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ANALYSIS OF IMPLEMENTATION OF THE CONCEPT OF SUSTAINABLE DEVELOPMENT IN THE FIELD OF AUTOMOBILE IN THE USA, EUROPE AND ASIA

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automobile industry, automotive industry, sustainable development, alternative energy sources, ecological economy, ecological price

The article examines the activities of the automotive industry. Alternative energy sources have been identified. Trends in the development of alternative fuel cars in the United States, Europe and Asia are analyzed. The positive consequences of using alternative fuels have been identified. Problems arising from the disposal of batteries have been identified. It is argued that the largest business in the world economy and the degree of its social responsibility are increasing in the face of global turbulence. The example of the automotive industry reveals various aspects of the economic activity of multinational corporations based on the paradigm of sustainable development. New challenges facing automotive corporations and provocative global trends in attracting business to achieve sustainable development goals have been identified. Ecological principles of socio-economic development and prospects of development, including in the automotive industry. The strategies of a number of corporations to overcome these challenges and strengthen their position in the global market are analyzed.

АНАЛІЗ РЕАЛІЗАЦІЇ КОНЦЕПЦІЇ СТАЛОГО РОЗВИТКУ В АВТОМОБІЛЬНІЙ ГАЛУЗІ В США, ЄВРОПІ ТА АЗІЇ

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Ключові слова:
автомобільна промисловість, автомобільна промисловість, сталий розвиток, альтернативні джерела енергії, екологічна економіка, екологічна ціна

У статті розглядається діяльність автомобільної промисловості. Виявлено альтернативні джерела енергії. Проаналізовано тенденції розвитку автомобілів на альтернативному паливі в США, Європі та Азії. Виявлено позитивні наслідки використання альтернативних видів палива. Виявлено проблеми, що виникають при утилізації батарейок. Стверджується, що найбільший бізнес у світовій економіці та ступінь його соціальної відповідальності збільшуються в умовах глобальної турбулентності. На прикладі автомобільної промисловості розкриваються різні аспекти економічної діяльності транснаціональних корпорацій на основі парадигми сталого розвитку. Визначено нові виклики, які стоять перед автомобільними корпораціями, та провокаційні глобальні тенденції у залученні бізнесу для досягнення цілей сталого розвитку. Екологічні засади соціально-економічного розвитку та перспективи розвитку, у тому числі в автомобільній промисловості. Проаналізовано стратегії низки корпорацій щодо подолання цих викликів та зміцнення своїх позицій на світовому ринку.

Statement of the problem

The automotive industry today is one of the largest industries in the world. The importance of the automotive industry and trends in its development are determined by the place of motor transport in the transport and energy infrastructure, and its overall role in the national economy of a country. Leading countries in the automotive industry occupy the first positions in the world economy. The automotive industry directly affects technological progress and speaks of the solvency of the population, and, consequently, the standard of living. The effective functioning of all sectors of the economy in general and

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the automotive industry in particular is impossible without sustainable development.

Each production consumes energy and resources, as well as produces waste. The concept of sustainable development in production involves reducing waste and reducing resources used.

But the main tasks of sustainable development of the industrial complex are not only to save resources, but aimed at improving the environmental situation in the region, economic growth in general and more. These tasks of sustainable development of the industrial complex are successfully solved in the field of innovation. That is why innovation is an integral part of sustainable development.

Due to the growing importance and role of corporations in world economic development, experts note signs of transition from the classical form of the international division of labor to the transnational division of labor. Today, multinational corporations (MNCs) account for more than 50% of world industrial production and more than 70% of world trade; corporations control approximately 80% of patents and licenses for inventions and high technologies. If in 2000 the 100 largest economic structures in the world included 71 states and 29 MNCs, in 2017 – 59 states and 41 MNCs [1].

The «cost parameters» of the avant-garde of the modern corporate world are impressive. Thus, the 2,000 largest public companies ranked by Forbes Global 2000 in 2018 together: 39.1 trillion USD sales; 3.2 trillion USD profit; 189 trillion USD assets and 56.8 trillion USD market value [2].

The enormous scale and global coverage of the extensive network structures of the world's leading corporations, whose position often sets new points of socio-economic development in the global space. According to UNCTAD, in 2017, the volume of value added produced by MNC branches in other countries with a staff of 73.2 million people exceeded 9% of world GDP, and exports accounted for a third of world trade [3]. Compared to 1990, the contribution of foreign MNC units to world GDP has increased 1.7 times, the number of employees – 2.7 times, and the volume of accumulated foreign direct investment (FDI) – 14 times. The accumulated volume of FDI in the world by the end of 2017 was at about 31 trillion. dollars, including the annual flow of FDI amounted to more than 1.4 trillion USD (this is about 7% of all fixed capital investments in the world for the year) [4].

At the same time, not only the importance and influence of big business in the world economy is growing, but also the degree of its involvement in sustainable development, and public support for Zur is becoming part of the business reputation, image and operations of many MNCs. However, most corporations often perceive this area as a source of financial costs, and the benefits acquired are not obvious. However, more and more specific practices and projects are emerging, which show that the implementation of the Zur is growing from a set of good wishes and socially responsible activities in the business direction, combined with very specific and tangible commercial effects [5; 6]. If a year ago, according to the consulting company PwC, of the 729 largest MNCs operating in 21 countries and representing 6 industries, only about 200 corporations, one way or another, mentioned Zur in their business strategies; to date, of the 1,141 MNCs operating in 31 countries representing 7 industries, about 72% of corporations mention Zur in their reporting, 25% include it in their business strategies and 14% set specific targets for achieving Zur [7].

Analysis of recent studies and publications

Prerequisites for the formation of the foundations of sustainable development were studied in the works of M. Reimers, L.G. Melnyk, MI The next. Back in 1990, the first inaugural conference of the International Union for Ecological Economics (ISEE), The Ecological Economics of Sustainability, was held in Washington, DC. The conference was attended by leading scientists, ideologues of sustainable development (G. Daly, R. Constance, K. Folke, S. Fouche, A.-M. Janson, etc.) and became a kind of rehearsal for the World Summit, L.G. Melnik was present with the report «Environmental principles of socio-economic development». In Stockholm, at the second ISEE conference «Investing in Natural Capital: Prerequisites for Sustainable Development», held after the World Summit in Rio, L.G. Melnyk made a report on «Environmental price as a measure to optimize investment», which today is quite relevant and promising and even then determined the prospects for development, including in the automotive industry. L.G. Melnyk formulated the concept of the ecological price of a unit of production. Another important area of research is the development of a methodology for forecasting the environmental and economic consequences of the development of industrial complexes and assessing the effectiveness of design decisions taking into account environmental factorsThe impact of global sustainability trends on the automotive sector was studied by Joey Powis. Sustainable development as a driver of innovation in the automotive industry on the example of recycling old cars and their parts was studied by Stephanie Rothbauer.

Objectives of the article

Analyze trends and identify prospects for the development of the automotive industry in the United States, Europe and Asia taking into account the concept of the ecological price of a unit of production and assessing the effectiveness of design decisions taking into account environmental factors.

The main material of the research

The largest automobile companies occupy a special place among the set of MNCs in the context of sustainable development. Automotive industry is traditionally considered the core of mechanical engineering, which, along with the power and chemical industries, is part of the «avant-garde troika» of industries in the era of STR. It is also well known that generating and implementing technical and organizational innovations, creating new capacity and ensuring the continuity of passenger and freight traffic, the industry's products have always been one of the main polluters of the environment. In particular, motor transport remained the main source of CO_2 emissions

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for the air basin of large agglomerations. As early as the end of the twentieth century, there were several dozen independent car companies in the world, but as a result of the merger and acquisition, there are now just over ten large conglomerates of automakers that have retained historic brands and produce nearly 90% of the industry. And such a global organizational restructuring of the industry, coupled with all the crises in the world economy has not affected the volume of production and sales of vehicles of various classes, which are steadily increasing globally. This is largely due to the stability of demand, which is based on long-term trends as widespread income growth and population mobility, as well as increasing domestic and international movement of goods. Another thing is that the dynamic quantitative growth was associated with serious qualitative transformations of technology based on the active introduction of innovations and new technologies in production, changes in the principles of plants through the integration of digital platforms and infrastructure. In response to the demands of the times, classic cars with internal combustion engines (ICEs) are rapidly transforming into innovative vehicles with a fully electric power plant; turn into a kind of «smart» cars, transmit big data on the basis of digital technology, or move on the roads offline without the participation of the driver. The scale of such changes is quite tangible, their pace is accelerating and often no longer predictable. In the wake of technological renewal of the industry there is a rapid emergence of new players in the world market, rotation in the ranking of automakers, the formation of a new type of automaker. So, on June 29, 2010 – the day of the beginning of trading in shares of the American electric car manufacturer Tesla on the NASDAQ stock exchange – no one expected that in exactly 10 years its shares will be traded at a price higher than the original price by more than 4 000% will become one of the most expensive automobile corporations in the world [8]. Moreover, in early 2020, Tesla built and launched its first plant for electric vehicles outside the United States – in China, and has already begun construction of the second such plant – in Germany.

In the commercial transport industry, while previously manufacturing companies perceived themselves as exclusively manufacturers, today many of them seek to position themselves as a provider of integrated transport solutions for customers and expand the boundaries of traditional transport and logistics. The elite of the global automotive industry was one of the first in the global business to actively support Zur, which was reflected in the integration of the principles of sustainable development into corporate culture; transformation of behavioral and business models of MNCs; implementation of socially significant and environmental initiatives that attract global attention; launching projects to reduce energy consumption and environmental impact; reflecting various aspects of Zur-related company activities in annual reports, etc. Such a strategy opens the way for corporations to new market niches shaped by global trends, from the development of alternative energy and changing the structure of energy consumption around the world to changing consumer preferences in favor of environmentally friendly products, resource conservation and recycling. Car companies can, of course, fight these trends and make very risky attempts to circumvent the requirements and falsify the level of emissions with new technical devices and sensors, jeopardizing the business reputation and brand image. An example of this is the example of Volkswagen, which as a result of the scandalous case known as «Dieselgate», incurred costs in the form of fines and compensation of about $35 billion, not to mention significant reputational losses [9]. But to stay in the «mainstream», the vast majority of the world's leading automakers clearly choose the path of finding new opportunities that hide behind the world's leading trends. In order to build on the achievement of the Zur on a systemic basis, most automotive corporations consistently integrate the principles of sustainable development into the main goal and mission of the organization, management structure and corporate culture, reflecting specific changes in management documents and business processes. At the same time, with the help of specific performance indicators (KPI), they measure the efficiency and effectiveness of business in achieving the Zur. Based on these indicators, you can also calculate the contribution of a project related to sustainable development, initiatives or activities in the financial condition of the business. Companies such as Daimler, Volkswagen, Scania, MAN, Volvo Trucks and a number of others have signed the UN Global Compact, an international business initiative in the field of corporate social responsibility and sustainable development, and are committed to implementing its ten internationally recognized principles. human rights, labor relations, the environment and anti-corruption, in internal corporate documents – instructions, standards and policies. And now they are disclosing to their stakeholders information detailing the company's progress in implementing the Zur over the calendar year (relevant information is posted annually on the official website of the UN Global Compact in the form of a Progress Report). In addition, some companies have begun to compile and publish on their website an annual report and a report on sustainable development as the only integrated document prepared in accordance with the principles and requirements of international reporting standards, and publicly report on progress towards commitments.

Constantly growing concerns about irreversible environmental change and the severe depletion of natural resources make sustainable management truly important for automotive associations. Governments, as well as customers, investors and sponsors, are now pushing for car associations to 'green' their way of working, culture and products. This will have serious implications for businesses, which, when making significant progress, must in fact be guided by the concept of sustainable development.

The car business is under a lot of pressure from governments and society to find the best development model. Thus, the whole situation reflects a huge impact on the climate.

1. As of 2016, transport has already emitted almost a quarter of global CO_2 emissions, with 18% accounted for by street transport.

2. Destruction of normal biological systems. For example, China produces most of the world's graphite

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used in electric vehicles. Expanding demand, along with the lack of strict environmental principles, has led to crop failures, soil pollution, water pollution and large-scale environmental degradation [10].

3. Non-biodegradable industrial waste and industrial waste have caused significant landfills, land poisoning and water pollution. In January and June 2017 alone, the United States, Europe, and Japan sold 3.1 million tons of plastic waste to non-industrial countries, mostly in Asia. Much of this is made up of vehicles that are no longer in use [2].

4. Automotive production requires significant consumption of energy, water and assets that increase carbon pollution. The automotive industry uses 5.2 billion liters of water and produces 1 million tons of CO_2 in vehicles in the UK alone [1].

Of course, companies are working to solve many of these problems. For example, between 2000 and 2015, EU automotive organizations exceeded their carbon emissions by reaching CO_2 emissions of almost 120 g/km, compared to the target of 130 g/km [4].

For sustainability to meet the industry's ambitious goals, it must be pursued through a value chain.

Secondly, the competition for leading positions in the world market of electric vehicles is intensifying. In the passenger segment, almost all major automakers are actively developing electric transport technologies. Volkswagen, for example, despite the scandal and the costs incurred, began to rely on electric cars and has already set itself the task of producing 26 million such cars by 2028 and become the world's largest manufacturer [12].

The development of this market has become part of the environmental policy of some countries and keeps pace with the principles of sustainable development. In Norway, thanks to various measures to support this market, electric cars have become cheaper than many traditional cars and accounted for 46% of all new cars sold in 2018 (growth – 40% compared to a year earlier), and in the country's total car fleet from 2 million. cars, the share of environmentally friendly cars reached 10% [13].

In Germany, funding for the electric car subsidy program has increased since 2020, and now state subsidies, such as for the purchase of electric cars worth less than 40,000 euros, are 6,000 euros instead of the previous 4,000 euros (for a car with a «clean» electric motor) and 4.5 thousand euros instead of the former 3.5 thousand euros (when buying a car with a hybrid engine) [10]. It is noteworthy that in the first half of 2020, despite the coronavirus pandemic and economic recession, the German car market saw a boom in sales of electric vehicles against the background of falling sales of cars with internal combustion engines (from January to June 2020 sales of «pure» electric vehicles increased by 42.7% and Hybrids – by 54.6% compared to the same period last year) [11].

In China, the largest market for electric vehicles, thanks to targeted measures to stimulate the production of environmentally friendly vehicles combined with efforts to localize the production of batteries, there is a sharp increase in the number of new players: in 2019 there were about 500 electric car manufacturers, and in 2018 electric and hybrid cars amounted to 1.3 million units, which is 62% more than a year earlier.

Conclusions

Thus, in the long run, those industrial organizations that predict a sustainable future will prosper. The future lies in the introduction of sustainable models, characterized by the use of much less material and energy to create the same, and perhaps better value for the product. Generating waste from companies and products is an unwise long-term strategy that is not viable in the face of environmental challenges.

Automotive organizations have made sustainability a strategic priority, although the challenge to be achieved is greater and more urgent than ever. While this is a good start, action is needed at the ground level throughout the value chain of cars. Management, measurement and monitoring need to be strengthened, and investment in sustainability needs to be significantly increased beyond large-scale advances in electric vehicle research and development. The electric vehicle strategy itself must be supported by a renewable charging infrastructure ecosystem and a circular economy to be truly sustainable. These initiatives will have a major impact, but the industry needs a structured approach to long-term stability. Automotive organizations need to prudently assess the maturity of their sustainable development strategy, learn from sustainability leaders, and make sustainability the goal of the organization.

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