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GLOBAL ELECTRIC VEHICLE MARKET AND PROSPECTS FOR UKRAINE'S CONTRIBUTION TO ITS DEVELOPMENT

The article discusses the features and reasons for the development of electric vehicles in the context of intensifying globalization processes and limited resources. It is substantiated that motorization is a key factor in the development of developed countries. Therefore, the presence of a competitive and well-functioning automotive market is an important condition for successful economic growth. The experience of foreign countries in stimulating the production and consumption of electric vehicles has been studied.

Current trends in the development of the global electric vehicle market have been analyzed. It has been found that more than a third of the global market (over 36%) of electric vehicles is occupied by three manufacturers: BYD, Tesla and Volkswagen. An analysis of the global electric vehicle market by country shows that three countries are the leaders in electric vehicle sales: China, Europe, and the United States. It has been observed that China is ahead of other leading countries in terms of electric vehicle consumption, and the following companies have the greatest demand for electric vehicles in its market: BYD, SAIC and Tesla. Chinese manufacturers are showing faster growth rates in electric vehicle production than leading American and European companies. The article classifies the problems of development of the global market for electric vehicles: the global energy crisis, shortage of resource

components for electric vehicles, the Covid-19 pandemic, uneven development of countries, institutional factors. Taking into account current global development trends, we conclude that the global electric vehicle market will develop at a rapid pace, effectively solving the problems hindering the growth of electric vehicle production.

It has been substantiated that Ukraine has the potential to produce electric vehicles. Using the latest Industry 4.0 technologies and research and production potential, Ukraine can produce cars of a new generation, since developments in this area do not stop. Based on the graphic of the Ukrainian alphabet «Ruthenia», a sample trademark for the national electric vehicle has been developed and proposed. It has been established that this graphic most closely matches the functions and requirements of developing a national trademark. The proposed trademark reflects the features of the national manufacturer, indicates the latest technologies and will attract the attention of consumers.

Keywords: *alternative energy sources, automotive industry, electric vehicle, development, regional cluster, global market, national market, trademark*

JEL classification: *F20, F43, F47*

У статті досліджено особливості та причини розвитку електромобілів в умовах посилення глобалізаційних процесів та обмеженості ресурсів. Обґрунтовано, що автомобілізація є ключовим фактором розвитку розвинутих країн світу, тому наявність конкурентоспроможного та сформованого автомобільного ринку є важливою умовою успішного економічного зростання. Вивчено досвід зарубіжних країн, щодо стимулювання виробництва та споживання електромобілів.

Проаналізовано сучасні тенденції розвитку світового ринку електромобілів. Виявлено, що понад третину світового ринку електромобілів (понад 36%) займають три виробники: BYD, Tesla та Volkswagen. Аналіз світового ринку електромобілів за країнами свідчить, що лідерами із продажів електромобілів є три регіони: Китай, країни Європи та США. Відслідковується, що Китай випереджає інші країни-лідери із споживання електромобілів, а на його ринку найбільший попит на електромобілі мають наступні компанії: BYD, SAIC і Tesla. Китайські виробники демонструють вищі темпи зростання у виробництві електромобілів, ніж американські та європейські фірми-лідери. Здійснено класифікацію проблем розвитку світового ринку електромобілів: світова енергетична криза, дефіцит ресурсних компонентів для електромобілів, пандемія Covid-19, нерівномірність розвитку країн світу, інституційні чинники. Враховуючи сучасні тенденції глобального розвитку, дійшли висновку, що світовий ринок електромобілів буде стрімко розвиватися, ефективно вирішуючи проблеми які стримують темпи зростання виробництва електромобілів.

Обґрунтовано, що в Україні є потенціал щодо виробництва електромобілів. Використовуючи новітні технології Індустрії 4.0 та науково-виробничий потенціал, Україна може виробляти автомобілі нового покоління, оскільки розробки у цій галузі не припиняються. На основі графіки української абетки «Рутенія» розроблено та запропоновано зразок товарного знаку для національного електромобілю. Виявлено, що ця графіка найбільше відповідає функціям та вимогам до розробки національного товарного знаку. Запропонований товарний знак відображає особливості національного виробника, вказує на новітні технології та буде привертати увагу споживачів.

Ключові слова: *альтернативні джерела енергії, автомобільна промисловість, електромобіль, розвиток, регіональний кластер, світовий ринок, національний ринок, товарний знак*

JEL classification: *F20, F43, F47*

Statement of the problem. Due to the sharp deterioration of the global environmental situation and the reduction of natural resources that provide fuel for cars, the development of environmentally friendly vehicles that use alternative energy sources

is becoming increasingly popular. Electric vehicles are intended to become such vehicles. New technologies, changing consumer preferences, and increased regulatory efforts by national governments will help transform the automotive industry in the medium term.

Electric transport is one of the current trends in the automotive industry, which contributes to the rational use of resources and the widespread adoption of clean and environmentally friendly technologies. Its benefits include energy efficiency, reduction of greenhouse gas and harmful substances, lower air pollution, urban environmental improvement, and improved road safety.

In Ukraine, consumer demand is growing and shifting towards environmentally friendly transport. The industry is driven by a competitive environment and the coordinating role of government institutions. Successful incentive tools and defined goals influence the development of the automotive industry as a whole. For example, to stimulate the development of electric vehicles, the EU plans to set zero emissions for new cars starting in 2035. The US plans to increase the share of electric vehicle sales to 50% of total sales by 2030. It is important to note that in order to achieve such goals, it is necessary to develop related industries and infrastructure to serve this type of transport in parallel.

Currently, the world economy is experiencing increased competition in many segments of the automotive market. In order to work effectively in a tough competitive environment, many companies adopt innovative production models and implement the latest technologies. Others prefer to invest in advertising creative that they believe should maximize the product/service among many similar products/services of competitors. Economic factors are one of the main challenges for the development of innovative solutions in the automotive industry and the gradual transition to energy from renewable energy sources. The current situation shows that fuel cannot be considered as a resource of the future for the transport sector due to global warming and relative scarcity of resources. As a result, over the past decade, nearly all major automotive companies have contributed to electric vehicle research and development. The main factors that lead to the rapid development of the global electric vehicle market are environmental concerns regarding environmental pollution and CO₂ emissions, favorable national policies for

the introduction of electric vehicles, and significant investments by electric vehicle manufacturers.

Therefore, the study of the peculiarities of the development of the global market of electric vehicles and the development of the national market is an urgent issue today.

Analysis of recent studies and publications. Many scientific works of domestic and foreign scientists are devoted to the problems of evaluation and development of the modern market of electric vehicles. Among them are the works of Ukrainian scientists, in particular, Oleshko T.I. [1], whose works are devoted to issues of the automotive industry in the context of increasing the share of electric vehicles in the development of this industry. The scientific works of Yu.V. Shevchuk and M.I. Lalakulich are devoted to the issues of development prospects and competitiveness of electric vehicles in Ukraine. [2], comparing the competitiveness of electric vehicles with traditional gasoline and diesel vehicles. The works of Girin V.S. [3] are devoted to the study of the sustainable state of electric vehicles with an indication of the problems that need to be urgently addressed in order for electric vehicles to become a full-fledged replacement for traditional internal combustion engine vehicles in Ukraine.

The works of foreign scholars, including Najmeh Neshat, Murat Kaya, and Sara Gaboulian Zare, are also devoted to the analysis of the policy of introducing electric vehicles in European countries [4]. Catherine Monica Bumann and Josep Rialp Criado [5] in their works deal with the study of consumer preferences for electric vehicles. J. Barkenbus [6] in his research analyzes the prospects for the development of electric vehicles in the world. N. Adnan, S. Nordin, I. Rahman [7] in their works study and forecast the development of the global electric vehicle market.

It should be emphasized that despite the significant scientific interest of specialists in this topic in Ukraine, numerous theoretical, methodological and practical issues remain unsolved. The incompleteness of scientific developments and the essential practical

significance of this problem for the country's economic development justify this study.

The purpose of the study: to analyze the trends in the global electric vehicle market and to identify potential opportunities for the national production of electric cars.

Presentation of the main research material with full justification of the scientific results obtained.

I. Current trends in the development of the global electric vehicle market.

Automobilization is a key factor in the development and prosperity of developed countries, which is why a competitive and well-functioning automotive market is an important condition for successful economic development. An analysis of the situation in the global automotive market shows that the automotive industry is operating in a digitalized environment along with the introduction of new advanced technologies, with electric vehicles driving the growth in almost all segments (from cars to trucks and buses). The growing need for energy resources and their gradual depletion, high prices for primary energy sources against the backdrop of acute environmental problems only increase the substitution of vehicles in the market in favor of electric vehicles. The global electric vehicle market has been growing rapidly in recent years. According to experts, by 2026, more than 50% of electric vehicles sold worldwide will be supplied by Chinese brands. As of early 2023, more than 15 Chinese companies offered electric models, and their prices are lower than those of foreign competitors. At the same time, Chinese manufacturers demonstrate higher growth rates in the corresponding segment than such large and well-known corporations as General Motors, Volkswagen, and Tesla [8,9,10]. Chinese developers in particular have great growth potential due to favorable access to key raw materials and battery production capacity. Chinese automotive companies that focus on electric vehicles are integrating supply chain planning and transparency software to make more

efficient business decisions and achieve production stability.

It is predicted that by 2025, tech giants will own at least part of the operating system components for 95% of new cars. Moreover, high-tech companies such as Foxconn, Huawei, Alibaba, Xiaomi, Tencent, and Sony will be directly involved in the development, production, and sale of cars.

According to statistics, in 2022, 10.2 million electric vehicles of various types and modifications were sold on the world market, which is 100 times more than in 2012. The following countries became the largest consumers of electric vehicles: China – 5.9 million cars, European countries. – 2.6 million, USA – almost 1 million, South Korea – 131 thousand cars, Japan – about 100 thousand cars (Table 1). It should be emphasized that more than 95% of all electric vehicles sold in the world are in the above countries and regions.

Sales analysis in Table 1 shows that 9 years ago, almost half of all electric vehicles sold in the world were sold in the United States, but now that figure is less than 10%. On the contrary, Europe is accelerating, and there is a logical explanation for this. The availability of energy, especially fuels, is variable in Europe, especially with the 2022 energy crisis, and prices are significantly higher than in the US. On a practical level, the cost of servicing an electric car in Europe is significantly lower than that of an internal combustion engine. An important factor in increasing sales of electric vehicles in Europe is lobbying for the “green agenda”, which has become “absolute” and was updated in 2022, so the transition to carbon neutrality is accelerating.

China is following a similar path, but given its increasingly specific energy balance, the emphasis is also placed on electric vehicles. In 2022, almost 7 million electric cars were sold in China, with a penetration rate well above the industry average of 31.3%. Growth in electric vehicle sales in China is being driven by high oil prices, government subsidies, promotions by auto companies

Table 1

Number of electric vehicles sold in the world, thousand units [11]

	2014	2015	2016	2017	2018	2019	2020	2021	2022
China	15,7	73,0	211,0	339,0	580,0	1090,0	1060,0	1140,0	3250,0
Europe	96,0	188,0	212,0	300,0	390,0	570,0	1380,0	2300,0	2600,0
USA	118,0	114,0	160,0	194,0	360,0	325,0	294,0	630,0	990,0
Germany	13,5	23,0	24,0	54,0	67,0	108,0	390,0	690,0	690,0
UK	14,5	29,0	39,0	49,0	62,0	75,0	178,0	310,0	370,0
France	13,1	22,7	29,4	37,0	46,0	62,0	185,0	300,0	340,0
Norway	21,7	33,9	45,0	62,0	73,0	79,0	106,0	148,0	166,0
Sweden	4,6	8,7	12,9	20,4	29,1	41,0	94,0	135,0	163,0
Korea	1,3	3,4	5,0	14,7	59,4	35,7	39,7	91,0	131,0
Canada	5,1	6,8	11,6	16,7	44,0	51,0	51,0	87,0	107,0
Italy	1,3	2,2	2,7	4,9	9,7	17,5	60,0	138,0	114,0
Netherlands	14,7	44,8	23,1	10,3	27,5	66,9	88,0	95,0	107,0
Japan	32,0	24,0	24,4	54,0	50,0	39,0	30,	45,0	102,0
Switzerland	2,9	5,7	6,1	8,4	9,5	17,3	34,0	54,0	59,0
Denmark	1,7	4,7	1,9	1,3	4,6	9,4	32,0	65,0	57,0
India	1,0	0,5	0,7	0,9	0,9	0,7	3,1	12,1	48,0
Austria	1,7	2,8	5,0	7,1	9,1	11,5	23,6	48,0	47,0
Israel	0,1	0,1	0,1	1,6	3,7	4,8	6,9	24,0	43,0
Australia	1,7	2,8	5,0	7,1	9,1	11,5	23,6	48,0	47,0
Portugal	0,2	1,1	1,8	4,4	8,0	12,7	19,8	29,0	34,0
Finland	0,4	1,7	1,4	3,1	5,7	7,9	17,2	30,0	31,1
New Zealand	0,3	0,5	1,5	3,4	5,6	6,9	5,4	10,3	28,2
Poland	0,2	0,2	0,5	1,1	1,4	2,7	8,2	16,3	25,0
Brazil	0,1	0,1	0,2	0,3	0,3	1,9	2,5	13,9	18,5
Iceland	0,2	0,6	1,2	3,1	3,7	2,6	5,0	9,2	11,9
Mexico	0,0	0,1	0,8	1,2	1,8	1,7	3,8	6,5	8,4
Greece	0,0	0,1	0,1	0,2	0,3	0,5	2,2	7,0	8,3
Turkiye	0,1	0,2	0,1	0,1	0,2	0,3	1,3	3,9	7,5
Chile	0,0	0,0	0,0	0,1	0,2	0,3	0,2	0,6	1,5

and the supply of electronic components from domestic high-tech companies.

It is important to note that the electrification of transportation has a negative impact on the oil industry. According to expert estimates, the oil industry loses about 0.6-0.7 million barrels of oil from the global market every day due to the production and use of electric vehicles. The industry is projected to lose up to 3.5 million barrels of oil per day by 2030 due to increased use of electric vehicles.

When analyzing the global electric vehicle market, it is important to focus on

the production of these products. According to statistics, more than a third of the global market – approximately 36% – is held by three manufacturers. The world's leading manufacturers of electric vehicles include BYD, Tesla, SAIC-GM Wuling, Volkswagen, BMW: in 2022, their total share was 44.0% of total sales (Fig. 1).

The leader in the global electrified car market in 2022 was China's BYD Auto: the company sold more than 1.8 million cars in the analyzed segments. In 2022, the year-on-year growth in deliveries was about 153%, and the share reached about 20%. BYD's

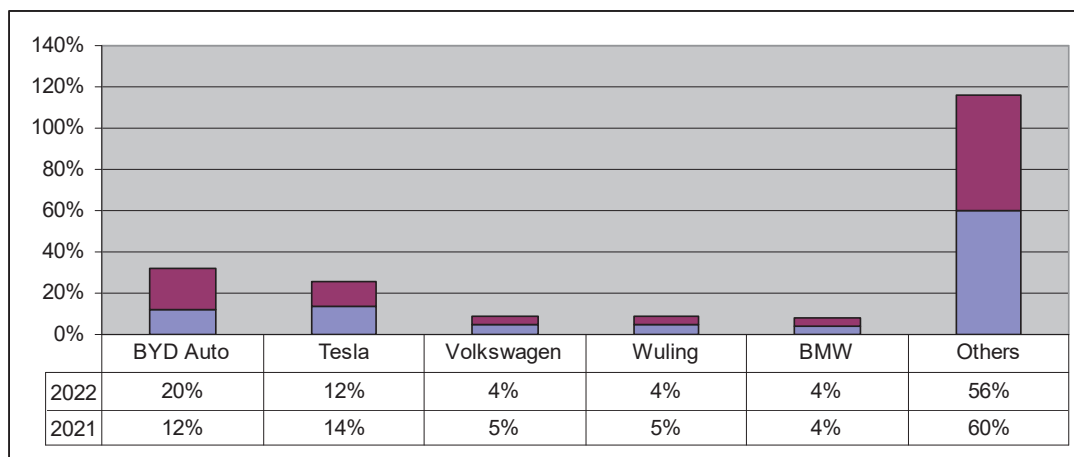


Fig. 1. Manufacturers of the global passenger electric vehicle market in 2022 [12]

three most popular models – Song, Qin and Han – accounted for more than 55% of sales. At the same time, the company sold more PHEV models than BEVs. In 2022, exports amounted to more than 33 thousand units. BYD is forecast to enter several European markets in 2023, which will increase the supply of electrified vehicles.

Tesla took the second place in the ranking of leading suppliers in 2022, having shipped approximately 1.3 million vehicles. By the end of 2022, sales of Elon Musk's company grew by more than 31% year-on-year, while the global share was about 12%. It is noted that the result would have been greater if not for restrictions in China related to the COVID-19 pandemic. Tesla Model Y became the company's most popular model in the European market at the end of 2022.

Volkswagen rounds out the top three: sales of the group's electrified vehicles increased by 23% by the end of 2022 compared to 2021, which allowed it to take 4% of the global market. The most popular models were the VW ID.4 crossover, the VW ID.3 hatchback and the VW ID.5 crossover. Volkswagen expects electric vehicles to account for approximately 25% of its sales by 2026.

If we consider only the Chinese market, which is the largest consumer of electric vehicles, the leaders are BYD, SAIC and Tesla, which account for 53% of electric

vehicle sales. It should be emphasized that in China, the list of the ten largest manufacturers of electric vehicles is dominated by local brands. The exception is the American Tesla, which ranks third with a share of about 10.3% in 2022.

A study of the global electric vehicle market by country shows that three countries are the leaders in electric vehicle sales, as illustrated in Fig. 2.

The leader in global sales of electric vehicles is China with a share of 63.6% in 2022. In second place is Europe with an indicator of approximately 24%. The United States followed with 9.2%. All other regions together accounted for only 3.2% of the total number of electric cars sold. All this suggests that the rapid growth of the market for such cars is explained not only by the manufacturers' desire for electrification, but also by the use of autopilot tools and the development of relevant Internet services. Therefore, all these elements of the electric car market can be provided only by those countries that are moving towards the development of high-tech industries.

Estimates show that in 2025, almost a quarter of all cars sold in the world will be electric, and in 2030 – 41%. That is, there will be a rapid increase in the use of electric vehicles. At the same time, 2/3 of electric cars will be sold in the structure of total sales in Europe in 2030, and at least 75%

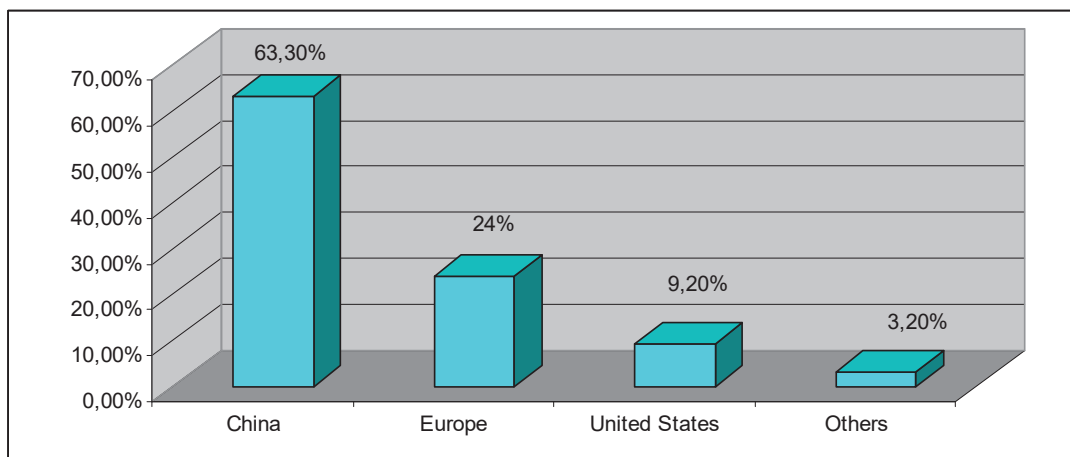


Fig. 2. Sales of electric vehicles in the selected countries in 2022, (% of the world's total) [13]

in Western Europe. According to forecasts, the US intends to increase the production of electric vehicles four times by 2025. It is important to emphasize that the United States was the first to introduce the standard of “car electrification” into mass use, with Tesla as the flagship.

The trends outlined above indicate that the global electric vehicle market will continue to grow rapidly.

II. Challenges for the global electric vehicle market. Given the current geopolitical and macroeconomic environment, the global electric vehicle market is facing a major transformation due to a number of factors.

It is well known that a new product that enters the global or national market will always be subject to constraints on further development. The electric vehicle market is no exception. We have grouped and highlighted all the problems that hinder the development of the electric vehicle market in Fig.3.

One of the main factors of economic growth of any country is the level of availability of energy resources and their efficient use. The energy crisis caused by Russia's invasion of Ukraine has caused an energy crisis not only in Ukraine but throughout the world. We believe these developments will accelerate rather than slow down the global transition from fossil fuels to cleaner technologies, which in turn

will support the development of the electric vehicle market.

Industry is also adversely affected by the sharp rise in prices for raw materials, particularly lithium and nickel. All this leads to an increase in the cost of electric cars themselves and an increase in the cost of maintenance. As a result, the growth rate of sales of electric cars may slow down, and in some regions even stop.

Analysts stress that several years after the outbreak of the COVID-19 pandemic, automakers still cannot foresee the end of the shortage of semiconductor chips. In addition, market participants continue to experience difficulties in purchasing materials for key components of electric vehicles, including batteries. Instead, we emphasize that this period of decline will provide an opportunity for automobile companies to increase their share due to the introduction of advanced IT technologies.

The main goals of 4.0 programs are accelerated growth, modernization and improvement of competitiveness of key sectors, growth of new segments through better preparation for digitalization, adoption of innovations, and new business models. All these facts emphasize that the further a country lags behind Industry 4.0, the less likely it is to produce and consume electric vehicles, as there is no infrastructure to service electric vehicles.

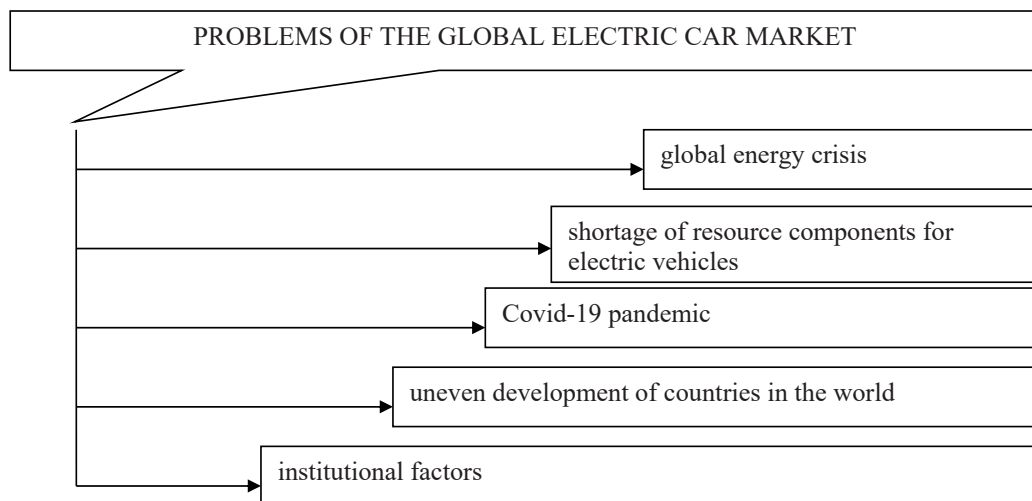


Fig. 3. Classification of problems in the development of the global electric vehicle market
(developed by the authors)

The impact of institutional factors, such as the lack of favorable conditions for the production of electric vehicles (preferential lending and taxation, stimulation of investment processes, etc.), as well as the lack of factors stimulating the demand for these cars (subsidies for the purchase of electric vehicles, tax preferences, “green tariff”), will create obstacles for the development of the electric car market.

III. Peculiarities of the development of the national automotive industry and potential opportunities for the production of electric vehicles in Ukraine.

The development of the Ukrainian automotive industry is characterized by cyclicity. This industry was created over decades from scratch, but during the transition to market-based management, it was almost destroyed completely in a few years. Subsequently, it took a decade to restore it, bringing it to a new technological level. After the global financial crisis of 2008-2009, even more destructive changes took place. After the recession, the gradual recovery of the global economy, the impact of global trends on the development of the automotive industry, and the European integration vector of the national economy began to have a positive effect on the functioning of the automotive industry in Ukraine.

It is worth noting that in the early 90s, Ukraine was among the top 20 countries in the world in terms of passenger car production. The industry was represented by Zaporizhzhia and Lutsk automobile plants, which together produced more than 200 thousand cars. Ukraine entered the year 2022 with only one working manufacturer of passenger cars, the Zakarpattia-based Eurocar, whose activities, like 20 years ago, were again limited to assembling Skoda cars. Production is carried out in small volumes. By the end of 2021, the plant assembled only 3476 cars. From March to May 2022, the plant was idle due to active hostilities, but in June it resumed assembling cars. Currently, the national passenger car production is represented only by “Eurocar”.

The first electric vehicles in Ukraine were officially introduced in 1993. The Zaporizhzhia automobile plant “Komunar” assembled a batch of electric cars based on the “Tavria” ZAZ-1102 for Switzerland. These models were demonstrated at the Swiss exhibition. Unfortunately, there was no continuation of this experiment and the production of electric vehicles was suspended.

The demand in the Ukrainian consumer market for new electric vehicles is satisfied by imports. Unfortunately, there is no

national production of electric vehicles at the moment, although there is a potential, as we noted above. The national market is seeing an increase in sales of imported electric vehicles. In particular, in 5 months of 2023, sales of new passenger electric cars in Ukraine amounted to 3.7 thousand units. Comparing these figures with sales in European countries, Ukraine ranks 19th of the electric car market. It is worth noting that the demand for electric cars is higher than the overall new car market, where Ukraine ranks 23rd among European countries. The share of consumption of imported electric cars in the Ukrainian market is at the level of the leading European countries and amounts to 15.6%. It is important to note that this is on par with the markets of developed countries: UK (15.7%), Portugal (15.6%), Germany and France (15% each). It should be emphasized that the most developed European automotive markets in terms of electrification are Norway (83.3% share of new electric cars), Iceland (39.2%), Sweden (36.9%), Finland (32.4%), and Denmark (30%). The Netherlands, Luxembourg, Austria, and Switzerland are also among the leaders [14].

In the first half of 2023, the national consumer demand for electric vehicles was satisfied by the following models: (Fig. 4).

Volkswagen ID.4 has again become a bestseller on the new car market. In a month, the

Ukrainian fleet was replenished with 134 new cars of this model. Second place went to Dongfeng (Honda) M-NV with 86 units. Volkswagen ID.6 is in third place with 33 units. The fourth most popular model is the compact Honda E-27. The top 5 of the February market is closed by Mercedes-Benz EQC – 16 units. Since the beginning of the year, 708 new electric vehicles have been sold in Ukraine, which is 164% more than in the same period last year. Statistics show that middle-class electric vehicles are in demand on the national market.

Ukraine has potential for the production of electric vehicles, as our country is one of the few countries in the world with a full cycle of automotive production. Using the latest Industry 4.0 technologies and research and production potential, Ukraine can produce cars of a new generation, and developments in this area continue.

An example can be the “Engineering – Automation – Machinery” cluster, which is actively exploring the possibility of creating a joint product that would maximize the existing potential of its participants and become competitive in domestic and foreign markets (Fig. 5). Together with business, scientists of the National University “Zaporizhzhia Polytechnic”, and experts of the Zaporizhzhia CCI, they are working on creating an industrial park in the region [15].

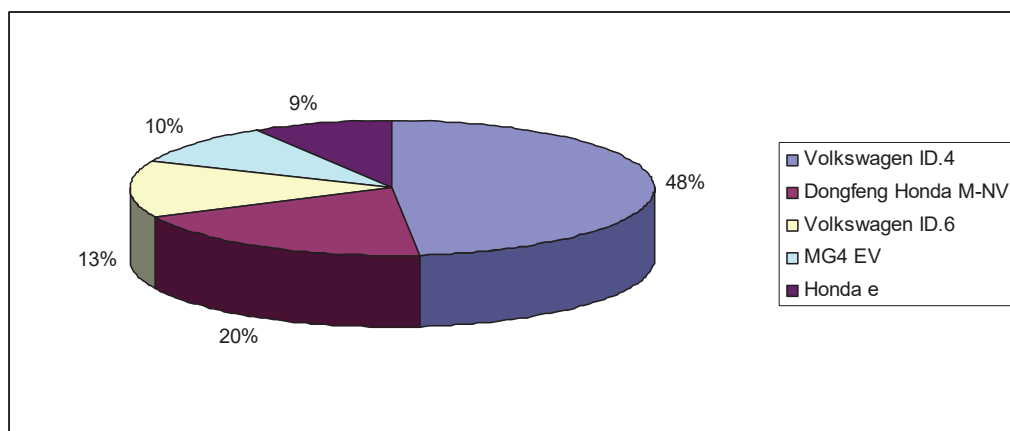


Fig. 4. TOP-5 new electric vehicles in the Ukrainian market in the first half of 2023 [14]

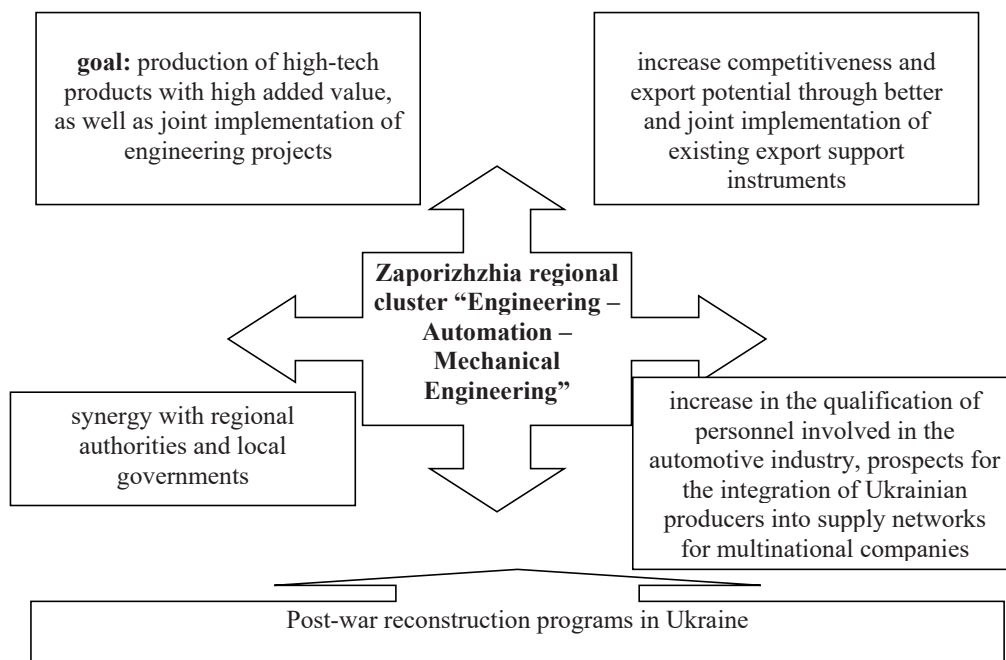


Fig.5. Algorithm of Zaporizhzhia regional cluster “Engineering – Automation – Mechanical Engineering” activities
(developed by the authors)

The Zaporizhzhia Regional “Engineering – Automation – Mechanical Engineering” Cluster sees great potential for the development of Zaporizhzhia’s industrial complex in setting up its own electric vehicle production.

The potential of the domestic production of electric vehicles is also evidenced by the activities of “INFOCOM LTD” [16]. The company is headquartered in Zaporizhzhia. The company is the leader in the Ukrainian market in the development of automated process control systems. As for the automotive industry, the company develops charging stations for electric vehicles, autonomous solar power plants, unmanned technologies for cars and robotics, automation of technological processes (autopilot system, driver assistance in identifying obstacles, signs, road markings), and also develops a new generation of batteries used to power electric motors. The company also has significant achievements in the production of unmanned technologies in the defense sector (protection of state borders, use in combat

operations, reconnaissance, transportation of the wounded, ammunition, demining, etc.) This company’s activities once again confirm the potential of the national economy in the field of advanced technologies. It is worth noting that the company’s products are in great demand on the global market.

The future of Ukraine lies in the integration of science, education and business, the production of the latest technologies and innovative economic development, and in the access to world markets with high-quality and branded products with high added value.

IV. Implementation of a trademark for a new generation Ukrainian electric car (based on the Ruthenian font).

Forecasting the development of the national electric car prompts us to develop a trademark, which is a passport that certifies the official registration of a trademark or brand. A trademark indicates the fact of its existence and that it is the intellectual property of a person or company. Analyzing the global market of electric cars, experts use not only quantitative and qualitative

indicators, but also trademarks that testify to the recognition and originality of a given product. The practical use of a trademark makes it possible to distinguish not only goods, but also their manufacturers. In the globalized economic space, a trademark is a hallmark of a firm, corporation, enterprise or company.

When developing a trademark for a national electric vehicle, in our opinion, it is advisable to use the graphics of the Ukrainian alphabet “Ruthenia” [17]. This graphic has national, artistic and aesthetic features and emphasizes the symbolism of our statehood. In the context of globalization processes, national goods, services, and technologies will be increasingly produced and enter national and world markets, so their trademarks must be original and meaningful. The use of the Ruthenia font in the development of a trademark will allow it to effectively use the functions of individualization of goods, increase the recognition of the country of origin of a product or service, and increase visual perception. A trademark should be informative and easy to decipher. Looking at the automotive industry, we can see that the most common trademarks are letter-based marks. Based on the graphics of the Ukrainian alphabet “Ruthenia”, we have proposed a sample trademark for a national electric vehicle (Fig. 6).

This trademark is a combined one because it includes letters and an image. You

can also add colors, but this is the work of designers. The proposed trademark reflects the latest product (electric car), intellectual property, national identity, as well as the ability of this mark to be distinguished from other trademarks on cars. The registration procedure must be carried out in accordance with the requirements of Ukrainian law.

Conclusions. The study shows that the market for electric vehicles in the global economy is growing. Electric cars are an environmentally friendly form of transport, which is not a prospect, but a production necessity in the context of globalization challenges. An analysis of the global electric vehicle market shows that growth has increased more than sixfold over the past five years. The geographical structure of global consumption of electric vehicles is becoming more diverse every year. China is the leader in global sales of electric vehicles, surpassing the United States and European countries. The main incentive for the popularization of electric vehicles in the world was environmental problems and energy shortages, as well as the latest technologies in the automotive industry.

The restoration of the national automotive industry on a new technological basis remains a very complex and multifaceted issue that requires a comprehensive and balanced solution. The analyzed potential opportunities for the production of Ukrainian electric



Fig. 6. Trademark for a Ukrainian electric vehicle
(developed by the authors)

vehicles indicate the possibility of restoring domestic production in the medium term.

On the basis of the Ukrainian alphabet graphic “Ruthenia”, a sample trademark for a national electric vehicle has been developed and proposed. It is substantiated that this graphic best corresponds to the functions and requirements of developing a national trademark. The proposed trademark reflects

the features of the national manufacturer, indicates the latest technologies and will attract the attention of consumers.

Areas of further research may be related to the increasing demand for electricity, the problems of utilization of batteries for electric vehicles, and other pressing issues arising from the development of the global electric vehicle market.

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GLOBAL ELECTRIC VEHICLE MARKET AND PROSPECTS FOR UKRAINE'S CONTRIBUTION TO ITS DEVELOPMENT

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The article discusses the features and reasons for the development of electric vehicles in the context of intensifying globalization processes and limited resources. It is substantiated that motorization is a key factor in the development of developed countries. Therefore, the presence of a competitive and well-functioning automotive market is an important condition for successful economic growth. The experience of foreign countries in stimulating the production and consumption of electric vehicles has been studied.

Current trends in the development of the global electric vehicle market have been analyzed. It has been found that more than a third of the global market (over 36%) of electric vehicles is occupied by three manufacturers: BYD, Tesla and Volkswagen. An analysis of the global electric vehicle market by country shows that three countries are the leaders in electric vehicle sales: China, Europe, and the United States. It has been observed that China is ahead of other leading countries in terms of electric vehicle consumption, and the following companies have the greatest demand for electric vehicles in its market: BYD, SAIC and Tesla. Chinese manufacturers are showing faster growth rates in electric vehicle production than leading American and European companies. The article classifies the problems of development of the global market for electric vehicles: the global energy crisis, shortage of resource components for electric vehicles, the Covid-19 pandemic, uneven development of countries, institutional factors. Taking into account current global development trends, we conclude that the global electric vehicle market will develop at a rapid pace, effectively solving the problems hindering the growth of electric vehicle production.

It has been substantiated that Ukraine has the potential to produce electric vehicles. Using the latest Industry 4.0 technologies and research and production potential, Ukraine can produce cars of a new generation, since developments in this area do not stop. Based on the graphic of the Ukrainian alphabet «Ruthenia», a sample trademark for the national electric vehicle has been developed and proposed. It has been established that this graphic most closely matches the functions and requirements of developing a national trademark. The proposed trademark reflects the features of the national manufacturer, indicates the latest technologies and will attract the attention of consumers.

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