

# Economic Realities and Strategic Orientation of the Development of Russian Industry

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**Abstract**—The authors substantiate a vital task – the need to develop industrial and post-industrial potential of the Russian economy. Problems in the activities of industry in the Russian Federation revealed through analysis of statistical data (low level of average annual production capacity utilization, high physical depreciation of fixed assets of industrial enterprises, lack of investment resources for the development of Russian industry, low level of yield and profitability of sales, reduction in the number of employees, and shortage of highly qualified workers) indicate inappropriate condition of industry in terms of changes in external economic environment that requires modernization of organizational and economic mechanism for managing industrial enterprises. The conclusion was made about the strategic vector of the further development of domestic industry in the direction of comprehensive reindustrialization which is a new industrialization (neo-industrialization) based on the latest technological paradigm.

**Keywords**—industry, industrialization, development, technological paradigm, potential.

## I. INTRODUCTION

The economic policy maintained in our country at the end of the 20th and beginning of the 21st centuries contributed to the widening of the development gap between the leading industrial countries and the Russian Federation and, as a result, led to the de-industrialization of Russian economy. “Deindustrialization is a process when production does not simply decrease or have less output, but when it becomes more primitive, loses its technological level; when production infrastructure is destroyed, funds are reduced; the level of mechanization and automation, the overall technological level, and the complexity of production operations are declined; the intellectual basis of production is reduced” [1]. In this case, the “2D effect defined by O.S. Sukharev appears, i.e. “deindustrialization – deskilling” [2].

Present-day economic realities are the following: Russia is faced with the need to restore the industrial potential of economy, to adjust its structure, and to modernize technological paradigm. According to S.Yu. Glazyev [3], Russian economy is now mainly in the fourth technological wave. The percentage of technologies that can be attributed to the fifth wave is about 10% (mainly in military-industrial complex and aerospace industry), more than half of technologies can be attributed to the fourth technological wave, and more than 30% – to the third one, approximately 10% – to the second. Obviously, the country’s economy faces a challenging task – to make the transition to the sixth

technological wave and, on this basis, to ensure a high level of development.

Theoretical rethinking of the problems of industrialization, reindustrialization, the transition of domestic enterprises and sectors to digital technologies in the broader context of a new wave of modernization of social and economic system and the development of market relations becomes relevant.

Some other critical, debatable questions are posed that are associated with the problem of developing the industrial and post-industrial potential of Russian economy: why there are no planned growth rates; what are the boundaries of state participation in solving the problems of domestic industry; how to create a system of motives and incentives for investments and innovations. Modern scientific publications [1, 2, 4] mention the absence in the modern Russian economic system of entities interested in the development of industrial production together with market mechanism and capitalist relations. Theoretical and practical relevance is represented by the problems of creating the institutional environment required for technical and technological renewal of production and the transition to the post-industrial stage of social development.

## II. RESEARCH METHODOLOGY

Methodological basis of this study includes general scientific, statistical methods of economic research. The basic scientific principle of this study is the principle of systematization that involves the study of events and phenomena in their systemic performance and development – complexity, interconnection and dependence. When conducting economic analysis, the authors adhered to a systemic approach due to their desire to create a holistic picture of the current state of Russian industry, to define problems in the functioning of this industry and the logic of analyzed processes.

Methods of dynamic deviations, comparison, vertical and horizontal analysis became special scientific methods used in accordance with the structure and concept of this study. Selected methodological foundations made it possible to analyze modern economic realities in the development of Russian industry, to reveal development trends and to outline the further development direction of the industry.

## III. RESULTS

The following problems were found in the functioning of Russian industry on the basis of the analysis of statistical data:

### 1) Incomplete process utilization of industrial production facilities.

According to statistics, in 2015-2017 there was a slight increase in the level of process utilization in food, chemical, and metallurgical industries. At the same time, there was a steady tendency to decreasing level of process utilization in leather and shoe production, in wood processing and manufacture of wooden products, in cement production, and in the production of machinery and equipment.

For the most part, the percentage of product utilization in many industries does not exceed 70% what can be explained, first of all, by the physical deterioration of equipment or the lack of opportunities for its further operation. This is confirmed by the fact that the industry of Russia in its development has not yet embarked on the path of sustainability and dynamism.

### 2) A high level of physical depreciation of fixed assets at industrial enterprises.

As the analysis of statistical data shows, there are problems of increasing the efficiency of using fixed assets by industrial enterprises. Significant characteristics of the condition of fixed assets are shown in Table 1.

TABLE I. BASIC CHARACTERISTICS OF THE CONDITION OF FIXED ASSETS AT ENTERPRISES OF THE RUSSIAN FEDERATION [5]

Parameters	2015	2016	2017	Deviations, (+,-) 2017 compared to 2015
Commissioning of fixed assets: mln RUR	10721081	13256290	12484066	1762985
in % to the previous year	94.5	123.7	94.2	-
Coefficient of renewal of fixed assets (in comparable prices)	0.039	0.044	0.043	+0.004
Coefficient of retirement of fixed assets (in comparable prices)	0.01	0.008	0.007	-0.003
Degree of depreciation of fixed assets (for a full range of organizations; at the end of the year), %	47.7	48.1	47.3	-0.4

Based on the data of Table 1, we can make a conclusion about the large percentage of depreciation of fixed assets (about 50%) despite a decrease of 0.4 percentage points over the last three analyzed years. During the analyzed period there was a significant commissioning of fixed assets. In 2015-2017, fixed assets for a total amount of 1762985 million rubles were commissioned. The value of renewal coefficient increased by 0.004 points what is a positive trend.

Parameters describing the availability and condition of fixed assets are shown in Table 2.

TABLE II. AVAILABILITY AND CONDITION OF FIXED ASSETS AT THE ENTERPRISES OF THE RUSSIAN FEDERATION BY TYPE OF ECONOMIC ACTIVITY IN 2017 [5]

Parameters	Availability of fixed assets, at the end of the year, mln RUR	Commissioning of fixed assets, mln RUR	Level of depreciation of fixed assets at the end of the year, in %
Total	194649464	12484066	47.3
Including manufacturing	18956787	1767259	49.6

Based on the data in Table 2, we state that the percentage of physical depreciation of fixed assets at the end of 2017 in manufacturing was 49.6%. This value is approximately half of their initial value; therefore, there is an urgent problem of high depreciation of fixed assets.

Today, a high degree of physical deterioration of fixed assets is one of the main problems of Russian industrial enterprises. Changes in the physical volume of fixed assets, the values of the coefficients of renewal and retirement of fixed assets are shown in Table 3.

TABLE III. INDICES OF CHANGES IN THE PHYSICAL VOLUME OF FIXED ASSETS, VALUES OF COEFFICIENTS OF RENEWAL AND RETIREMENT OF FIXED ASSETS AT THE ENTERPRISES OF THE RUSSIAN FEDERATION IN 2017 [5]

Parameters	Index of changes in physical volume of fixed assets	Coefficient of renewal of fixed assets	Coefficient of retirement of fixed assets
Total	1.038	0.043	0.007
including by type of economic activity: manufacturing	1.054	0.059	0.009

According to Table 3, coefficient of renewal of fixed assets in manufacturing in 2017 amounted to 0.059. Manufacturing enterprises acquire new machinery and equipment, that is, there is a technical re-equipment of production, increasing and expansion of production capacities. However, the coefficient of retirement of fixed assets from the production sector amounted to 0.009 points. Consequently, main equipment continues functioning despite its physical deterioration.

Changes in the values of coefficients of renewal and retirement are shown in Table 4.

TABLE IV. CHANGES IN THE VALUES OF COEFFICIENTS OF RENEWAL AND RETIREMENT OF FIXED ASSETS IN THE RUSSIAN FEDERATION IN 2015-2017 [5]

Parameters	Years			Deviations, (+,-) 2017 compared to 2015
	2015	2016	2017	
Coefficient of renewal of fixed assets (of the availability of fixed assets at the end of the year), all fixed assets	0.039	0.044	0.043	+0.004
including manufacturing	0.063	0.052	0.059	-0.004
Coefficient of disposal of fixed assets (of the availability of fixed assets at the beginning of the year), all fixed assets	0.01	0.008	0.007	-0.003
including manufacturing	0.01	0.008	0.009	-0.001

Based on the results of the analysis of data in Table 4, we conclude that the coefficient of renewal of fixed assets increased in the period from 2015 to 2017. There is another situation in the manufacturing sector: during 2015-2017, there is a decrease in the coefficient of renewal of fixed assets, in 2017 the percentage of renewal amounted to 5.9% down from the value of 0.063. The coefficient of retirement, on the contrary, in 2015-2017 decreased to the value of 0.007. In manufacturing, there also was a decrease.

Economy of the Orenburg Region is based on region's industry which accounts for 51% of GRP. The number of employees in this sector is more than 147 thousand. Industry is based on fuel and energy, metallurgical and engineering complexes. More than two hundred large and medium-sized industrial enterprises operate in the region producing over 80% of total industrial output. The volume of industrial production of large and medium-sized enterprises is more than 850 billion RUR a year.

At the end of 2016, the value of fixed assets in industrial production of the Orenburg Region amounted to 159465 mln RUR; the degree of their physical depreciation is 57.1%.

The rate of renewal of fixed assets in the industry of the Orenburg Region remains low (do not exceed 4% per year) what is a result of the lack of financial resources in enterprises for renewal of fixed assets.

So, we revealed a high level of depreciation of fixed assets in industry and low rates of their renewal. With such a high degree of physical depreciation of fixed assets in industry, it is impossible to obtain a high level of capital productivity and to accelerate the growth rate in industry.

*3) Lack of investment resources for the development of Russian industry does not allow achieving the desired rate of economic growth.*

According to the Federal State Statistics Service of the Russian Federation, very few fundamentally new advanced production technologies were developed in 2017 – just 190 units. Most of the technological advances and radical innovations, including nanotechnologies, are acquired abroad. Over the past few years, the innovative activity of Russian industrial enterprises has been declining. So, the proportion of enterprises that carried out technological, organizational and marketing innovations in 2017 amounted to only 8.5% of the total number of enterprises in the Russian Federation; it is shown in Table 5.

TABLE V. CHANGES IN THE PARAMETERS OF INNOVATIVE ACTIVITY OF ENTERPRISES OF THE RUSSIAN FEDERATION (ACCORDING TO THE FEDERAL STATE STATISTICS SERVICE OF THE RUSSIAN FEDERATION) [5,6]

Parameters	2015	2016	2017
Innovative activity of enterprises (the proportion of organizations implementing technological, organizational, marketing innovations during the reporting year), for the whole of the RF, %	9.3	8.4	8.5
The number of fundamentally new developed advanced production technologies, units	175	192	190
The number of new technologies (technical achievements) and software acquired by enterprises, for the whole of the RF, units	63253	68484	69141
The number of nanotechnologies used for the whole of the RF, units	1152	1166	1144
The number of developed nanotechnologies for the whole of the RF, units	505	494	446

A large share in the structure of costs for innovation in 2018 (more than 50%) was spent on the purchase of machinery and equipment related to the implementation of technological innovations, as evidenced by the data in Table 6.

TABLE VI. CHANGES IN TECHNOLOGICAL INNOVATION COSTS BY TYPE OF INNOVATION IN 2016-2018, MLN RUR

Type of innovation activity	2016	2017	2018
Research and development of new products, services and methods for their production (transfer), new production processes	997.3	1761.2	1 729.7
Design	9.5	3.4	5.7
Purchase of machinery and equipment related to technological innovations	9150.9	5351.2	13350.6
Purchase of new technologies	602.7	701.6	323.3
Purchase of new fixed assets	102.0	93.4	192.7
Engineering	11919.3	3872.1	7468.7
Personnel education and training related to innovations	4.4	7.9	12.1
Marketing research	1.7	0.9	0.5
Other technological innovation costs	9.7	16.6	9.8

An indicator of the low attractiveness of industrial production for investment purposes is the volume of investments in fixed assets per 1 ruble of the volume of shipped products. If in 2017, for 1 ruble of shipped products for "Mining" type of activity there were 16 kopecks of investment in fixed assets (62,245.7 mln RUR of investments), for "Provision of electric energy, gas and steam; air conditioning" type of activity there were 15.7 kopecks (9,106.5 mln RUR of investments), then for "Manufacturing" type of activity this value amounted to only 8.4 kopecks. (25,494.7 mln RUR of investments).

*4) Low level of yield and profitability of products sold.*

To confirm this problem, we will show the values of the revenue and profits of industrial enterprises in the Russian Federation as a whole and in the Orenburg Region in particular for 2015-2017 in manufacturing sector, as shown in table 7.

TABLE VII. THE STRUCTURE OF THE VOLUME OF SHIPPED PRODUCTS (WORKS, SERVICES) OF RUSSIA AND THE ORENBURG REGION FOR "PRODUCTION OF MACHINERY AND EQUIPMENT" TYPE OF ACTIVITY FOR 2015-2017, % [6]

Subjects of the Russian Federation	Production of machinery and equipment		
	years		
	2015	2016	2017
RF as a whole	13.6	14.1	13.6
Volga Federal District, including:	18.5	19.5	19.4
Orenburg Region	6.2	6.5	4.9

In 2018, at the initiative of Rosstat, factors limiting revenue growth in manufacturing were defined; the results are shown in Figure 1.

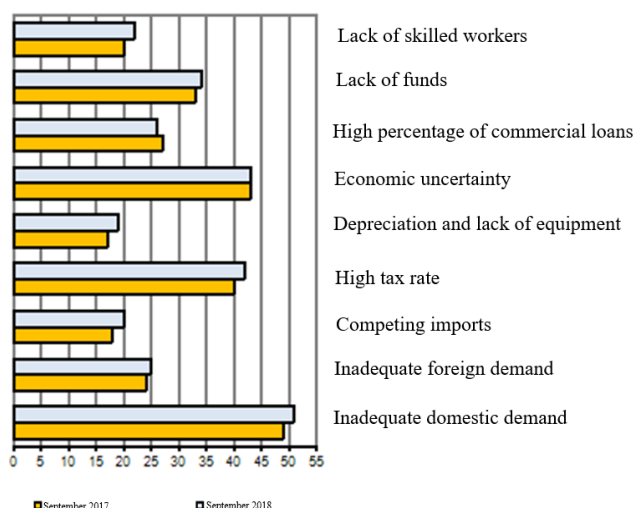


Fig. 1. Factors limiting revenue growth at Russian manufacturing enterprises.

Among the limiting factors of income growth in industry, as shown by a survey of senior management representatives, at the industrial enterprises there are generally low domestic demand for enterprise products, uncertain economic situation in the country, and high tax burden.

A decrease in revenue parameters and a simultaneous increase in the total cost of sales led to a decrease in the profitability of sales in the manufacturing sector of the Orenburg Region as a whole from 9.3% in 2016 to 6.6% in 2017.

5) *Decrease in the average number of employees and the lack of highly qualified specialists are shown in Table 8.*

TABLE VIII. CHANGES IN THE AVERAGE NUMBER OF WORKERS IN THE MANUFACTURING INDUSTRY OF THE ORENBURG REGION [7]

Parameters	Years		
	2015	2016	2017
Number of employed, thousand	113.5	113.4	108.5
including the number of workers employed in the production of machinery and equipment, thousand	11.9	12.0	26.76

The average number of employees in the manufacturing industry of the Orenburg Region decreased over three years by 4.4% (113.5 thousand in 2015; 108.5 thousand in 2017).

Industrial enterprises in the Orenburg Region are experiencing a shortage of highly skilled workers. The lack of qualified specialists, as follows from the results of a survey conducted by the Federal State Statistics Service, is one of the main problems in the industrial sector, along with other ones.

The reasons for the shortage of workers can be the following: low wages at industrial enterprises; economic passivity of the population (migration, self-employment, etc.); high competition in the labor market for skilled workers; working conditions that do not meet the standards for normal operation; inconsistency of qualifications of specialists with Russian professional standards.

#### IV. CONCLUSIONS

The current state of Russian industrial enterprises does not ensure the intensification of economic growth throughout the

country; it reduces stability in the development of Russian industry. Increasing sustainability in the development of the industrial sector of economy should be achieved by increasing the share of exports and improving the quality of industrial products, increasing innovative activity of enterprises, reducing the cost of production and sales, maintaining a high level of skill of workers, and favorable social and environmental climate in the country.

Industrial economy in the regions needs significant state regulation and state support in the form of implementing federal targeted programs for the development of industry. State industrial policy should be aimed at restructuring and modernizing existing production facilities. Creation of new high-tech and knowledge-based industries in future will have a multiplicative effect.

Active position of the state in the field of stimulating and developing Russian industry involves the implementation of technological innovations. For the functioning of industry, such conditions are necessary when high growth rates, balanced industrial sector, and the development of economic and social sphere are ensured. Financial results that create stimulating conditions for the development of the economy of industrial enterprises are an important factor in the further sustainable development of enterprises.

According to S.D. Bodrunov [8,9]: "Russia, in order to reduce the gap with the USA as a leader in global economy and to ensure a forced transition to the latest technological wave, should within the framework of new industrialization solve two complementary tasks: to relatively cheapen resource base, and to radically renew production capacities in the manufacturing industry and modernize this industry as a whole."

According to the experience of developed countries, for entering of the national economy to the stage of growth and for transition to a new technological wave, a high-tech renewal of fixed capital is necessary. At the same time, the level of investment and innovation activity of Russian financial and investment system should be at least twice the present. The experience of countries that have made an economic breakthrough shows the need for a significant increase in investments – up to 35-45% of GDP. The main source of financing for a significant increase in investment activity was the multiple expansion of loan sector implemented with state support through controlled monetary emission backed by obligations of the state and enterprises in order to attract investment in the expansion, development, modernization of promising production and technological systems. This implies the need to reorient monetary policy to the development of national economy by creating a multi-channel mechanism of targeted loan issue under the obligations of the state and advanced enterprises for developing innovative technologies and expanding production sphere.

Further development of domestic industry is possible only in the direction of comprehensive re-industrialization, i.e. a new industrialization (neo-industrialization) based on the latest technological wave. Reindustrialization can be not only a catalyst for the development of new high-tech industrial sectors in regional economies, but also an effective mean of innovation in traditional sectors of economy, provided that qualitative changes between the socio-economic and financial-institutional spheres are implemented through

interactive technological and managerial changes. Particular attention should be paid to digitalization, since it makes it possible to increase the efficiency of most sectors of the economy by reducing costs, including transaction ones. This, in turn, requires significant modernization of organizational and economic mechanism for managing industrial enterprises.

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