THE COMPETITIVENESS OF ENTERPRISES OF MACHINE-BUILDING INDUSTRY OF UKRAINE

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Abstract

Machine-building industry is one of the main industries and the economy as a whole. Analysis of statistical data of engineering Ukraine showed the presence of a number of distinct cycles. In the period from 1986 to 1990 - the ascending phase, from 1990 to 2000 - the phase of acute crisis and 10 years of decline, and from 2001 to 2011 years - a chaotic development machine-building. The main problems of the industry at the macro level are: political instability, lag legislation, increased requirements for environmental performance; at the regional level: lack of innovation projects, low profitability of engineering firms and others; at the micro level: the obsolescence of fixed assets, large deficits own sources of investment resources in the enterprise and others. We obtain the econometric model of the machine under the influence of factors in a multivariable linear function (investment in machine-building; the index of prices of products; the degree of depreciation of machine-building enterprises; average wages in the industry; inflation).

Key words: machine-building industry, competitiveness, factors, Ukraine.

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Introduction

The economy of the country includes a variety of areas, each of which contributes to the development of the country. The main feature of the division of the economy into different areas is involved in the creation of the gross national product. Mechanical engineering is one of the main industries and the economy as a whole. Almost every country is a leader in engineering positions.

In developed countries building accounts 1/3-2/5 and more products manufacturing. The greatest diversity is engineering the U.S., Japan, UK, France and Germany. They are available all branches of engineering production and directly form the world market. The largest range of engineering products introduced in the United States, Germany, and a quarter century later they were joined by Japan. Other countries can not fully provide the products themselves, and therefore dependent on external supply market.

Ukraine has significant potential for the development of engineering industry. However, as the statistics show, currently this sector is not competitive. So urgent is the problem of finding the factors affecting the development of the industry and providing suggestions to improve its competitiveness.

Research on competitiveness pay attention to many scientists, defining different aspects: Azaryan [1]; Dolzhansky [2]; Fathudynov [3]; Yudanova [4]; Danilov [6]. A more complete interpretation seems to us this time I. Spiridonov, which defines competition as "the process of economic interaction, relationship and struggle between functioning market companies in order to provide better opportunities to market their products to meet different customer needs and obtain the greatest profit" [5].

Category “competitiveness” has different interpretations, both domestic and foreign among professionals. This shows, on the one hand, the extreme importance and complexity of the problem, on the other hand - the incompleteness of its methodological study and need further research.

Thus we can not agree with M. Porter that “when you try to answer the question of competitiveness at the national level need to focus not on the economy in general and on specific industries and industry segments. We need to understand how and why there commercially viable skills and technologies, and understand it sufficiently only at the level consideration of competitive industries” [7].

1. Trends in engineering industry

In Ukraine a market economy, one of the major industries is machine-building, which defines the scientific and technical policy of the country, providing competitive products and economic security. From the effective functioning of the machine-building industry depends not only meet the demand of the consumer, but also the development of certain industries.

Ukraine has significant potential in engineering, as evidenced by the fact that Ukraine has such a unique company in heavy machine-building, like "Azovmash", Novokramatorsky Instrument Co., association "Luganskteplovoz", Kharkov Scientific-Production Association "Turboatom", Sumy NPO im. Frunze and other plants and associations. In Ukraine there are excellent conditions for the development of engineering complex, but due to lack of material resources of the country is not able to realize their full potential. This is due also to the fact that all developed countries have long switched to...
zero waste and low-waste production that Ukraine is unable to do so due to lack of finance [8].

Today, engineering is considered as the largest complex of activity which depends on the competitiveness of goods and services both in the domestic and foreign markets. It Ukraine unites 11.267 enterprises, of which 146 - large, 1834 - medium and 9287 - small manufacturing various machinery and equipment, instruments and equipment, and more. In the area are more than 15% of the value of fixed assets and nearly 6% of current assets of the domestic industry and more than 22% of employees. Engineering enterprises are among the most affected by the economic crisis. Due to the decline in external demand decreased exports of engineering products, reducing production and increasing the number of finished goods in warehouses, deteriorating financial performance [8].

Within the engineering Ukraine over the last decade there have been significant changes (Figure 1). So back in 2001, almost half of the production machine-building industry accounted for the manufacture of machinery and equipment in 2011, its share dropped to 30.3%. However, the share of vehicles and equipment increased from 26.3% to 48.4%, due to the increasing number of products.

Analysis of statistical data of engineering Ukraine showed the presence of a number of distinct cycles. In the period from 1986 to 1990 - the ascending phase, from 1990 to 2000 - the phase of acute crisis and 10 years of decline, and from 2001 to 2011 years - a chaotic development machine (Figure 3). The largest growth in industrial production in the last decade has seen in 2010, where production machinery products increased by 36.1%.

Another factor prompting the industry has been the growth of domestic investment demand in a gradual increase in profits of the domestic corporate sector and improving investment activity in the CIS countries, which contributed to the growth in exports of machinery (including supplies Freight to Russia).

Significant role in the growth of unprofitable enterprises in the engineering industry played receivables and payables. Also, decrease profitability white downscaling products. The rate of growth in sales and engineering industries are on figure 4. Reduced sales of engineering products in 2009 were primarily due to lower demand for Ukrainian machine-building due to non-production world standards. Significant decline in output in 2009 also contributed to reducing foreign supplies of raw materials, energy,
intermediate goods and components. Also entered the market cheaper and better imported products. In the first half of 2008 increased metal prices, which led to an increase in the final cost of the product. There was a reduction in global demand for engineering products market and as a result was losing enterprises overseas markets. Already in 2010 the restoration of production capacity of domestic enterprises to increase production and growth in sales (in 2010 they almost reached the level of 2008).

2. Problems of machine-building industry

To evaluate the profitability of mechanical engineering at Figure 5 shows the dynamics of return on operating enterprises in the industry.

![Fig. 5. Profitability of enterprises in industry and engineering, Compiled by [12]](image)

As shown in Figure 5, the profitability of engineering companies started to decline in late 2008, due to the economic crisis. In 2010, the value and profitability of engineering industry in general has improved significantly, not only in relation to 2009, but the entire analyzed period. The economic crisis is the deterioration of business as the industry in general and engineering in particular. During 2008 - 2009 years, the volume of production and sales declined, and significantly reduced the financial results of companies studied area. Implementation results of innovation are one of the areas of the revival of domestic engineering.

Analysis of investment and active enterprises shows that, over the last five years there have been minor changes in the number of innovative enterprises of machine-building complex (Figure 6). So from 2006 to 2007, their number gradually increased, indicating that the development of the industry, and in 2008 the situation deteriorated as a result of the crisis, already in 2009-2011, there are positive signs that a successful outcome given the lack of proper innovation support from the state. It should be noted that engineering Borderland is export-oriented industry. Nearly half of their products are exported abroad. During 2001-2006 the share of industry exports in total exports of goods grew Ukraine.

The sharp decline in investment activity on the major companies of the industry in 2009 led to a decrease in exports of engineering products, which led to a reduction in exports by 20.9% . Due to the gradual recovery in investment demand in overseas markets in early 2010, an increase in exports of engineering products. Engineering products are mainly exported to the CIS countries, which are also badly affected by the crisis.

In the past few years, about half of the imported products accounted for the investment of equipment, vehicles and other equipment. Minor part in the structure of import of engineering products is heavy engineering products. In the period from 2001 to 2007 import growth contributed to the development programs of bank lending. Emission credit programs in 2008-2009 years helped reduce the amount of imports.

A significant depreciation of fixed assets increases technical and technological backwardness of industrial enterprises and, in particular, domestic engineering. The degree of wear of Ukrainian enterprises significantly higher than in the global industry: domestic fixed assets depreciated by more than 50%, while the rate of global depreciation in the period from 2002 to 2010 in the range of 30%. In terms of quality, reliability, durability and efficiency of machines and devices, Western companies have long been superior Ukrainian. Increase critical level of fixed assets depreciation base enterprises availability of funds engineering industries adversely affected the competitiveness, quality and cost of production of all industrial enterprises in the country. Current rate of renewal of fixed assets in the industry at the level of 4-5% per year, while the degree of wear of about 60% is not noble to ensure their proper upgrades.

After analyzing the current state of engineering industry of Ukraine, it can be concluded that the problems the industry is multi-faceted. The main problems of engineering complex are shown in Table 1.
The current state of engineering industry needs to move to a new more advanced technological way that is only possible through the use of scientific and technological progress, which in turn is associated with a significant risk for investors, the possibility of which increases due to political and economic instability, making it impossible to strategic planning. In such circumstances, they either require higher profits as compensation for risk (minimum rate of return should be 25-40% higher than in Western Europe, and 65-75% higher than in the U.S.), or contained on investment or choose minimally risky strategy. In the process sets capable of transferring activity of Enterprises of machine-building industry to a new, higher level of technological structure, one can identify technology collectively acting on the macro - and micro levels. Technological aggregate operating at the micro level associated with the need to use measures to replace obsolete equipment, the introduction of advanced technologies, creating new products to meet emerging consumer needs, the realization of the scientific potential of scientific and technical personnel. Technological aggregate operating at the macro level associated with the implementation of public policies aimed at creating favorable conditions for investment.

In our opinion, the impact on the profitability and attractiveness of engineering Ukraine perform the following factors: the price index of industry, investment in machinery, the depreciation rate of fixed assets engineering enterprises, the average salary in the industry and inflation. By carrying out some calculations, we obtain the econometric model of the machine under the influence of factors in a multivariable linear function which has the form:

\[ y_1 = 449.262 - 0.026x_1 + 1.955x_2 + 1.793x_3 + 0.090x_4 - 4.044x_5 \quad (1) \]

where

- \( y_1 \) - index of machine-building;
- \( x_1 \) - investment in machine-building;
- \( x_2 \) - the index of prices of products;
- \( x_3 \) - the degree of depreciation of machine-building enterprises;
- \( x_4 \) - average wages in the industry;
- \( x_5 \) - inflation.

Rate closeness relationship between impacts and the resultant figure is possible, using the coefficient of determination. The results of calculations by the author get \( R^2 = 0.988 \). Thus, the calculations allow to draw conclusions about the close relationship between the effective indices of machinery and discussed factors to 98.8% affect it. To assess the adequacy of the econometric model statistical data appropriate to use Fisher's criterion, which in our case

<table>
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<th>Table 1. The main problems of engineering industry of Ukraine</th>
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<td><strong>Macro level</strong></td>
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<td>much competition from foreign producers</td>
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<td>backlog of legislation</td>
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<td>not clearly defined strategy</td>
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<td>growth requirements for environmental performance</td>
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<td>general destabilization of the economy</td>
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<td>political instability</td>
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According to the report Ukrainian economic trends forecast, prepared by experts of the analytical group, this year the domestic machine-building enterprises will play a role as one of the main drivers of growth in industrial production in the country in general. However, they note that the preservation of the Ukrainian machinery as the engine of the economy directly depends on overcoming the crisis in Russia. But analysts IR Astrum Investment Management believes that growth in output in the industry still fall significantly - up to 15%. And by 2013, according to specialists MIP, the industry finally with output to reach pre-crisis peak [12]. The successful development of mechanical engineering Ukraine to maintain the competitiveness of domestic products in the world market. It is necessary to ensure high product quality, reliability and durability, which in turn requires large investments in scientific software and fixed assets of production.

3. Directions to increase competitiveness of the sector

The current state of engineering industry needs to move to a new more advanced technological way that is only possible through the restructuring of existing technological populations associated with production of products for the railway industry to the production of precision machinery, high technology products, nanotechnology to meet the changing needs of consumers. Changing the structure of technological populations is only possible through the use of scientific and technological progress, which in turn is associated with a significant risk for investors, the possibility of which increases due to political and economic instability, making it impossible to strategic planning. In such circumstances, they either require higher profits as compensation for risk (minimum rate of return should be 25-40% higher than in Western Europe, and 65-75% higher than in the U.S.), or contained on investment or choose minimally risky strategy. In the process sets capable of transferring activity of Enterprises of machine-building industry to a new, higher level of technological structure, one can identify technology collectively acting on the macro - and micro levels. Technological aggregate operating at the micro level associated with the need to use measures to replace obsolete equipment, the introduction of advanced technologies, creating new products to meet emerging consumer needs, the realization of the scientific potential of scientific and technical personnel. Technological aggregate operating at the macro level associated with the implementation of public policies aimed at creating favorable conditions for investment.

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is $F = 42.429$. With a certain probability $p = 0.95$ and the number of degrees of freedom $K_1 = 5$ and $K_2 = 3$ is a table-valued $F_{Kr}$. With the reliability of 95% confirmed the relationship between materiality index of machinery and the factors considered and a model is adequate.

Conclusions

Analysis of statistical data of engineering Ukraine showed the presence of a number of distinct cycles. In the period from 1986 to 1990 - the ascending phase, from 1990 to 2000 - the phase of acute crisis and 10 years of decline, and from 2001 to 2011 years - a chaotic development machine-building. The largest growth in industrial production in the last decade has seen in 2010, where production machinery products increased by 36.1%.

Analysis of key indicators of business engineering has made it possible to identify the main problems of the industry at all levels, namely at the macro level: political instability, lag legislation, increased requirements for environmental performance and others at the regional level: lack of innovation projects (in recent years much does not increase the number of innovation active enterprises in engineering), low profitability of engineering firms and others at the micro level: the obsolescence of fixed assets (degree of depreciation of Ukrainian enterprises significantly higher than in the global industry: domestic fixed assets depreciated by more than 50% while the global figure of depreciation in the period from 2002 to 2010 in the range of 30%), large deficits own sources of investment resources in the enterprise and others.

The research allowed to conclude that domestic enterprises engineering to create an effective mechanism to attract foreign capital, the first step is to seek funding for the first of any investment business. The main three alternative sources of financing (loans, bonds, shares) prompted to venture investing.

The proposals to improve Ukraine’s investment attractiveness and industries including: simplify and reduce the time of the procedure of approval of foreign investment, giving priority to export projects to encourage foreign investment in the form of tax incentives for joint ventures may provide tax holidays for 5 years for projects in engineering, development of effective support investors who have come into the country.

Reference