

Sustainable Development of the Region—the Basis of New Industrialization

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Abstract—New industrialization is based on sustainable and dynamic development of the national economy, including innovative, socially oriented regional development. The Ural macro-region, which includes the Sverdlovsk Region, needs to modernize its industrial potential, based on sustainable development in the context of new industrialization. The rating of sustainable development indicators, according to the methodology of the UN Commission on Sustainable Development, is focused on the national level. The authors took it as a basis for the formation of similar indicators at the regional level, taking into account its specificity in order to ensure quantitative and qualitative assessment and continuity of indicators at all levels of the hierarchical system. The hypothesis of the study is that the sustainability of the growth of the regional economy as the basis of new industrialization is ensured by the qualitative, systemic growth of the main indicators of the economic, social sphere, and the training of qualified personnel. The purpose of the research is to study the dynamics and interrelation of indicators of the socioeconomic and labor spheres of the region and their impact on the sustainable development of the region in the context of new industrialization. The dynamic series for the gross regional product (GRP), socially significant health indicators, and indicators for the training of qualified personnel for 2002-2016, obtained from official statistics, have been analyzed. Based on the analysis of dynamic series, a forecast of indicators of the economic, social sphere, and the sphere of qualified personnel training in the region in the medium term up to 2020 has been calculated. The indicators of sustainable development, calculated in accordance with the methodological sheets, are absolutely comparable with each other, which is very valuable in terms of the possibilities of their subsequent statistical and economic analysis for implementing the strategy of the regional sustainable development as the basis of new industrialization.

Keywords—new industrialization, sustainable development, economic growth, analysis of sustainable development factors, indicators of the regional development.

I. INTRODUCTION

New industrialization is provided by the structural and technological diversification of the economy based on innovative development, which will ensure the transition to a new technological order. Russian economists S.D. Bodrunov, R.S. Greenberg [1], E.G. Animitsa, Ya.P. Silin [2, 3], D.E. Sorokin [1],

A.I. Tatarkin [4] et al., Chairman of the Government of the Russian Federation D.A. Medvedev [5] emphasizes that the noofactors of economic growth will form the sixth technological order basis and it will have a decisive influence on the established institutions and social structures. A new economic reality requires the sustainable development of the economy of the country's territories, ensuring a new quality of economic growth [6, 7].

E.G. Animitsa, Ya.P. Silin have substantiated the hypothesis about the need to take into account the regional component in the implementation of the doctrine of new industrialization on the example of the Ural macro-region [8]. New industrialization assumes a new quality of economic growth based on sustainable development.

The sustainable development indicators of the region can be analyzed both by the “scientific-analytical” and the “applied” methods. The authors chose the first one to identify critical points of regional development and draw the attention of relevant authorities to the current trends in the economy of the Sverdlovsk Region in order to make timely decisions on the forming the development environment of new technological patterns, for example, the creation of the Regional Council for the Sustainable Development of the Sverdlovsk Region under new industrialization in order to ensure the consolidation of the efforts of the authorities, businessmen, and the scientific community. National Councils for Sustainable Development (NSDS)—organizations whose creation in all countries is recommended by the UN (Agenda 21) [9], with the goal of sustainable development in the 21st century as organizations with wide representation in order to formulate and implement sustainable development policies at the level of a separate country.

Baseline rates (indicators) of sustainable development (according to the UN methodology) [10], meeting the national priorities of the Russian Federation as a whole and the Sverdlovsk Region in particular [11, 12] and providing the conditions for new industrialization, are grouped into four categories: social, economic, environmental, and institutional ones. This is the basis for the long-term design of sustainable socioeconomic and environmental development of the Sverdlovsk Region. The selected rates (indicators) assess

the level, a “state” of the region’s sustainable development, that is, in essence, its economic growth.

As a hypothesis, the authors have suggested that the sustainability of the growth rate of the regional economy as the basis of new industrialization is ensured by the qualitative, systemic growth of the main indicators of the economic, social sphere, and the training of qualified personnel. Based on this, the purpose of the research is to study the dynamics and interrelations of indicators of the socioeconomic and labor sphere of the region and their impact on the sustainable development of the region in the context of new industrialization.

II. RESEARCH METHODOLOGY

Under new industrialization, the sustainable progressive development of the regional economy is affected by a range of key indicators of the economic, social sphere, and the sphere of qualified personnel training. In order to assess and forecast the marked processes, ensuring the sustainable development of the region in the context of new industrialization, we have analyzed the dynamic series for the gross regional product (GRP), socially significant health indicators, and indicators for training of qualified personnel for 2002-2016, obtained from official statistics published on the FSSS sites [13], the Directorate of the Federal State Statistics Service for Sverdlovsk Region and Kurgan Region [14], the Government of Sverdlovsk Region [15], and the Ministry of Health of the Sverdlovsk Region [16]. Based on the analysis of dynamic series, the authors have also attempted to predict the considered indicators in the medium term until 2020. This year, the next All-Russian population census will be held, and the results of the Strategy 2020 will be considered.

The indicators have been calculated using the methods of averages, the analysis of series, and the system of averages of series with the aim of predicting them. A total of about 300 statistical tables have been processed. The following methods and models were used to analyze and predict the marked processes and indicators: forecast using the method of average absolute increase, the average growth rate [5].

III. ANALYSIS AND FORECASTING OF THE SUSTAINABLE DEVELOPMENT INDICATORS OF SVERDLOVSK REGION IN THE CONTEXT OF NEW INDUSTRIALIZATION

The current socioeconomic situation in the region is characterized by a marked increase in indicators of the industrial and social sphere. The gross regional product of Sverdlovsk Region over 15 years (2003-2016) shows a positive dynamic of an average annual growth rate of 116.083%, and the annual increase is + 16.083%, which in absolute terms amounted to 130,267.646 million rubles. The average annual absolute growth in the sector of agriculture amounted to 1986.107 million rubles, which is higher compared to the Russian Federation during the same period. The average annual growth rate for GDP was 114.85%, the growth was 14.85%, in absolute terms—5633.83 billion rubles, in agriculture—0.751 billion rubles, with losses annually at 24.9% (Table 1):

TABLE 1 – ANALYSIS OF AVERAGE GDP INDICATORS OF BY BRANCHES OF RUSSIAN ECONOMY FOR 2002-2011 (IN CURRENT PRICES, BILLION RUB.) IN ORDER TO PREDICT FOR 2020*

Indicators	- \bar{y} - averag e level of	- Δy - average absolute increase	Forecast for 2020 using the average	Increase for 2020 relative to 2011 (%)
GDP at market prices	55,967.2	5,015	101,104	81
Including GVA in basic prices	47,718.9	4,238	85,856	80
Agriculture, hunting, and forestry	1,986.3	157	3,399	71
Fisheries and fish farming	98.6	7.7	168	71
Mining operations	5,110.7	497	9,583	88
Manufacturing activities	7,433.5	643	13,221	78
Production and distribution of electricity, gas, and water	1,797.7	161	3,246	81
Building	3,517.5	334	6,521	85
Wholesale and retail trade, repair	9,115.2	769	16,038	76
Hotels and restaurants	466.9	42	846	81
Transport and communication	4,104.7	348	7,250	77
Financial activities	1,956.1	186	3,632	86
Real estate operations, rental and provision of services	5509,4	499	9,999	81
Public administration and military security, social insurance	2,676.1	243	4,857	82
Education	1,387.8	123	2,496	80
Health care and	1,758.6	159	3,196	82

social services				
Providing paid commercial, social and personal services	792.6	68	1,403	77
Product taxes	8,463.3	783	15,511	83
Food subsidies	215	5.45	264	23
Net taxes on food	8,248.3	777.70	15,248	85

* Calculated according to Rosstat.

Using the method of an average absolute increase, it is possible to predict a change in Gross Domestic Product and Gross Regional Product by 2020 with a high degree of probability. We get the following values:

GDP 2020 = $92,081.9 + (5,633.83 \cdot 3) = 108,983.39$ billion rubles (compared to 2017)

GRP 2020 = $1,978,055.7 + (130,367.646 \cdot 4) = 2,499,123.7$ billion rubles (compared to 2016)

(Table 2)

TABLE 2 – ANALYSIS OF THE AVERAGE INDICATOR SYSTEM OF THE DYNAMIC SERIES OF THE BASIC SOCIOECONOMIC INDICATORS OF SVERDLOVSK REGION FOR 2012-2016 IN ORDER TO PREDICT FOR 2020*

Indicator	Mean value \bar{y}	Average absolute increase Δy	Forecast for 2020 using the average
Average monthly nominal accrued salary of organization employees, rub.	29,055	1,802.35	39,557.6
Average size of pensions, rub.	12,290	2,113.9	26,345.8
GRP, mln. rub.	1,689,836	117,885.25	2,427,961
GRP per capita, rub.	389,044	24,567	540,919
Fixed assets in the economy, billion rubles	4,665	544	8,017.8
Turnover of organizations, billion rubles	4,384.88	94.5	4,599.3
Mining operations	55.54	-2.35	43.9
Manufacturing activities	1,383.96	92.05	1,948.7
Production and distribution of	168.96	2.75	187.6

electricity, gas, and water			
Agricultural products, billion rubles	65.56	6.275	101.6
Commissioning of the total area of residential buildings, ths m ²	2,126.56	59.3	2,343.8
Transportation of goods by all types of public transport, mln. t	147.78	12.875	245.9
By railway transport	60.82	-1.45	53.3
Bus passenger turnover, mln passenger-km	3,105.2	-33.25	2,911
Retail turnover, billion rubles	980.28	48.85	1,249.6
Catering turnover, billion rubles	50.72	2	59.8
Paid public services, billion rubles	279.16	29.85	453.8
Consolidated budget revenues, billion rubles	217.12	9.825	282.2

* Calculated according to Sverdlovskstat.

The annual average growth rate for 2012-2016 in gross regional product of manufacturing enterprises, the average monthly wage of workers for the whole circle of organizations has amounted to 107%, respectively, the average annual growth—7%, for pensions—117%, or annual growth—17%, for fixed assets and paid services for the population—112% and 12%. Retail turnover, revenues, and expenses of the consolidated budget of Sverdlovsk Region have grown by 5% each year, construction—by + 3%, agricultural products—by + 10%, transportation by all modes of transport—by + 8%, production and distribution of electricity, gas, and water—by + 2%, public catering—by + 4.28% annually. The mining sector has shown a negative trend with an annual decrease of 4%, rail transportation—by 2%, and passenger bus traffic—by 1%. The calculated coefficients of variation for each of the economy sectors are in the range of 7-17%, which falls within the limits of the standard 33.3%. The data are characterized by a low level of fluctuations; therefore, they can be used for predicting [17].

Over the past 15 years, the population structure of Sverdlovsk Region has not changed: 87% are urban, 13% are rural, which is justified by the industrial specification of the region. For the reviewed period 2012-2016, the demographic situation in Sverdlovsk Region has shown an annual positive increase of 0.1%, which in absolute terms is +4,725.33 people, while the male population has grown by 3.3% annually, or +24,381.66 people, and female—by 3.2%, or +12,106.33 people annually. At the same time, the number of working-age population in working age falls every year:

men—by 2% (-18,656.66 people), women—by -1.8% (-21,637.01 people), in total—by -1.6% (or -40,203.33 people).

According to the Sverdlovskstat for 2015, the number of state and municipal day-time general education institutions amounted to 1,068 units, which is 14.2% less than in 2008. The number of their students was 430.1 thousand people. This figure has increased by 13%, but this is mainly due to the reduction in the number of institutions, while the number of full-time teaching staff has grown by 2.5%. If these trends continue, the number of schools predicted by the method of average absolute increase will be:

$$Y_{2020} = 1,068 - 29.5 \cdot 5 = 920.5 \text{ units.}$$

The reduction in the number of educational institutions is an objective response primarily to a decrease in the population of Sverdlovsk Region, and the second reason is the optimization and transition to the per capita wage of the work of pedagogical workers at the middle level of the educational system. The effectiveness of these reforms will be noticeable only over time. All parts of the educational system, as well as the birth and death rates, are interrelated in a hierarchical sequence. The processes characterizing the lower link of the system—schools—are reflected in secondary and higher vocational education (Tables 3, 4):

TABLE 3 – DESIGN TABLE OF THE SYSTEM OF AVERAGES SERIES AND FORECASTS FOR 2020 ON THE MAIN INDICATORS OF THE POSTSECONDARY INSTITUTIONS ACTIVITIES IN SVERDLOVSK REGION FOR 2010-2015 (PSE)*

Indicators	Mean value - y	Average absolute increase - Δy	Annual average growth rate - T_p	Forecast for 2020 using the average absolute increase	Forecast for 2020 using the AAGR method
Number of institutions (at the beginning of the academic year), units, total	112.00	2.5	1.022	129.5	130.44
State and municipal institutions	102.00	3	1.029	123	125.08
Private institutions	10.0	-0.5	0.953	6.5	6.96
Number of students (at the beginning of the academic year), people, total	80,109	1,201	1.015	88,516	86,887.7
State and municipal institutions	77,593.5	1,221.25	1.015	86,142.2	86,221.5
Private institutions	2,515.5	-20.25	0.991	2,373.75	2,365.6
Student admission, people, total	27,245	-218	0.992	25,719	25,753.6
State and municipal institutions	18,310	-280	1.020	25,383	26,972.0
Private institutions	1,022	62	1.062	1,456	1,548.7
Turn-out of specialists, people, total	18,310	-1,914	0.919	7,712	10,017.6
State and municipal	17,405	-1,383	0.922	7,724	9,753.6

institutions					
Private institutions	905	-131	0.861	-12	304

* Calculated according to Sverdlovskstat.

The predicted growth of indicators, which in the aggregate characterize PSE, reflects both the region's need for skilled workers in the professions and the objective reality of the processes that characterize the younger generation. The current generation, which is characterized as "Generation Z", according to the modern theory of generations [18], is no longer inclined to choose working professions related to unskilled physical labor. The growing level of the population welfare (which confirms the growing level of consumption of goods and services) and improving the quality of life affects the formation of youth motivation. Therefore, the society should form a motivational environment associated with the popularization of a blue-collar job—a "Labor Man" [19].

TABLE 4 – DESIGN TABLE OF THE SYSTEM OF AVERAGES SERIES AND FORECASTS FOR 2020 ON THE MAIN INDICATORS OF THE HIGHER PROFESSIONAL INSTITUTIONS ACTIVITIES IN SVERDLOVSK REGION FOR 2010-2015 (HPI)*

Indicators	Mean value - y	Average absolute increase - Δy	Average growth rate - ΔT_p	Forecast for 2020 using the average absolute increase	Forecast for 2020 using the AAGR method
Number of institutions (at the beginning of the academic year), units, total	29.6	-2	0.93	14	15.6
State and municipal institutions	17.4	-1	0.94	10	10.5
Private institutions	12.2	-1	0.91	4	4.95
Number of students (at the beginning of the academic year), people, total	175,877	-14,438	0.92	74,238	87,856
State and municipal institutions	149,891	-10,752	0.93	74,802	89,631
Private institutions	2,598	-3,685	0.86	-564.7	-566
Student admission, people, total	37,866	-408	0.98	351,534	35,149
State and municipal institutions	33,446	-169	0.99	31,938	31,957
Private institutions	4,421	-238.7	0.95	3,215	3,451
Turn-out of specialists, people, total	40,762	-678.2	0.98	36,166	36,410
State and municipal	34,381	-512.7	0.98	30,757	30,822

institutions					
Private institutions	6,300	-165.5	0.97	5,409	5,498

* Calculated according to Sverdlovskstat.

The predicted growth of indicators, which cumulatively characterize HPI, also reflects both the region's need for qualified personnel for a "digital" society and the objective reality associated with the desire of young people and their parents for higher education. Higher education, according to young people, is an element of life comfort, a high level of income, and an element of happiness [6].

IV. CONCLUSIONS AND DIRECTIONS FOR FURTHER RESEARCH

Thus, the sustainable development indicators, ensuring the formation of the new industrialization environment, calculated in accordance with the methodological sheets, are absolutely comparable with each other, which is very valuable in terms of the possibilities of their subsequent statistical and economic analysis for the implementation of the sustainable development strategy of the region.

It should also be noted that the traditional factors of the region's sustainable development under new industrialization are influenced by noofactors, transforming and changing quality, while it is important to understand the degree of their influence. These noofactors include: globalization of business processes; international integration of economic agents; the emergence of new economic centers, the departure from the unipolar world; global changes in climatic conditions; depletion of natural resources throughout the world; revolutionary technological innovation; digitization of society, especially its economic component; changes in the structure of the gross national product, increasing the share of industries producing services; changes in the structure of employment, etc.

Multitasking of the "sustainable development" definition as the basis of new industrialization provides a wide field for analyzing various indicators characterizing it; however, within the paper, the authors have analyzed a small range of them, hoping to continue to work in this direction in the future.

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