The problems of the machine-building enterprise economic development

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Abstract. The article is devoted to studying the problems of the machine-building enterprise development using the example of public joint stock company Taganrog Combine Plant “Krasny Kotelshchik” (PJSC TKZ “Krasny Kotelshchik”), located in the city of Taganrog, Rostov Region, Russian Federation. PJSC TKZ “Krasny Kotelshchik” is one of the leaders in the Russian boiler equipment market. Currently, equipment, manufactured at this plant, operates in more than 60 countries of the world. The main directions of equipment export in 2018 were the Community of independent states (CIS countries) – Belarus, Kazakhstan, Asia (Vietnam, India) and others. Despite the leading position in the boiler equipment market, this company is in a difficult financial situation. Therefore, the purpose of this article is to study factors affecting the success of a machine-building enterprise and determining the main promising areas of development.

1. The share of industrial production in the GDP of Russian Federation in the period of 2012 to 2018

For the formation of a strong, powerful and independent state, the development of all sectors of the economy is necessary. Modernization of an industry has a key value to the economy of any country. Modernization, or in another way the update, renovation of an industry, is both the population welfare improvement and working conditions upgrading, as well as the GDP growth in the country [1].

In the period from 2012 to 2016, the share of industrial production in Russian Federation showed significant changes. The most noticeable were the changes in the index of physical volume GDP for 2016 - initially the negative GDP growth moved to the area of the positive values. The first estimation of the GDP physical volume index for 2018 was 102.3% (figure 1 [2]). During 2018 the largest contribution to GDP growth was made by mining, construction, wholesale and retail trade, financial and insurance activities, public administration and military security, social security, as well as net taxes on products and imports. In a period of 2014–2018, the share of household spending on final consumption of goods significantly decreased in the structure of GDP according to the “Use” account (by 2.6 percentage points over 5 years). At the same time, the export of goods share increased by 3.1 percentage points. The main contribution to GDP growth in 2018 was made by the growth of household consumer spending (+1.2 percentage points), gross fixed capital formation (+0.6 percentage points) and net exports (+0.8 percentage points). In 2014–2018, there was an increase in the share of gross profit of the economy and gross mixed income - in aggregate, by 3.1 percentage points in the
structure of GDP by income sources during five years. The share of employees’ wages had been increased until 2016, and in 2017–2018 a decrease of this indicator was observed (−1.1 percentage points over 2 years). Beside it, over the past four years, the share of wages and mixed income that is not observed by direct statistical methods in the GDP structure has been continuously decreasing. In the first quarter of 2019 the economic growth is estimated by the Ministry of Economic Development of Russia at 0.8% in annual terms. By the end of the year, the department and the expert community forecast a slowdown in GDP growth compared to 2018 to 1.0–1.3%.

![Figure 1. Industrial Production Index (to the average monthly value of 2016).](image)

Nominal GDP values for 2014–2016 were reduced by 0.2–0.4% compared to previous estimates, while GDP in 2017 was higher by 64 billion rubles. The index of physical volume of GDP for 2015-2017 was revised upward, with the most considerable changes in 2016 – initially negative GDP growth moved into the area of positive values. Thus, in the period under consideration, only one year – 2015 demonstrates now negative growth rates (−2.3%).

Nominal GDP in 2018 amounted to 103,876 billion rubles, while the deflator index turned out to be high (110.3%), which was due to growing Urals oil prices during the year, which reached a maximum monthly average of 79.26 $ USA per barrel in October of 2018. Thus, the largest contribution to the growth of the GDP deflator was made by mining (+3.3 percentage points) and a number of other activities related to the processing, trade and transportation of energy: manufacturing (+1.4 percentage points), wholesale trade (+0.8 percentage points), transportation and storage (+0.4 percentage points), as well as taxes on products that include export duties (+2.1 percentage points).

In the structure of GDP in the account “Production” there was a noticeable increase in the share of mining (+3.6 percentage points for 2014–2018), the shares of manufacturing, as well as transportation and storage, increased less significantly (+0.8 percentage points each type of economic activity). At the same time, the share of trade in GDP decreased by 1.3 percentage points, mainly due to a decrease in the share of retail trade, except the motor vehicles and motorcycles trade, by 0.9 percentage points (figure 2 [2]).
Figure 2. The structure of Russia's GDP by production account in 2014, 2017–2018 (the inner circle — 2014, middle circle — 2017, outer circle — 2018).

Table 1 provides the information on GDP growth rates.

Table 1. Gross domestic product at purchasing power parity of 10 countries – leaders in this indicator, trillion int. dollars, 1995–2018 [2].

|        | 1995 | 2000 | 2008 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--------|------|------|------|------|------|------|------|------|------|------|------|
| China  | 2.3  | 3.7  | 10.1 | 13.9 | 15.2 | 16.7 | 18.3 | 19.8 | 21.3 | 23.2 | 25.3 |
| USA    | 7.6  | 10.3 | 14.7 | 15.5 | 16.2 | 16.8 | 17.5 | 18.2 | 18.7 | 19.5 | 20.5 |
| India  | 1.4  | 2.1  | 4.4  | 5.8  | 6.2  | 6.7  | 7.4  | 8.0  | 8.7  | 9.6  | 10.5 |
| Japan  | 3.0  | 3.4  | 4.5  | 4.6  | 4.7  | 4.9  | 5.0  | 5.1  | 5.3  | 5.4  | 5.6  |
| Germany| 2.0  | 2.4  | 3.3  | 3.5  | 3.6  | 3.6  | 3.8  | 3.9  | 4.0  | 4.2  | 4.4  |
| Russia | 1.4  | 1.6  | 3.3  | 3.5  | 3.7  | 3.8  | 3.9  | 3.9  | 4.0  | 4.0  | 4.2  |
| Indonesia | 0.9  | 1.0  | 1.8  | 2.2  | 2.3  | 2.5  | 2.7  | 2.9  | 3.0  | 3.2  | 3.5  |
| Brazil | 1.3  | 1.6  | 2.6  | 3.0  | 3.1  | 3.2  | 3.2  | 3.2  | 3.2  | 3.3  | 3.4  |
| Gr Britain | 1.2  | 1.6  | 2.3  | 2.4  | 2.4  | 2.5  | 2.7  | 2.7  | 2.8  | 2.9  | 3.0  |
| France | 1.3  | 1.7  | 2.3  | 2.4  | 2.5  | 2.5  | 2.6  | 2.7  | 2.7  | 2.9  | 3.0  |

Table 1 shows that in order to reach the level of Germany (i.e., 5th place in terms of GDP by purchasing power parity) in 2023, the Russian economy in 2019–2023 must grow annually at an average rate exceeding 2.4%. However, it should be borne in mind that such a growth rate will be
enough to rise to 5th place only if the average annual growth rate of Germany does not exceed 1.5%, and Indonesia - 5.2%.

Figure 3. Quarterly dynamics of the economic activities' contribution into the GDP growth, 2015–2018, percentage points.

According to figure 3, it can be seen that after the imposition of sanctions in December 2014, there was a decrease in the industry share in the GDP growth. Starting from the 3rd quarter of 2016, there has been a positive trend in increasing the share of industrial production in the structure of GDP. In the 4th quarter of 2017, there was a sharp drop in the contribution of industry to GDP, then the situation returned to normal. As for other areas of activity, such as services, its share is growing in the structure of GDP, together with the growth of industrial production [3].

Thus, we can conclude that the industrial sector growth rate of the economy is extremely low [4]. To increase the contribution of industry to the Russian economy, it is necessary to perform a set of measures for the development of industry [5,6]. To do this, it is crucially needed to analyze the specific industry problems. For this aim, let us consider the performance of a particular engineering enterprise.

2. Characteristics of the PJSC TKZ “Krasny Kotelshchik” as the typical enterprise in the energy machine-building market

Public joint stock company Taganrog Combine Plant “Krasny Kotelshchik” (PJSC TKZ “Krasny Kotelshchik”) carries out its main business activity in the energy machine-building market. The enterprise has a significant share in the volume of installed power equipment in Russia and the CIS countries.

The main goal of PJSC TKZ “Krasny Kotelshchik” is to provide reliable and efficient integrated solutions to meet the needs of the global energy system, continuously improving its technologies and business processes, as well as making a profit. The priority area of activity of PJSC TKZ “Krasny
“Krasny Kotelshchik” is to remain a key player in the global market and occupy a leading position in the market of power engineering in Russia and the CIS.

Today, PJSC TKZ “Krasny Kotelshchik” implements projects in Russia, the CIS countries, Northern and Eastern Europe, India, Vietnam, Latin America and others. In this article all data on the financial condition of the company are taken from annual reports of PJSC TKZ “Krasny Kotelshchik”, published in the public domain.

In 2017 23,766 tons of commercial products were manufactured in the amount of 11,180,890 thousand rubles, which is 266.1% of 2016.

The volume of output of commercial products in 2017 increased significantly compared to 2016 and amounted to 244.7% in physical terms and 266.1% in value terms from the 2016 volume.

In 2017, the growth in the production of equipment for boilers of large and small capacity intensified, an increase was of 78.4%. The equipment for TPP (thermal power plant) PJSC “NLMK” and Zherkazgan TPS (thermal power station) in Kazakhstan was completely manufactured and shipped. The process of equipment production for TPS Sofia (Bulgaria) and Norilsk TPS-2 has started.

During a year of 2017 the production of high pressure heaters increased by 202.3%. High-pressure feed heaters (HPFH) were manufactured and shipped for the Kostroma hydroelectric power station (HPS), Verkhnetagilskaya HPP, Kirishka HPS, Primorsk TPP, Karaganda HPS-2 (Topar, Kazakhstan), Grodno TPS-2.

The company's share in the world market of equipment for the production of electricity over the past three years has been about 1%. The volume of concluded contracts of PJSC TKZ “Krasny Kotelshchik” taking into account DDTEP (declarative decision-theoretic ethical programs?) contracts amounted to 16,480,789 thousand rubles in 2017.

For the fiscal year of 2017, the plant’s revenue increased by 1,431,738 thousand rubles, including largely due to proceeds from the sale of products, services under contracts in progress by 1,478,969 thousand rubles, and revenues from the provision of services by 75,226 thousand rubles. Gross profit increased by 13 019 thousand rubles, including due to an increase in revenue by 1 431 738 thousand rubles, an increase in cost by 1 418 719 thousand rubles.

For the fiscal year of 2018, the revenue decreased by 5,225,058 thousand rubles, largely due to decreasing revenue from the sale of products, services under contracts in progress by 5,119,412 thousand rubles, decreasing revenues from the provision of services by 101,316 thousand rubles.

The amount of uncovered loss at the reporting date is 3 162 778 thousand rubles, compared with the same period of the last year it increased by 1,583,093 thousand rubles.

| Indicators (thousand rubles) | 2015         | 2016         | 2017         | 2018         |
|-----------------------------|--------------|--------------|--------------|--------------|
| The value of net assets     | -2 278 484   | -1 651 320   | -1 104 282   | -2 693 025   |
| The size of the authorized capital | 284 344 | 284 344 | 284 344 | 288 344 |
| Retained earnings (loss)    | -2 128 950   | -1 579 685   | -3 162 778   |

The company's net assets are those own funds of the enterprise, that will remain with it after the firm settles with all creditors. That is, this is the difference between the assets of the company and its liabilities, taking into account small adjustments. According to table 1 the value of own assets is less than borrowed funds, that is, the company lives off borrowed funds. At the same time, the value of assets for three years from 2016 to 2018 decreased by 1,041,075 thousand rubles. The loss of the analyzed enterprise increased from 2 128 950 thousand rubles, up to 3 162 778 thousand rubles. These indicators demonstrate the increasing losses of the enterprise.

3. The main measures of the PJSC TKZ “Krasny Kotelshchik” economic recovering

According to the managers of PJSC TKZ “Krasny Kotelshchik”, the main measures that can bring the value of net assets in line with its authorized capital is an extensive contracting plan for subsequent periods, consisting of already concluded, as well as promising projects. The Company has
significantly reduced the share of external bank financing. The obligations of the company on bank loans are fully fulfilled. Moreover, the same measures were indicated in the annual report of PJSC TKZ “Krasny Kotelschik” for 2016 and for 2017.

As for the proposed activities, they are aimed to:

- the expansion of the product range, including the development of a new equipment, capable to satisfy all customer requirements;
- the improvement of an existing equipment in its technical and economic characteristics, including the modernization packages expansion of an own equipment;
- the development of modernization packages, including those for an equipment of competitors, as well as a long-term maintenance program for an installed equipment;
- the selection of product, services and materials suppliers, on a competitive basis, including the expansion of the competitive environment through a larger number of product suppliers;
- the interaction and work as part of intergovernmental commissions on trade and economic cooperation;
- the sanction challenging by suing the states that introduced them;
- the interaction with government agencies to provide the support to exporters (financial support, state counter guarantees, subsidies, investment guarantee mechanism);
- the scientific and technical qualifications of engineering personnel improving in order to create modern and competitive equipment;
- the applied and fundamental scientific research conducting;
- the design and technological departments development;
- the third-party organizations involvement in the framework of R&D to increase the reliability and efficiency of the manufactured equipment;
- the modern technologies and equipment use in the manufacture, providing high quality products.

It can be seen from the above, the proposed measures are general in nature and are not aimed at increasing the profits of the enterprise, therefore, for 4 years from 2015 to 2018, the company has been at a loss. The problems of enterprise management are not investigated, and only the implementation of corporate management ethics is considered. It would be advisable to consider modern theories of enterprise management and to implement them in the companies’ business-processes running [7,8]. PJSC TKZ “Krasny Kotelschik” top-managers should pay a special attention to measures that neutralize international economic sanctions. It is necessary to embed the development strategy of a company into the mainstream of the regional and municipal development programs [9,10].

According to the estimates of the Ministry of Economic Development of Russia, after the acceleration of economic growth in February of 2019 against the backdrop of a surge in activity in mining and manufacturing industries, in March 2019 there was a slowdown in the GDP growth rate to 0.6% compared to the corresponding period in 2018. Economic growth in the first quarter of 2019 is estimated by the department at 0.8% in annual terms. Operational estimates of a real GDP growth in 2019, published by the Russian Ministry of Economic Development and by the Vnesheconombank Institute, are close and are at the level of 1.0-1.3%.

In the medium term until 2024, the GDP growth is estimated positively by the expert community, the Ministry of Economic Development of Russia and the Bank of Russia, although the independent institutions estimation is more restrained: in 2020–2024, economic growth will not exceed 2.5%. The basic scenario of the Bank of Russia for the period 2020–2021 looks as a kind of a consensus forecast that establishes a rather broad framework for the possible rates of economic growth (in 2020, the range of acceptable values is 0.5 percentage point, in 2021 - 1 percentage point).
References
[1] Kazanskaya A and Kompaniets V 2015 Factors and antagonisms of development of innovative potential of high-technology lines of industry of Russia in globalization conditions ARPN Journal of Engineering and Applied Sciences 10 4571-82
[2] Dynamics and Structure of Russia's GDP 2019 Bulletin on Current Trends in the Russian Economy 48 21974
[3] Makarenya T, Stash S, Nalesnaya N and Zimovets A 2018 The contribution of housing and communal services to the economic growth of the country and structural Proc. Int. Multidisciplinary Scientific GeoConf. on Surveying Geology and Mining Ecology Management SGEM (Albena) vol 18(5.3) (Sofia: STEF92 Technology Ltd.) pp 847-54
[4] Borisov V and Pochukaeva O 2016 Modern problems of increasing the efficiency of the development of engineering Scientific works: Institute of Economic Forecasting RAS 1 170-84
[5] Borisov V, Pochukaeva O, Balagurova E, Orlova T and Pochukaev K 2017 Assessing the competitiveness of engineering products as a cumulative effect of the dynamics of innovative saturation of investments Scientific works: Institute of Economic Forecasting RAS 15 294-315
[6] Masyutin C and Zhivotovskaya A 2019 Reindustrialization of the economy as the basis of Russia's industrial policy Economics in industry 12(4) 416-25
[7] Bystraya Yu, Makarenya T and Stash S 2016 Enterprise architect: the conflicts resolution instrument of business management Book of Proc. of the 16th Int. Scien. Conf. on Economic and Social Development – “The Legal Challenges of Modern World” ESD (Warsaw: Varazdin Development and Entrepreneurship Agency) pp 697-703
[8] Nalesnaya Ya and Babikov N 2019 Topical issues of the use of information technologies at the modern stage of technological development of the economy Management in economic and social systems 2 44-50
[9] Stash S, Makarenya T, Simchenko N and Sinelnikov T. 2017 Ecological and economic problems of development of socio-economic system at the municipal level Proc. Int. Multidisciplinary Scien. GeoConf. on Surveying Geology and Mining Ecology Management SGEM (Albena) 17(43) (Sofia: STEF92 Technology Ltd.) pp 365-71
[10] Kazanskaya A and Nalesnaya Ya 2019 Potential points of regional economic growth: the possibilities of a cognitive approach Collected Scientific Papers of the XXIII Int. Scien. and Pract. Conf. System analysis in design and management Part 3 (St. Petersburg: Publishing house Polytech-Press) pp 498-504