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EVALUATION OF THE UKRAINIAN AGRICULTURAL MACHINERY PROSPECTS ON THE EUROPEAN UNION MARKET

ABSTRACT

The article provides an overview of the peculiarities of functioning and analysis of performance indicators of machine-building enterprises in 22 countries of the European Union and Ukraine. The article studies profitability indicators of machine-building enterprises, with an emphasis on the peculiarities of approaches to pricing. A comparative analysis of the number of machine-building enterprises and the number of people employed in machine-building in each country was carried out. The indicators of imports of machinery and equipment for agriculture from Ukraine to the EU countries are analysed in terms of the main product groups. A comparative analysis of the activities of the machine-building industry of the EU and Ukraine per enterprise, with special attention to the indicators of costs and investments, was carried out. The volumes of investments in material assets, machinery and equipment, personnel, and energy costs were analysed. An evaluation of these indicators of the functioning of machine-building enterprises of the European Union and Ukraine has allowed to identify the key problems of domestic machine-building enterprises in the context of ensuring the competitiveness of their products in the EU market. In particular, the author has established the existence of fundamental differences between Ukrainian and European machine-building producers in terms of investment in personnel and renewal of fixed assets, which leads to a significant technological lag behind their European competitors and a lag in terms of individual productivity of personnel.

Keywords: agricultural machine-building, manufacturers of agricultural machinery, countries of the European Union, Ukraine, the EU market, import of agricultural machinery

JEL Classification: E20, F02, L15, L69

INTRODUCTION

Strengthening of European integration processes, in which Ukraine is an active participant, has a significant impact on all spheres of public life [1, p. 38] and, in particular, on the functioning of machine-building enterprises.

The current macroeconomic and military-political situation in our country prompts a large-scale reorientation of manufacturers to the markets, primarily of European countries, which escalated the problem of ensuring the necessary quality of machine-building products and their competitiveness.

Due to the development of the machine-building industry is the basis of scientific and technological progress, and the competitiveness of machine-building enterprises is one of the determining factors of effective competition of the country's economy in the global market [2], the issue of identifying prospects and problems of domestic producers and their products on the market of the European Union is gaining special relevance.

LITERATURE REVIEW

Foreign authors in their studies on this issue tend to substantiate the strategic prospects of industrial production and analyze the markets for agricultural machinery products

and ways of their strategic development. Thus, in the work of E. Westkemper [3], devoted to the vision of the future of industrial production in Europe, attention is focused on four main components of the successful operation of industrial enterprises: innovation of products and processes; basing of production engineering on the principles of the knowledge economy; digitalization and digitalization of processes; application of new business models in product life cycle management. G. Ozogül, studying the peculiarities of demand for agricultural machinery and equipment in the context of individual countries [4], concludes that the growth and diversification of demand for these products depends on the production models used, price levels, availability and cost of credit resources. In turn, consumers of agricultural machinery and equipment, according to the researcher, "need innovative multitasking machines with a high level of functionality with the possibility of their use in niche production areas, minimal energy consumption and, in return, with high levels of safety, efficiency, comfort and versatility" [4].

Given the exceptional importance of the agricultural machinery sector for the domestic economy, investigation of issues related to ensuring the competitiveness of its products and enterprises is generally dedicated a whole range of scientific works. Among the latest scientific works published before the start of the full-scale war, it is worth noting the work of O. Krekhivskyi [5], which analyzes the Chinese experience of using state support for agricultural machine-building with an emphasis on comparing and identifying the shortcomings of approaches available in Ukraine. The need for state support is also emphasized by O. Kovalenko [2], investigating the current state of competitiveness of agricultural machine-building enterprises. In particular, according to the author, one of the main factors in bringing domestic agricultural machinery to the level of world producers is state support for agricultural machine-building enterprises, including the development of state programs for the innovative development of the corresponding market. O. Redkva [6] also focuses on the issue of state support and investments in agricultural machine-building, noting that «Ukraine has quite high opportunities for the development of agricultural machine-building, however, it does not use them effectively enough, and it is possible to fully ensure the production of machinery at the proper level only with the expense of significant investments to transfer the industry to new technologies».

Other authors [1] focus attention on the export possibilities of Ukrainian agricultural machine-building, noting that «the development of export of machine-building products to the European Union is a promising direction for the diversification of the sales markets of Ukrainian machine-building enterprises», however, without studying the differences between Ukrainian and European manufacturers, and therefore and prospects for expanding the export opportunities of Ukrainian agricultural machine-building. In this context, the work of A. Vitiuk and O. Smetaniuk [7] studied the peculiarities of the functioning of Ukrainian machine-building enterprises focused on agricultural production and substantiating.

substantiation on the basis of this direction of meeting the needs of consumers of agricultural machinery.

Also, the export possibilities of agricultural machine-building in Ukraine are emphasized in the infographic guide [8], which allows us to make a conclusion about a significant reduction in the volume of production of this product in the country over an eight-year period but does not provide an opportunity to find out the reasons for this situation and justify the ways out of it. Therefore, in general, we can say that the problem of ensuring the effective functioning of agricultural machine-building and the competitiveness of its products are in the field of view of many researchers, but currently, there are no works devoted to the study of the peculiarities of the activity of machine-building enterprises of Ukraine and the countries of the European Union as one of the main sales markets in the context the military necessity of reorientation of production from eastern markets.

AIMS AND OBJECTIVES

The aim of the study is to identify the problems and prospects of Ukrainian producers of machine-building products in the European Union market. The realisation of this goal requires a review of the peculiarities of functioning and an analysis of the performance indicators of machine-building enterprises in Ukraine and individual countries of the European Union.

METHODS

During research it was applied methods of statistical analysis, in particular, grouping, calculation of average values, basic growth rates and economic analysis - calculation of average output per employee, calculation of selected performance indicators per enterprise, as well as theoretical methods of comparative analysis. synthesis and logical generalization. The information base of the research was made up of statistical materials from Ukraine and the European Union, as well as scientific works on the issues raised in the work.

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For the purpose of analysis it was selected 22 member states of the European Union (Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Greece, Spain, France, Croatia, Italy, Latvia, Lithuania, Hungary, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia and Sweden), the key criterion for the selection of which was the availability of complete statistical information on the main indicators of the functioning of their machine-building industry.

RESULTS

In order to study the peculiarities and results of the economic activity of machine-building enterprises of Ukraine and the EU countries, first of all, it was carried out a comparison of their profitability indicators from the sale of products (Figure 1).

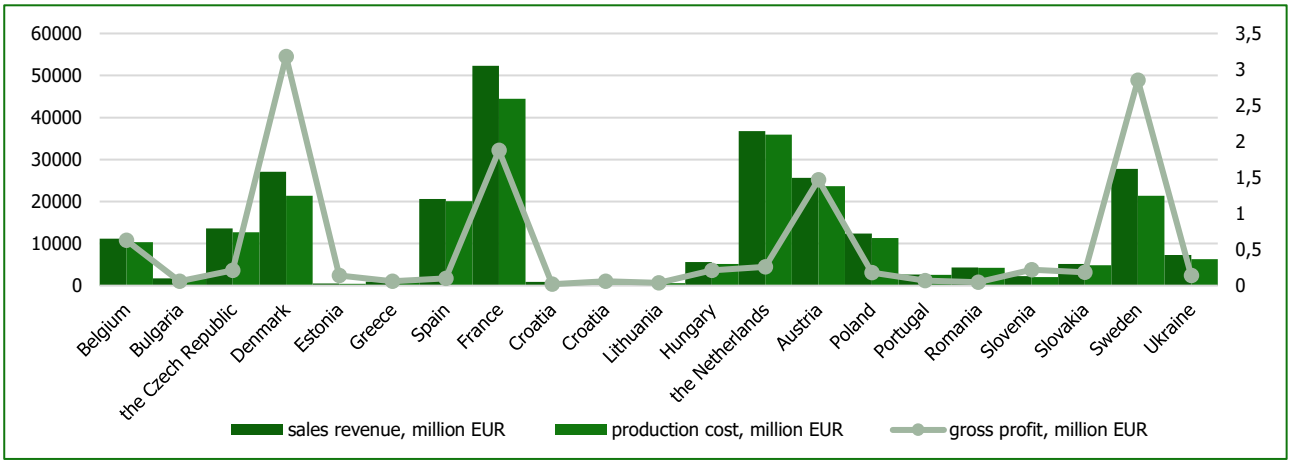

Figure 1. The turnover and the costs of EU and Ukraine machine-building enterprises in 2020. *(Source: calculated and constructed by the authors according to data [9;10]; Ukrainian data converted into EUR million by the author at the official exchange rate of the National Bank of Ukraine in 2020 [11])*

The figures for Germany and Italy are missing from the presented graph, as they are too significant compared to the others. Thus, in Germany, the total revenue of enterprises from the sale of machine-building products amounted to EUR 292.6 billion, and in Italy – EUR 109.3 billion. And if at the same time, the German enterprises received a significant amount of gross profit, then the Italian ones - only a loss, which indicates that they sell their own products at prices below the cost price.

Among those presented in Figure 1 countries, there are actually three approaches to pricing. The first of them consists of practically identical indicators of revenue and cost of production of machine-building products, that is, in sales almost at cost price. Such a situation is observed in the machine-building industry of Bulgaria, Greece, Croatia, Lithuania, Latvia, Romania, Portugal and Slovenia.

The second approach is characterized by the presence of relatively low markups on the products of the machine-building industry, but it allows enterprises to receive fairly significant amounts of gross profit. We can note its use in Belgium, the Czech Republic, Hungary, Spain, Estonia, Poland, the Netherlands, Slovakia and Ukraine.

The third approach to pricing of own products is typical for countries with mostly higher revenue in the machine-building sector. It is significant volumes of revenue (that is, actually high demand for products) that enable enterprises to set a high level of prices. Such countries include, in addition to Germany, Denmark, France, Austria and Sweden. In this aspect, we can note that although the gross profit rate in the machine-building industry of Ukraine is not the lowest among the studied countries, it is too low in comparison with the leaders.

In terms of the number of machine-building industry enterprises, the countries of the European Union are very heterogeneous (Figure 2). At the same time, in countries with a significant number of machine-building enterprises, the number of workers employed at machine-building is significantly higher, although there are some exceptions.

Thus, in Hungary, where more than 2,200 enterprises operate in the machine-building sector, the number of people employed there is about 56,000, which is the lowest indicator among this group of countries. For example, in Sweden, a slightly smaller number of enterprises employ more than 81.7 thousand people.

It is also worth noting the very significant difference in the number of employees between German and Italian machine-building enterprises, while the number of machine-building enterprises in these countries is the highest among others,

which allows us to conclude about the predominance of large-scale production entities in Germany and, on the contrary, saturation of Italian machine-building sector by small enterprises.

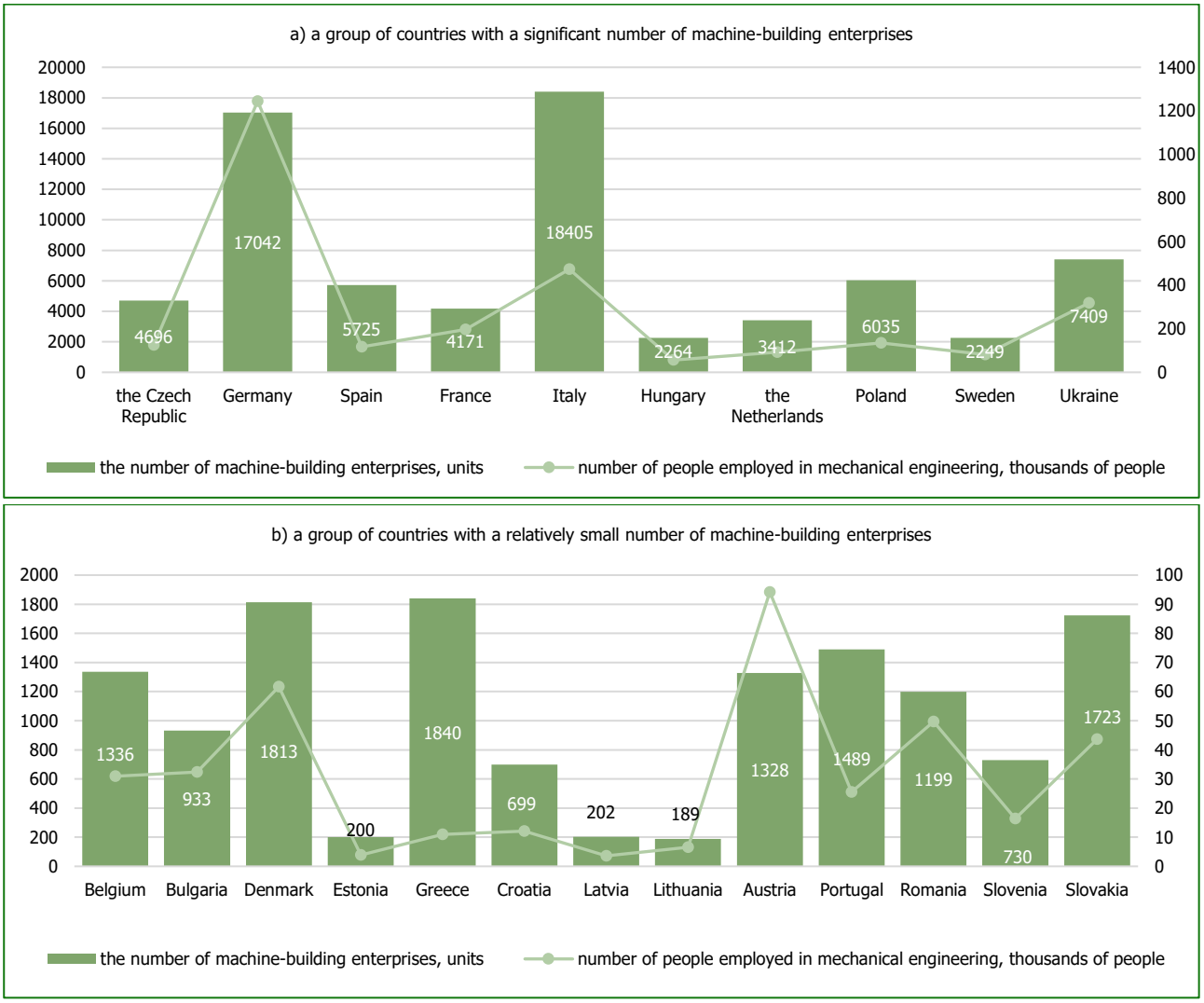

Figure 2. Indicators of the number of machine-building enterprises and employed people in machine-building in the particular EU countries and Ukraine in 2020. *(Source: calculated and built by the authors according to data [9; 10])*

As for groups of countries with a relatively small number of machine-building enterprises, it is worth paying attention to the indicators of the machine-building sector of Greece and Austria. Thus, only 11,000 people are employed at 1,840 enterprises in Greece, which is quite similar to the Italian model of machine-building enterprises. On the other hand, the situation in Austria is the opposite: there are more than 94,000 employed persons at 1,328 enterprises, i.e., it is observed similar features as in Germany. In this aspect, it is appropriate to note that the mentioned countries have common trends regarding the profitability of the machine-building industry - it is at a very high level in the enterprises of Austria and Germany, while in Greece and Italy, it is too low or even negative. That is, to sum up, large machine-building enterprises operate with higher profitability in the European Union machine-building market due to wider financial and market opportunities in varying the quality and competitiveness of their own products.

Another conclusion from the obtained analytical results is that the Ukrainian machine-building industry if we compare its general indicators, is not an outsider among the machine-building enterprises of the studied EU countries. However, domestic machine-building products are extremely inferior to competitors in the European market (Figure 3).

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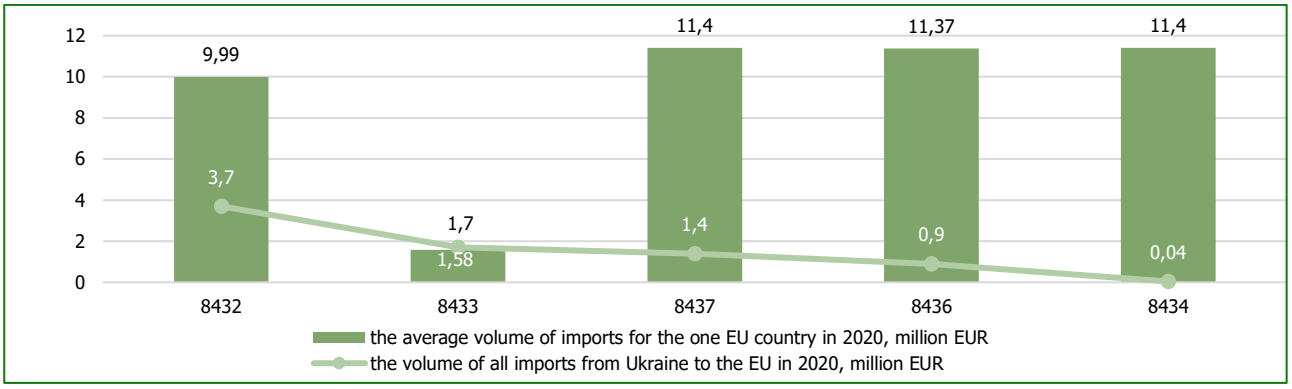

Figure 3. Comparative indicators of the import of machinery and equipment for agriculture from Ukraine to the countries of the European Union in 2020. Note: 8432 – machines for agriculture, forestry and horticulture; 8433 - machines and equipment for harvesting (except combines); 8434 - milking plant and apparatus; 8436 – other equipment for agriculture; 8437 - machines for agricultural work with seeds, grain. *(Source: calculated and built by the authors based on [9; 12; 13])*

The obtained data allow us to conclude that the Ukrainian machine-building industry occupies too small share of the European market. For example, if on average, each of the EU countries imported machines and mechanisms for agriculture, horticulture and forestry for almost EUR 10 million in 2020, then from Ukraine in total, these types of products arrived on the EU market for EUR 3.7 million.

The best situation from the point of view of the sale of Ukrainian machine-building products takes place in the product group «harvesting machines and equipment», where the import rate from Ukraine to the European market exceeds the average rate of import of these products to each of the EU countries. However, even in this case, the size of the import market of agricultural machines in the countries of the European Union is very significant in comparison with the volumes that are sold to them by Ukrainian manufacturers.

The worst situation is observed in the product group «milking machines and devices», according to which the entire volume of products from Ukraine to the EU market in 2020 amounted to EUR 0.04 million, while each of the countries of the European Union imported this product for more than EUR 11.4 million.

So, the prospects for increasing the representation of Ukrainian goods on the European market are extremely high, but it is worth understanding what are the problems of domestic machine-building enterprises in comparison with their European competitors. Because of that, it was carried out a comparative analysis of individual performance indicators of enterprises in the machine-building sector in the studied countries (Table 1).

It is clear that the presented calculation indicators are too generalized, but their application allows not only to compare the situation according to individual parameters of the machine-building enterprises in the countries of the European Union and Ukraine but also to carry out a rating assessment in order to identify the key factors of sustainable development of the machine-building sector.

Table 1. Indicators of machine-building activity of the particular EU countries and Ukraine per enterprise in 2020. *(Source: calculated and constructed by the authors according to data [9; 10]; Ukrainian data converted into EUR million by the author at the official exchange rate of the National Bank of Ukraine in 2020 [11])*

Country	Per company (one employee)							
	The number of employee persons	Output of one employee, million euros	Gross profit, million EUR	Costs per employee and a thousand euro	The amount of investments in tangible assets, million EUR	Investment volume in machinery and equipment, million EUR	The volume of investments in personnel, million EUR	Amount of expenditure on energy resources, thousand EUR
Belgium	23	0.36	0.63	61.04	0.27	0.22	1.41	46.9
Bulgaria	35	0.05	0.061	10.43	0.13	0.09	0.36	34.2
Czech Republic	27	0.11	0.21	21.85	0.11	0.08	0.58	40.3
Denmark	34	0.44	3.18	75.29	0.47	0.34	2.56	30.7
Germany	73	0.24	2.00	66,67	0.45	0.34	4.87	142.5
Estonia	20	0.12	0.14	26.70	0.09	0.05	0.53	32.0
Greece	6	0.09	0.062	18,29	0.01	0.01	0.11	6.1
Spain	21	0.18	0.10	43.20	0.10	0.07	0.89	26.5
France	47	0.27	1.88	62.47	0.39	-	2.94	66.9

(continued on next page)

Table1. *Continued.*

Country	Per company (one employee)							
	The number of employee persons	Output of one employee, million euros	Gross profit, million EUR	Costs per employee and a thousand euro	The amount of investments in tangible assets, million EUR	Investment volume in machinery and equipment, million EUR	The volume of investments in personnel, million EUR	Amount of expenditure on energy resources, thousand EUR
Croatia	17	0.07	0.02	16.33	0.04	0.02	0.28	22.3
Italy	26	0.23	-0.15	47,21	0.17	0.13	1.21	12.8
Latvia	18	0.08	0.059	17.15	0.08	0.02	0.30	59.4
Lithuania	35	0.09	0.04	18.46	0.19	0.09	0.65	26.5
Hungary	25	0.10	0.21	17.54	0.16	0.12	0.43	38.1
Netherlands	27	0.40	0.26	72.00	0.23	0.16	1.94	35.5
Austria	71	0.27	1.47	66.72	0.57	0.37	4.73	107.5
Poland	22	0.09	0.183	17,20	0.10	0.07	0.38	28.5
Portugal	17	0.10	0.07	22.15	0.12	0.08	0.38	18.6
Romania	41	0.09	0.05	14.81	0.29	0.18	0.61	63.5
Slovenia	22	0.14	0.22	30.82	0.14	0.10	0.69	42.7
Slovakia	25	0.12	0.184	21.98	0.18	0.13	0.56	66.5
Sweden	36	0.34	2.85	63.60	0.27	0.19	2.31	57.7
Ukraine	43	0.02	0.14	1.23	1.16	0.03	0.05	27.9

Thus, analyzing the number of employees at one machine-building enterprise in the above countries, we should note that Greece is an outsider according to this indicator, that is, the Greek machine-building industry is mainly represented by small enterprise, although the average output of one worker in the machine-building sector in Greece is 0.09 million euros per year, which is significantly higher compared to the output of those employed at machine-building in Bulgaria, Croatia, Latvia, and Ukraine. In general, it is worth noting here that although Ukrainian machine-building enterprises are among the top 5 in terms of the number of employees, in terms of their output, they are far behind even the EU outsider - Bulgaria. In this context, the key conclusion is the presence of unproductive employment and unreasonably large staff of administrative apparatus in the machine-building sector of Ukraine.

The highest production rates are typical for machine-building enterprises in Belgium, Denmark, the Netherlands and Sweden, i.e., for countries in which the average estimated number of employees per enterprise is low, and therefore, in this context, we can talk about a high level of efficiency in the formation of personnel. For example, in Germany, the indicator of average earnings per employee lags far behind not only the leaders but also a number of other studied countries, which allows us to talk about the presence of problems somewhat similar to Ukrainian enterprises - the presence of an expanded staff of administrative and management personnel.

If we talk about the average indicator of gross profit per machine-building enterprise, then we can note here that Ukrainian machine-building is in 13th place among the studied list of countries. However, at the same time, it is advisable to pay attention to the fact that many European manufacturers actually sell their products at cost price (like Italian ones, for example) in order to increase and maintain their market share, while Ukrainian manufacturers are not in a hurry to take such steps that, perhaps, is manifested in the significant difficulties of bringing products of domestic engineering to the EU market.

Another important, from our point of view, aspect that is worth paying attention to is the average volume of expenses per employee in the machine-building sector. Thus, in Ukraine, it amounts to EUR 1.23 thousand per year, while among the studied EU countries, the lowest level of costs per employee in the machine-building industry is EUR 10.43 thousand - in Bulgaria. Here it is appropriate to note that among the analyzed EU countries, according to this parameter, Bulgarian machine-building is an absolute outsider, because in Romania (21st place out of 22 countries) the average costs per employee per year are EUR 14.81 thousand. That is, the employees of Ukrainian machine-building enterprises are extremely low-paid and, at the same time, their number is quite significant compared to other countries of the European Union, which, from our point of view, is one of the evidences of a low level of technology and automation of production processes, along with low-efficiency formation of regular number of personnel.

The next point, which is quite often emphasized by researchers of the specified issue [14; 15], is an excessively high cost of energy resources for machine-building enterprises. However, the given calculations allow us to conclude that representatives of the Ukrainian engineering industry are in the group of countries that spend the least amount of money on paying for the use of energy resources in the process of functioning (Figure 4).

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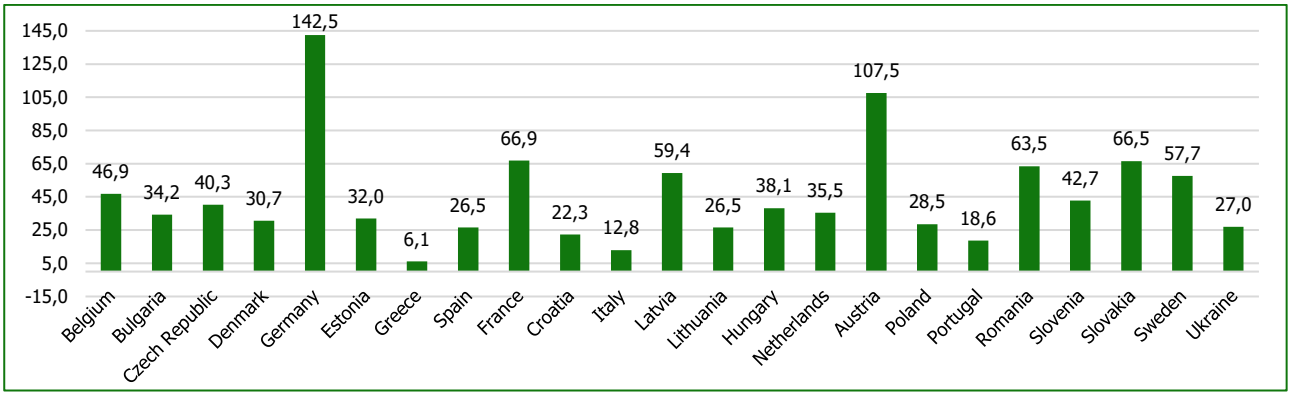

Figure 4. The amount of expenses on energy resources per machine-building enterprise in the EU and Ukraine in 2020*, thousands EUR. *(Source: calculated and built by the author according to data [9; 10]; Ukrainian data converted into EUR million by the author at the official exchange rate of the National Bank of Ukraine in 2020 [11])*

As shown by the given data, only in Greece, Italy, Lithuania and Portugal the average indicators of expenses of enterprises of the machine-building sector on energy resources are lower than in Ukraine. At the same time, taking into account the previous results of the analysis, i.e., the presence of a significant number of small producers in Greece and Italy, this can explain the relatively small amounts of their expenses for payment of the cost of energy resources used in the process of functioning

As for Portugal, it is precisely in this country of the European Union, according to the data of the European tracker of electricity prices (European power price tracker) [16], is the cheapest cost of electricity. So, it is wrong to talk about the extremely high cost of energy resources in Ukraine for machine-building enterprises - as we can see, the problem is not in the cost at all, but in the inability or unwillingness of the administrative apparatus to use these resources effectively.

In addition, it is advisable to pay attention to the fact that in Germany machine-building enterprises on average spend about EUR 142.5 thousand every year on paying for energy resources and, at the same time, have the opportunity to receive about EUR 2 million in gross profit. In the same way, we can talk about machine-building enterprises in Sweden, France, etc. In other words, the cost of energy resources is not a determining factor in the competitive advantages of one or another machine-building product and is easily levelled by effective management, regarding which, unfortunately, there are quite a lot of questions specifically in the Ukrainian machine-building industry. In particular, this assumption is confirmed by the average indicators of investment investments of machine-building enterprises.

Thus, the average indicator of investment in tangible assets per one machine-building enterprise is the highest in Ukraine - domestic manufacturers invest an average of EUR 1.16 million euros in tangible assets every year, despite the fact that the leader in this indicator among the EU countries - Austria - is characterized by the value of this parameter at the level of only EUR 0.57 million. That is, in the machine-building industry of Ukraine, as it turns out, there are significant amounts of financial resources, which, moreover, are actively invested in material assets. However, the most important thing is that all this mass of resources is practically not invested in machines and equipment. Thus, in 2020, machine-building enterprises of Ukraine invested in the renewal of machines and equipment only 0.03 million of the EUR 1.16 million spent on material assets, that is only 2.6% (Figure 5).

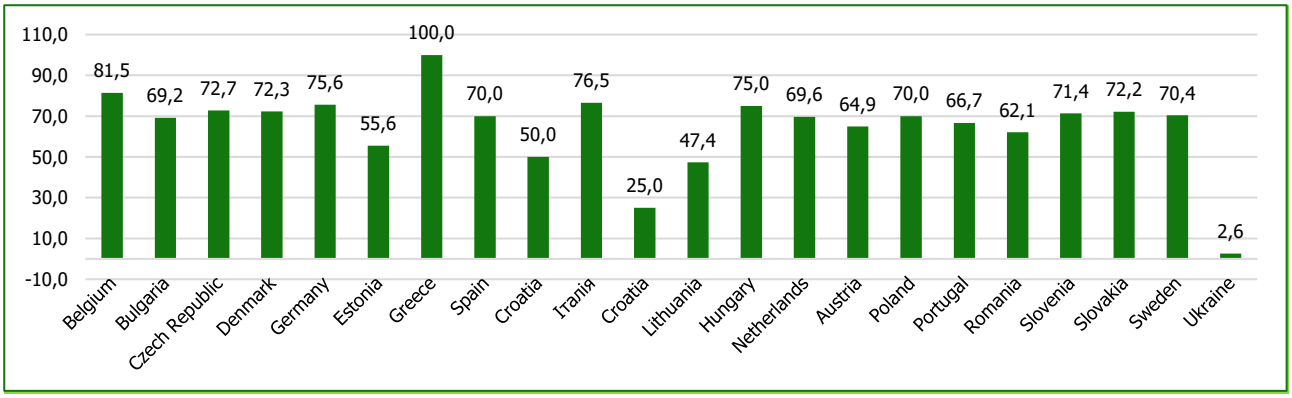

Figure 5. The share of investments in machines and equipment from the total amount of investments in tangible assets by machine-building enterprises of the EU countries and Ukraine in 2020, %. *(Source: calculated and constructed by the authors according to data [9; 10])*

Such a situation is frankly negative for domestic machine-building and, most likely, it is the key factor in the high level of technological lag of Ukrainian machine-building products from its European counterparts. After all, as we can see, in the leading countries of the EU machine-building industry, about 70% of the total investment in tangible assets is spent every year on the renewal of machines and equipment.

And the next most problematic moment of domestic machine-building is investment in personnel. So, if you look at the average indicators of investments in personnel per one machine-building enterprise of the EU countries, the undisputed leaders here are Germany with investments of EUR 4.87 million every year in the development and capacity building of employees, and Austria with an indicator of EUR 4.73 million. Machine-building enterprises in Denmark, Austria, the Netherlands and Sweden invest on average from EUR 2 million to EUR 3 million in their own personnel during the year. Machine-building enterprises in Greece have the lowest amount of investment in personnel, but they invest about EUR 0.11 million in its development every year on average. On the other hand, in Ukraine, the average amount of investment in personnel by one enterprise is only EUR 0.05 million, that is, about EUR 50 thousand per year or 1.5 million UAH (at the average exchange rate in 2020).

So, the conducted analysis allows us to talk about the presence of significant prospects for Ukrainian manufacturers in the European market, which, however, are almost not used due to inefficient and low-quality management, which leads to its saturation with machine-building products of other countries and regions.

In addition, it is important to note the fact that Ukraine is among the five countries from the researched list, in which, during the period 2011–2020, it was recorded a decrease in the average earnings per employee. In addition, the machine-building enterprises of our country, in comparison with the indicators of 2011, reduced the volume of investments in machines and equipment by almost 62%, while the volume of investments in material assets as a whole increased by 10%. That is, in this case, once again our opinion is confirmed about unproductive and ineffective spending of investment resources by machine-building enterprises.

DISCUSSION

Studying the prospects of the products of Ukrainian manufacturers of agricultural machinery on the market of the European Union, it was confirmed the conclusions regarding the significant role of the agricultural machine-building sector in the development of the domestic economy.

However, at the same time, the conducted analysis made it possible to largely refute the researchers' statements [2, 5, 6] regarding insufficient or absent state support and, in particular, state support for investment and innovative development of domestic agricultural machine-building enterprises as a key problem in shaping the competitiveness of their products on the European market.

At the same time, although we agree with the statement given in [6] that Ukraine has quite high opportunities for the development of agricultural machine-building, but does not use them effectively enough, we must add that in the context of the results of our research, inefficient use of opportunities and resources takes place at the most enterprises. Of course, the approach to the analysis proposed by us made it possible to obtain quite generalized comparative results regarding the main indicators of the activity of manufacturers of agricultural machine-building products in Ukraine and the EU countries, which is the main limitation in the interpretation of the obtained results. In addition, certain inaccuracies are possible when converting statistical indicators of agricultural machine-building in Ukraine into the official currency of the European Union.

In general, the given limitations do not give grounds to talk about the falsity of the conclusions and the obtained results, especially in the context of the fact that Ukrainian manufacturers spend significantly less money on the maintenance and development of personnel, payment for energy carriers used in the production process and, especially, on updating the technological park of production equipment. The obtained data proved that domestic enterprises spend at least three times more resources on updating material assets, compared to enterprises of the EU countries, but only about 3% of them are headed directly to production machines and equipment.

The given data, thus, completely refute the claims of the researchers regarding the lack of resources among domestic producers for innovative activities, technological renewal, etc. and the need for state support. The main role of the state in this case should consist of creating development opportunities and not hindering their use of manufacturers. On the other hand, the presence of significant prospects for the development of export markets is levelled by most enterprises and the generally low level of quality of use of their available resources.

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In addition, although we agree with the conclusions of the Turkish researcher [4] regarding the high level of consumer requirements for agricultural machinery products, we cannot but note that in most cases, the machines characterized by a higher level of competitiveness, i.e. the most acceptable ratio of cost and quality parameters for the consumer, will be in higher demand, which requires special attention not only to product design but also to pricing processes and effective cost management in the agricultural sector.

CONCLUSIONS

Agricultural machine-building in Ukraine is characterized by a significant product range and a wide export coverage, however, its products have a very narrow representation on the European Union market. The conducted research made it possible to note the presence of real prospects and opportunities for domestic machine-building enterprises to compete with European ones, which, however, can be levelled both by significant shortcomings and miscalculations in the management of the activities of business entities in general and by insufficient attention to the issues of ensuring the necessary level of quality and competitiveness of own products.

The key problems of domestic representatives of the machine-building sector are the low quality of investment costs and, in particular, investing in machines, equipment and personnel according to the residual principle, which leads to both significant technological lag behind their European competitors and lags in terms of individual labour productivity indicators of personnel. Therefore, in further studies, it is advisable to focus on modelling the results of the economic activity of specific manufacturers of agricultural machine-building products, taking into account the complete change of investment preferences and marketing policy in order to forecast the prospects of effective representation of their products on the EU market.

Agricultural machine-building in Ukraine is characterised by a significant product range and wide export coverage, but at the same time, its products have a very narrow representation in the EU market.

In the course of the study of the problems and prospects of Ukrainian producers of machine-building products in the EU market, a comparative assessment of certain indicators of the functioning of the machine-building sector of 22 EU countries and Ukraine was carried out. This allowed us to establish that domestic machine-building products are losing out to competitors in the European market, although the industry is not an outsider in terms of key indicators.

It is worth noting that there are real prospects and opportunities for domestic machine-building enterprises to compete with European ones, which, however, can be levelled by significant shortcomings and miscalculations in the management of business entities in general, as well as insufficient attention to ensuring the required level of quality and competitiveness of their own products.

The Ukrainian machine-building sector is generally characterised by relatively low margins and higher gross profits, compared to EU outsiders, due to economies of scale.

A study of certain parameters of the machine-building industry in the EU and Ukraine per enterprise has revealed fundamental differences between Ukrainian and European machine-building producers in terms of investment in personnel and renewal of fixed assets.

The low quality of investment expenditures and, in particular, residual investment in machinery, equipment and personnel, leads to both a significant technological lag behind their European competitors and a lag in terms of individual labour productivity. Therefore, in further research, it is advisable to focus on modelling the results of the economic activity of specific agricultural machine-building producers, taking into account a complete change in investment preferences and marketing policy in order to predict the prospects for effective representation of their products in the EU market.

ADDITIONAL INFORMATION

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REFERENCES

1. Vitiuk, Anna V., Kepko, Valentyna M., and Javela, Karlush. (2019) Exports of the Machine-Building Products to the European Union Member States. *Business Inform, 3,* 37-43. https://doi.org/10.32983/2222-4459-2019-3-37-43
2. Kovalenko, H., and Kovalenko, O. (2021). Current state of competitiveness of agricultural machine building enterprises. *Efektyvna ekonomika, 3*. https://doi.org/10.32702/2307-2105-2021.3.79
3. Westkämper, E. (2014). Towards the Re-Industrialization of Europe. A Concept for Manufacturing for 2030. Stuttgart, Germany: Springer-Verlag Berlin Heidelberg, 112 p. https://doi.org/10.1007/978-3-642-38502-5_6
4. Özogül, G. (2018). An overview of the world agricultural machinery manufacturing: sector. *Journal of agricultural machinery science*, *14* (1), 23–30. https://dergipark.org.tr/en/download/article-file/621888
5. Krekhivskyi, O. V. (2022). State Aid for Development of Manufacture of Agricultural Machinery: Economic and Statistical Aspect. *Statistics of Ukraine, 96*(1), 67-81. https://doi.org/10.31767/su.1(96)2022.01.07
6. Redkva, O. Z. (2019). Analysis of the main indicators of the functioning and development of agricultural machine-building in Ukraine. *Scientific notes of V.I. Vernadsky Taurida National University. Series: Economics and management, 4(30*(69), 30–36. https://doi.org/10.32838/2523-4803/69-4-31
7. Vitiuk, A., & Smetaniuk, O. (2020). Economic relationship between the development of agriculture and agricultural machine-building. *Problems of the economy, 4*(46), 134-145. https://doi.org/10.32983/2222-0712-2020-4-134-145
8. Ukrainian agribusiness. Infographic report 2019/2020. (n.d.). https://agribusinessinukraine.com/get_file/id/infographicsukrainianagro1920-en.pdf
9. Official exchange rate of the hryvnia to foreign currencies (average for the period). National Bank of Ukraine. (n.d.). https://bank.gov.ua/files/Exchange_r.xls
10. Performance indicators of business entities. State Statistics Service of Ukraine. (n.d.). https://ukrstat.gov.ua/
11. Annual detailed enterprise statistics for industry / Manufacture of machinery and equipment. Eurostat data browser. (n.d.). https://ec.europa.eu/eurostat/databrowser/view/SBS_NA_IND_R2__custom_7049105/default/table?lang=en
12. Statistical export and import of goods. State Customs Service of Ukraine. (n.d.). https://customs.gov.ua/web/content/3467?unique=04391de93ee9e 0931de88adfa45f9bcdff179ee2&download=true
13. Sold production, exports and imports. Eurostat data browser. (n.d.). https://ec.europa.eu/eurostat/databrowser/view/DS-056120__custom_7098084/ default /table?lang=en
14. Hryhorenko, Ye. O. (2014). Analysis of the influence of external and internal factors on the formation of a crisis state of machine-building enterprises. *Reporter of the Priazovskyi state technical university. Section: Economic sciences, 28*, 267–272. http://nbuv.gov.ua/UJRN/VPDTU_ek_2014_28_45
15. Kolisnyk, M. K. (2009). Anti-crisis management of industrial and economic structures in machine-building: monograph. Lviv: Lviv Polytechnic, 206 p.
16. Nyzhnyk, V. M., & Polinkevich, O. M. (2012). Methods of assessing the influence of environmental factors on business processes of industrial enterprises. *Economic sciences. Seies: Economics and management, 9*(2), 334–345. http://nbuv.gov.ua/UJRN/ecnem_2012_9%282%29__49
17. European power price tracker. (n.d.). https://ember-climate.org/data/data-tools/europe-power-prices/
18. SatyaNarendra, Y. (2020). Quality management in the age of industry 4.0. LTI: A Larsen and Turbo

DOI: 10.55643/fcaptp.6.53.2023.4191

group company. https://www.ltimindtree.com/wp-content/uploads/2020/05/Quality-Management-In-The-Age-Of-Industry-4.0.pdf?pdf=download

19. Panggabean, D. M. (2022). Product quality planning and control analysis on cv. Ananda Water Bandar Baru. *International Journal of Economics*, *1*(1), 203-218. https://doi.org/10.55299/ijec.v1i1.116
20. Khalifa, I. (2020). Quality management in theory. *International Journal of Scientific and Research Publications, 10*(1), 492–495. http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9776
21. Dahlgaard, J. J., Reyes, L., Chen, C., & Dahlgaard-Park, S. M. (2019). Evolution and future of total quality management: management control and organisational learning. *Total quality management and business excellence*. https://doi.org/10.1080/14783363.2019.1665776
22. Tiutiunyk, I., Kuznetsova, A., & Spankova, J. (2021). Innovative approaches to the assessment of the impact of the shadow economy on social development: an analysis of causation. *Marketing and Management of Innovations, 3*, 165-174. https://doi.org/10.21272/mmi.2021.3-14
23. «Competitiveness». Merriam-Webster.com Dictionary. (n.d.). https://www.merriam-webster.com/dictionary/quality

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ОЦІНЮВАННЯ ПЕРСПЕКТИВ УКРАЇНСЬКОЇ СІЛЬСЬКОГОСПОДАРСЬКОЇ ТЕХНІКИ НА РИНКУ ЄВРОПЕЙСЬКОГО СОЮЗУ

У статті здійснено огляд особливостей функціонування та аналіз показників діяльності машинобудівних підприємств 22-х країн Європейського Союзу та України. Досліджено показники доходності машинобудівних підприємств з акцентом на особливості підходів до ціноутворення. Здійснено порівняльний аналіз кількості машинобудівних підприємств і кількості зайнятих у машинобудуванні по кожній країні. Проаналізовано показники імпорту машин і обладнання для сільського господарства з України до країн ЄС в розрізі основних товарних груп. Здійснено порівняльний аналіз діяльності машинобудівної промисловості країн ЄС та України в розрахунку на одне підприємство з особливою увагою до показників витрат та інвестицій. Проаналізовано обсяги інвестицій у матеріальні активи, машини та обладнання, персонал, витрати на енергоресурси. Оцінювання зазначених показників функціонування машинобудівних підприємств Європейського Союзу та України дозволило визначити ключові проблеми вітчизняних машинобудівних підприємств у контексті забезпечення конкурентоспроможності їхньої продукції на ринку Євросоюзу. Зокрема встановлено наявність кардинальних розбіжностей між українськими та європейськими машинобудівними виробниками щодо обсягів інвестицій у персонал та оновлення основних виробничих засобів, що призводить до значного технологічного відставання від європейських конкурентів, також відставання за показниками індивідуальної продуктивності праці персоналу.

Ключові слова: сільськогосподарське машинобудування, виробники сільськогосподарських машин, країни Європейського Союзу, Україна, ринок ЄС, імпорт сільськогосподарських машин

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