ЕКОНОМІКА ПРОМИСЛОВОСТІ ТА ОРГАНІЗАЦІЯ ВИРОБНИЦТВА

INDUSTRIAL ECONOMICS AND ORGANIZATION OF PRODUCTION

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MACHINE BUILDING BRANCH IN UKRAINE: PROBLEMS AND PROSPECTS

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Акименко Н.В., Дігіч А.В. Машинобудівна галузь України: проблеми та перспективи.

Виявлені основні тенденції та проблеми розвитку, обґрунтовані перспективи та запропоновані шляхи покращення стану машинобудівної галузі в Україні.

Ключові слова: машинобудівна галузь України, проблеми розвитку машинобудівних підприємств, промисловість, тенденції, перспективи машинобудування.

Акименко Н.В., Дигич А.В. Машиностроительная отрасль Украины: проблемы и перспективы.

Выявлены основные тенденции и проблемы развития, обоснованы перспективы и предложены пути улучшения состояния машиностроительной отрасли в Украине.

Ключевые слова: машиностроительная отрасль Украины, проблемы развития машиностроительных предприятий, промышленность, тенденции, перспективы машиностроения.

Akimenko N.V., Digich A.V. Machine building branch in Ukraine: problems and prospects.

The main tendencies and development problems are revealed, prospects are proved and ways of improvement of Ukrainian machine building branch condition are offered.

Keywords: machine building branch of Ukraine, problem of machine building enterprises development, industry, tendencies, mechanical engineering prospects.

Machine building enterprises occupy an important place in the economy of each country, because they provide the foundation for other branches development and ensure maximum realization of their potential.

The national machine building is labor intensive, but in developed countries such enterprises are completely automated and machine-dominating. Necessity of such enterprises studying is a priority, because they are most closely linked to other industries, and thus their development level depends on them

Analysis of recent researches and publications

A large number of Ukrainian scientists analyzed the development and state of machine building branch: N.O. Beznoshchenko [1], A.V. Kolodiichuk, V.M. Pisniy [2], O.O. Shapurov [3], R.V. Feshchur, V.Y. Samyulyak [4], L.G. Solyanyuk [5], N.A. Yefimenko [6], N.P. Karachina [7], S.V. Breus [8], S.O. Gutkevych [9], N.V. Golikova-Tentulova [10], S.V. Zelenskyy, V.S. Zelenskyy [11], S.M. Illyashenko [12], M.A. Stadnyk, V.V. Stadnyk [13], V.V. Zyan'ko [14] and others.

Nowadays the Ukrainian machine building industry is one of the most backward industries, so its problems require further consideration and determination of ways to solve them.

The purpose of article

The aim of the article is to analyze the machine building industry in Ukraine over recent years and to substantiate the ways of solving existing problems.

The main material

Ukrainian machine building branch is a comprehensive manufacturing industry that consists of 20 specialized branches uniting about 11 thousand enterprises. Enterprises of this complex are located in

all regions of Ukraine, but particularly active cities are Odessa, Lviv, Dnipropetrovsk, Kharkiv, Donetsk, Luhansk, Kharkiv, Kyiv. Machine building sector in Ukraine consists of 11267 different size companies. It focuses almost 7% of domestic industry's current assets, about 20% of the fixed assets value and more than 22% of the employees' number. The implementation of STP in the fields that consume machine building products depends on the state of its branch. We should highlight that share of machine building in the Ukrainian industrial structure is low. During the first years of independence the share of machine building in the industrial structure was approximately 32%, but in recent years it has been just about 13%, while in developed countries the machine building industries' share ranges from 30 to 50% of total industrial output (for example in Germany - 53.6%, Italy - 36.4%, China - 35.2%). At the same time machine building is 36-45% of the European Union countries' GDP. In Ukraine this figure is about 2-2.5 times less, so that is a major cause of Ukrainian industry's technical backwardness. More than 50% manufactured engineering products are exported from Ukraine, but import of these products is 2.4 times greater than the volume of export [15].

Ukrainian machine building products are sold mainly in the CIS markets. They include vehicles, carriages, petroleum and chemical industry equipment, metallurgical, press, forging, hydraulic, mining, elevating specialized equipment. The largest Ukrainian producers are PJSC NKMP, concern "AzovMash", TPC "Ukrvuglemash", Kryukov railcar plant, Zaporozhtransformator and others. The most stable and successful sre PJSC "Sumy machine building research and production association named after Frunze", "Electrovazhmash" plant, "Kryukov railcar plant" concern, State research and production enterprise "Kommunar Association", State enterprise "Kharkov machine building factory "FED"", PJSC "Novokramatorsky machine building plant" and others. [16].

Depending on machine building enterprises' sales market we can distinguish:

- Heavy Engineering. Includes equipment for energy, transport, metallurgical, building complexes. To reduce their costs, heavy machine building enterprises are territorially focused on the centers of raw materials extraction and on consumers.
- Tractor and agricultural machinery. Produces tractors and other machines for land cultivation and livestock farming. It depends on the solvency of agricultural sector.
- Railway engineering. Serves railway industry.
- Automobile industry. This industry includes enterprises engaged in the motorized means of transport production.
- Electrical, device, machine tool engineering. Products of this group are various and knowledge-based.

Let us analyze the changes in machine building products sales in Ukraine during 2008-2011, according to official statistics data (Table 1) [17].

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Table 1.Sales volume of mechanical engineering works and services in Ukraine during 2008-2011, million UAH.

	2008	2009	2010	2011
Machinery and equipment	37271,5	34245,7	39778,4	48313,2
Electrical, electronic and optical equipment	25580,5	24504,7	27708,9	34413,5
Vehicles and Equipment	58928,4	27082,6	48861,2	71459,2
Machine building, total	121780,4	85833	116348,5	154184,9

It is worth mentioning that Ukrainian machine building branch significantly suffered from the crisis in 2009. For example, in 2009 the decrease of engineering companies workers number was more than 27% (compared to 2008), and sales volume dropped by about half. This crisis mostly affected vehicles and equipment segments.

At the end of 2011, an increase in mechanical engineering works sales volume is observed. The sales of transport equipment increased by 46.3%, electrical equipment – 24.2%, cars - 21.5% (compared to 2010). This is due to the increasing demand for the products of this industry in the CIS. Thus, exports of machinery, equipment, mechanisms, electrical equipment in the end of 2011 increased by 7,5%, transport – by 27,4% (compared to the year beginning). Despite the increase in sales, share of machine building in the industrial sector of Ukraine's economy in the end of 2011 was 11,6%. This indicates a low level of industry's development, because in developed countries the share of machine building is from 30 to 50% of industrial production [17].

There is a tendency to increase the share of profitable machine-building enterprises among all industrial enterprises. Thus, according to the State Statistics Committee, in the end of the year an increase was 3,9%. However, the number of unprofitable enterprises in this branch is still at a high level - 38,8% of the unprofitable industrial enterprises total number [18].

It is important to pay attention to analysis of the machine building products competitiveness in the domestic and foreign markets. To do this, we present the engineering production indexes, import and export volumes indexes (Table 2) [17].

Table 2.The dynamics of engineering production indexes, import and export volumes indexes

Index	2008	2009	2010	2011
Index of machine building products, % to the previous year	100,3	55,1	136,1	117,2
Index of machine building products export volumes, % to the previous year	128,54	63,18	133,32	129,5
Index of machine building products import volumes, % to the previous year	134,84	34,06	139,88	157,6

Analyzing the figures above, we can say that export gradually reduces and imports increases, so that can lead to the domestic markets loss by Ukrainian companies, machine building sector is more export-dependent.

Let us represent graphically the machine building products export and import by years (Fig. 1) [17].

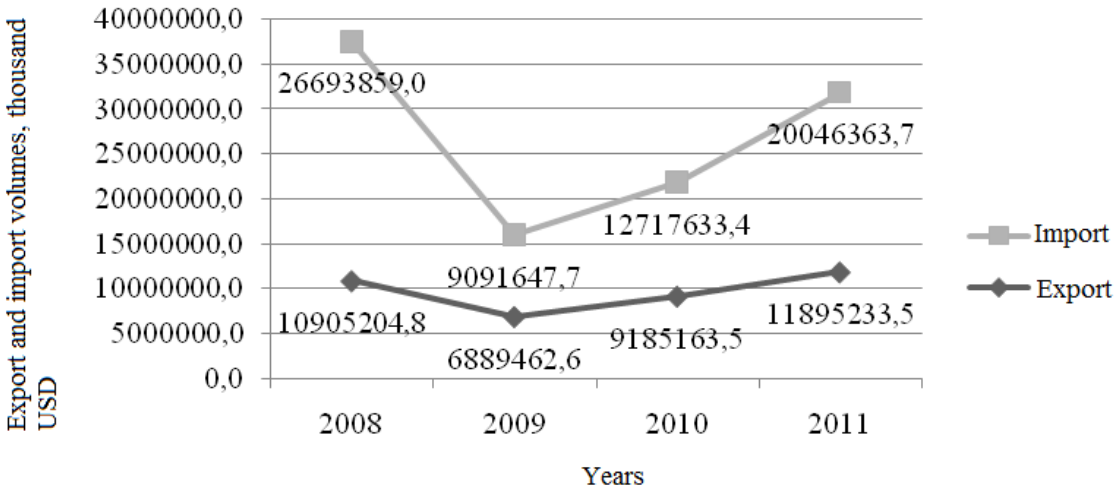

Fig. 1.The Ukrainian machine building products export and import volumes

This figure shows that the import's growth is much bigger than export's. That confirms the fact of Ukrainian products uncompetitiveness on both domestic and foreign markets.

Here is the ratio of export and import in machine building industry products structure for a better understanding of the situation (Table. 3) [17].

Table 3.The ratio of export and import in machine building industry products structure, %

Names of products	2008	2009	2010	2011
1. Machinery, equipment, mechanisms, electrical equipment	47,39	80,14	69,43	52,82
Nuclear reactors, caldrons, machinery	36,54	70,6	68,7	50,19
electric machines	74,66	96,45	70,36	56,12
2. Ground, aerial, floating vehicles	35,74	73,78	89,03	78,25
railway locomotives	419,44	838,46	869,11	768,57
ground vehicles (excluding railway locomotives)	11,03	19,43	16,28	11,63
aerial vehicles	499,39	369,9	386,08	463,99
vessels	458,49	439,21	557,68	47,33
3. Apparatuses and optical, photographic devices	19,85	41,55	28,47	26,88

The table shows that export-oriented commodity groups are railway locomotives and aerial vehicles. Other products are import-dependent. This shows the low competitiveness of Ukrainian producers on

domestic and foreign markets. We should pay attention to sharp decrease in exports of vessels, this indicates the deterioration of the shipbuilding industry.

The products are mainly exported to CIS countries such as Russia, Kazakhstan, Turkmenistan, Belarus and Moldova. The largest consumer is Russia (over 26%). Therefore, the case of this sales market loss can be a significant problem.

In this situation, if we consider the possibility of import substitution, first of all, the attention should be paid to the agricultural industry as a strategically important part of the Ukrainian machine building. Today the agricultural enterprises are provided with 45-80% of necessary equipment. This industry has a production potential and a possible constant demand [19].

At the same time, if we take tractors for farming as example, their import greatly exceeds domestic production (Fig. 2) [17].

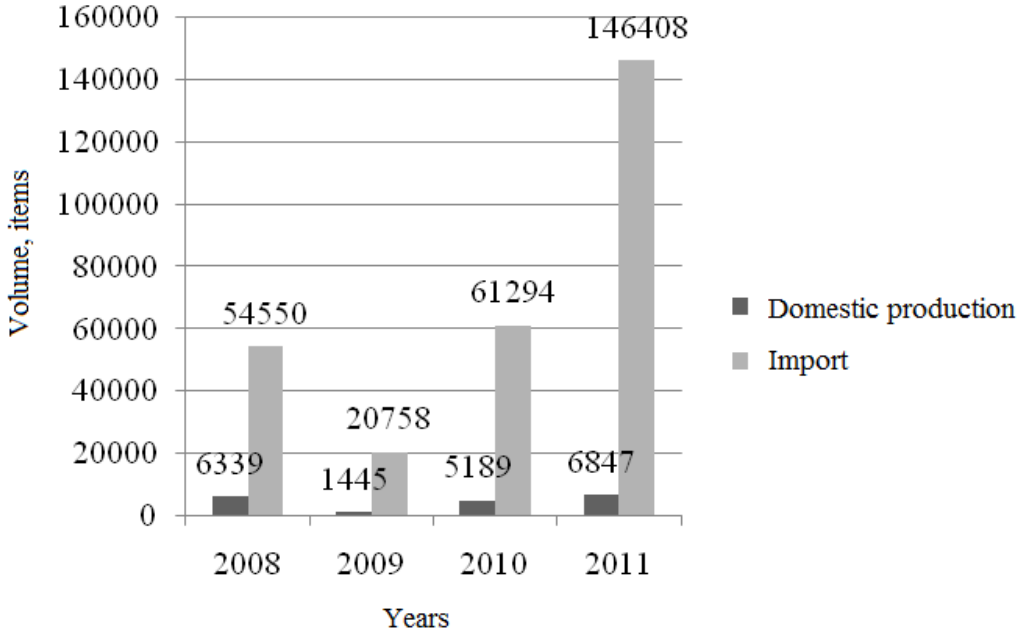

Fig. 2. Import and domestic production volumes of tractors for farming

This situation is caused by outdated construction of tractors, so the demand for foreign products is much higher, although their price is bigger. A similar situation is found in almost all machine building products.

Let us consider the advantages of modern machine building branch in general:

— The growing demand for the energy engineering products (turbines, compressors, generators, transformers), aircraft engines, space and military equipment, railway cars and cable products.
— The development of new sales markets in India, China, the EU and Latin America.
— Competitive "price - quality" ratio for the products of machine building industry.
— High scientific and industrial potential of enterprises.

Here are the major and most influential problems of machine building industry in Ukraine.

Firstly, these are low expenses for research and development. If developed countries figure these costs over 8%, for Ukraine it is little more than 1%.

Secondly, it is the lack of qualified personnel and a significant depreciation of fixed assets (60%), which can be solved by refitting of enterprises and replacing of universal equipment to modern computerized counterparts. This will reduce the laboriousness [18].

Over the long term it is necessary to take into account the global trends like globalization of economy, raising quality standards, environmentally friendly products, the requirements for personnel qualification, the monopoly of certain countries on the international market. The experience of more developed countries should be kept in mind. Thus, in developed countries using the innovation policy the state can be involved in management and support of industry. In world practice significant number of tools to activate innovation processes is used. They are direct financial support, fiscal privileges and other legal, infrastructural, economic and political support tools.

If we consider the experience of other countries in this area, it should be noted that innovation-developed countries use all three groups of instruments. For example, in Germany the state plays an active role in the development of scientific research: up to 80% of research in universities is carried out through grants. The originators of venture capital funds are exempt from half of taxes. And to provide the information about this area the German Patent Office was created. Also the system that helps to implement patented inventions was organized.

Comparing this system with the Ukrainian "analog", we can only make a disappointing

conclusion. The taxes are a barrier to the development of entrepreneurship and innovations. Of course, the government attempted to stimulate innovation activity of Ukrainian enterprises, but the desired results were not achieved. The Cabinet of Ministers' Resolution № 447 (May 14, 2008) approved the State Program "Establishment of innovation infrastructure in Ukraine for 2009-2013".

The aim of the program was to create during 2009-2013 the innovative infrastructure to ensure effective use of national scientific and technical potential, to increase innovativeness and competitiveness of the national economy. The program included a number of actions, the implementation of which was aimed at: ensuring the functioning of the innovation infrastructure that supported small innovation business; supporting the development of new innovation infrastructure network elements; increasing the innovative activity of industrial enterprises; accelerating the pace of innovative goods production; attracting investments for innovative products realization.

Financing of the Program had to be carried out by the state and local budgets, as well as by investments from companies and organizations, international grants [20].

However, now it is 2013, but the results of this program are not very visible, and international grants are very difficult to obtain.

Using the data from the Ukrainian State Statistics Service it is possible to see the following (Table 4) [17]:

Table 4.Sources of innovation financing

	Total expenditures	Including the funds			
		own	from state budget	from foreign investors	other sources
	million UAH				
2008	11994,2	7264,0	336,9	115,4	4277,9
2009	7949,9	5169,4	127,0	1512,9	1140,6
2010	8045,5	4775,2	87,0	2411,4	771,9
2011	14333,9	7585,6	149,2	56,9	6542,2

So if the company wants to get occupied in innovation activity, it has to search the funds independently. So that is not surprising that Ukraine has low indicators of innovation activity, as can be seen in the following table (Table 5) [17]:

Table 5.Innovations implementation in industrial enterprises

Year	The share of firms that implemented innovations, %	New technological processes implemented	including low-waste, resource saving	The production of innovative products, names	including new types of technique	The share of innovative products sales in volume of industrial products sales, %
2008	10,8	1647	680	2446	758	5,9
2009	10,7	1893	753	2685	641	4,8
2010	11,5	2043	479	2408	663	3,8
2011	12,8	2510	517	3238	897	3,8

Therefore, it should be noted that for the development of machine building branch as well as of the entire industry in Ukraine the support from the state should be intensified. This includes:

— fiscal privileges to manufacturers;
— implementation of programs which reduce imports and capture the domestic market by Ukrainian producers, export development;
— improving the investment climate, reducing the risks of investing, leading to increased investments in machine building complex. This, in turn, will help to upgrade and modernize the fixed assets of enterprises.

The international cooperation with high-tech enterprises can become an opportunity to develop machine building. On the one hand, Ukrainian producers will have access to new technologies, and on the other hand, foreign partners will have cheap labor and the ability to develop new markets for finished products.

In general, the potential of Ukraine in the field of machine building is high but its implementation needs active investments, that must be spent on upgrading and on synergy between the enterprises to increase the effect from their activities. Despite the many advantages of the industry, machine building is in dire need of investments. Lack of investments is explained by high depreciation of fixed assets and by the increase of tax burden on businesses from the government [20].

At the end of 2011, the share of investments in the machine building industry was 2,2% of the total investments in the Ukrainian economy [17].

One of the main countries that invest in this branch is Cyprus. However, this kind of investments can be called reinvestment in the economy because the main capital inflows into Ukraine from Ukrainian companies registered in the offshore.

If the tax law of the country is unstable and imperfect, the country belongs to the area that is unfavorable to investments and entrepreneurship. Change of tax legislation in developed countries is carried out according to existing procedures of laws approval. In most countries, tax policy change is impossible not only in the current fiscal year, but in the next. In Ukraine the changes take place several times a year. Moreover, in all countries there is a long period of time between the adoption of tax changes and the time when they enter into force.

The tax rate is used in international practice for assessing the tax burden (at macro level). It is the ratio of the amount of taxes paid, including social security contributions, to GDP at market prices (documented value of final production of goods and services within the country). The received results indicate a low level of tax burden in Ukraine according to this criterion. Thus, Ukraine (31.6%) is in a group with countries such as the United States (26.4%), Japan (25.8%), Portugal (33.9%), Ireland (28.4%), Australia (31.5%), Turkey (31.1%), Kazakhstan (24%), Lithuania (34%), Russia (33.8%) and Uzbekistan (30.2%).

It should be noted that the standard of living in Ukraine is much lower than in most of these countries, so it is no surprise that the amount of investments in the industry is too small.

Conclusions

The base of machine building market is large enterprises, the development of which directly affects the level of goods consumption in the importing countries (mostly - CIS). Thus, from January to July 2011, exports of machinery and equipment increased by 7.5%, while exports of vehicles increased by 27.4% compared with the year beginning [17].

The feature of the machine building manufactures is the presence of worn out by 60-80% fixed assets, which makes the products of these companies be highly expensive and technologically outdate compared with imported analogues. Also, the limiting factor of these companies is the lack of qualified personnel and financial support from the state.

The high share of machinery imports demonstrates the uncompetitiveness of Ukrainian producers. It is necessary to take measures to stimulate the development of the whole industry, to substitute import of at least some products, particularly agricultural machine building.

Machine building branch is one of the most attractive for investments because of the high production potential of domestic plants and potentially high demand on the Ukrainian market. The tax incentives should be introduced to improve the investment climate. Also the innovative activity of enterprises should be stimulated. To do this, first of all, we need to develop effective programs for industry and funding.

On the one hand, the development of domestic producer will reduce consumer spending, because imported products are more expensive, and on the other hand it will take the plunge in the development of the economy as a whole, increasing the competitiveness of the whole Ukrainian industry. Our priority is the complete the modernization and replacement of fixed assets. In the future, an effective mechanism of state innovation activities stimulation should be developed.

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