity level, geopolitical instability, significant fixed assets depreciation, etc. It indicates problems and challenges that industrial sector faces in Russia. In such a situation, it is necessary to analyze and identify the reasons for such dynamics in order to take appropriate measures and turn the situation in favor of positive industrial development.

In our opinion, industrial policy formation factors and industrial development factors are interrelated. The former determine directions and priorities for industrial development, the latter influence the effectiveness and industrial policy implementation, creating feedback and interaction between them. According to the analysis, proper state industrial policy formation factors in Russia include:

- industrial production and labor productivity intensification;
- industrial goods manufacturers rising prices regulation;
- fixed assets depreciation degree reduction;
- innovative processes in industry stimulation;
- industrial production digital transformation;
- industrial enterprises financial position strengthening;
- pollutant emissions reduction, waste recycling and neutralization.

These factors can be achieved through technical re-equipment and new technologies, processing industries development compared to raw development materials production rate activation, proactive approaches in industrial policy usage. At present, in our opinion, it is advisable to use a proactive approach to industrial policy formation, which is focused on anticipating challenges, threats and opportunities and planning future events. Increasing proactivity will lead to innovative companies' number increase, investment in innovative developments increase and a decrease in their unprofitability. It is a proactive approach that can become a determining factor in achieving technological sovereignty by a country. In this case, reindustrialization and import advancement are the instruments of the corresponding industrial policy.

CONCLUSIONS

The study developed a system of indicators for monitoring industrial development, including 15 indicators divided into 5 groups: dynamics, resources,



innovation, finance and ecology, and analyzed them in a normalized and aggregated form. This analysis made it possible to identify that many indicators fail to achieve the target level, as well as industrial development integral indicator negative trend presence. To change the trend in the industrial development, effective state industrial policy formation factors are identified in the work. The presented indicators system, as well as industrial development methodology for studying normalized and generalized indices, made it possible to identify trends and problems in the industry development, which is necessary for effective state industrial policy.

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