

HIGHLIGHTS

Highlight 1. Global Restructuring of the Auto Industry

Dušan Marković¹

In previous decades, the auto industry was the driving force behind global growth. It is an industry that is very specific compared to other industries. Namely, the auto industry is technologically and capital-intensive, and at the same time, it creates a large number of jobs, either directly or indirectly. Also, since it deals with products and services with a high added value, it should be borne in mind that this industry has a large contribution to the tax revenues of national economies. To illustrate the point, we can use the data for the USA - the second-largest auto market. It is estimated that the business ecosystem of auto companies in the USA generates about 1 trillion USD in value, which is about 4.9% of GDP, it contributes to the creation of 9.6 million jobs, and this ecosystem's member companies contribute annually about 220 billion USD to the federal and individual state budgets.² For a long time, the structure of the auto industry was considered stable, and there are large barriers, such as technological intensity and high capital investments, which prevent new competitors from entering the industry. However, high barriers to entry have been shown to lead to lower investment in innovation, which contributes to a slight decline in business performance.

In the last 15 years, the auto industry has faced several challenges, which have completely restructured relations in the industry and changed the importance of certain actors in the supply chain, as well as certain markets and production locations. The “Great Recession” of 2008, the development of electric, autonomous, and digital vehicles, and the accompanying services, and then the disruption of the supply chain during the pandemic, are intertwined, so it is difficult to analyse these processes separately.

Market Aspects of the Auto Industry Development

Although it may not seem that way at first glance, the global car market is relatively heterogeneous and highly competitive. Namely, in certain national markets, different segments dominate, and competition is fierce in all segments. For example, in Europe, the segment

of smaller city vehicles (B and C segment) dominates, while in the USA, and to a lesser extent in Canada and Mexico, the segment of light trucks (different variants of pickup trucks) dominates, which is all a result of living conditions and lifestyles. In addition, the dynamic of demand development is different in developed and emerging markets. Because of this, global trends in the past 15 years have affected individual markets to varying degrees. For the purposes of analysis, it is possible to divide the global market into four groups: the Chinese market, the US market, the “developed Europe” (EU+UK+EFTA), and other markets.

In the past 15 years, global sales of new motor vehicles³ have fluctuated, ranging from 68.3 million units during the “Great Recession” to 95.9 million vehicles in 2017. Sales moved differently in each of the aforementioned groups.

The US market was the largest single market before the Great Recession, with nearly 16.5 million units sold. During the “Great Recession”, the US government did not provide subsidies for the purchase of new vehicles but focused on the bailout of domestic car companies that were under threat of bankruptcy. Because of this, the demand for motor vehicles fell by almost 36% just two years into the crisis. In this period, the demand for motor vehicles dropped due to a reduced number of jobs, a decrease in wages, an increase in borrowing costs, but also a delay in the purchase of durable consumer goods due to a high degree of uncertainty. In addition, due to such trends in the US market, customers have turned to smaller, lower-priced, more energy-efficient vehicles. Declining demand and changing consumer preferences have negatively affected the “Big Three from Detroit”, which specialised in the production of large vehicles known as big consumers. Because of this, Chrysler and General Motors had to be nationalised to avoid bankruptcy, while Ford managed to avoid bankruptcy by selling its subsidiaries in Europe and focusing on the North American market and the large vehicle segment. However, the US market stabilised very quickly. The policy of low-interest rates favoured sales growth, stabilising at 17.8 million to 17.5 million vehicles per year from 2015 to 2019. The COVID-19 pandemic, supply chain issues, and microchip shortages have led to a drop in supply, so that sales at the end of 2022 were just 14.2 million units, far from the all-time high.

The “developed Europe” group represented the most important market of the auto industry before the beginning of the “Great Recession”, with annual sales of 18.7 million units. The headquarters of major

¹ University of Belgrade – Faculty of Economics

² <https://www.autosinnovate.org/posts/press-release/new-data-on-economic-impact>

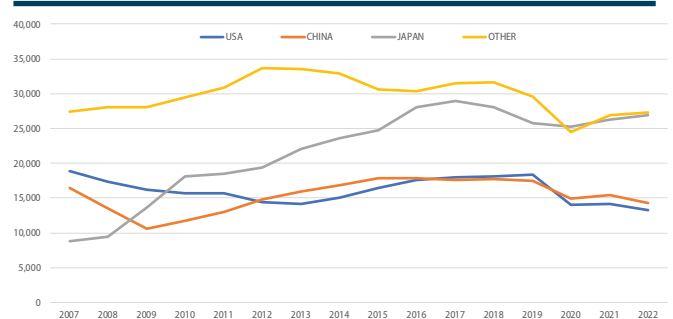
³ Based on the OICA classification, motor vehicles are considered passenger and commercial vehicles (trucks, buses, pickup trucks, etc.).

competitors (VW, Stelantis, Renault, BMW, Mercedes, etc.) are also located in the developed countries of Europe, which is why the auto industry is of great importance in the creation of economic policies both at the national and EU level. With the beginning of the “Great Recession”, national governments, primarily Germany and France, provided subsidies for the purchase of new vehicles, based on the principle of “old for new”. The goal of this economic measure was to stimulate the demand for domestic motor vehicles but also to put more efficient vehicles on the roads, which have less of a negative impact on the environment. In this way, in the countries that targeted more energy-efficient vehicles with economic measures, the drop in demand was 30.5% lower than if the measures had been absent, i.e. 29% lower than if the measures had been absent (in countries where the measures were not targeted).⁴ With this approach, the decline in sales was gradual but more long-lasting than in the USA, which did not subsidise demand. In this market, demand was constantly falling from 2007 to 2013, and the cumulative decline in this period was over 25%. The prolonged decline in demand in Europe was also negatively affected by the public debt crisis that culminated in that period. After 2013 and ending with 2019, the period of demand growth in this market began, but even in 2019, demand was slightly lower than in the year before the start of the “Great Recession”. The Covid-19 pandemic further threatened the functioning of this market. Namely, sales began to fall starting in 2019, and in 2022, due to the war in Ukraine, high inflation and a lack of microchips, they would further decrease to 13.3 million vehicles. The decline in demand particularly affected the segment of passenger vehicles, so that within the EU, demand dropped to 9.3 million units, the lowest since 1993.⁵

Developments in the US and European markets have encouraged the process of consolidation in the industry. First, in 2011, the Italian Fiat took over the American *Chrysler*, which declared bankruptcy due to the “Great Recession”, which created the FCA company. In this way, Fiat gained access to the US market and technology in the production of large vehicles, while *Chrysler* gained access to the technology to produce more energy-efficient vehicles. In Europe, the French company PSA took over Opel from Germany in 2017, which operated as part of the *General Motors* company. In this way, PSA strengthened its position in the European market and expanded its range of brands. Already in 2020, PSA and FCA merged under the name Stelantis, creating

the fourth auto group in the world. It is a company that has sales of more than 6 million units, which some experts consider a turning point in achieving economies of scale at the corporate level, necessary to be globally competitive.

Graph 1. Sale of Motor Vehicles in 000 of Units



Source: OICA sales statistics

Today, the Chinese market is the largest single market for motor vehicles. The market has grown steadily from 8.8 million vehicles sold in 2007 to 28.9 million vehicles in 2017. A low starting base, i.e. a large number of individuals who did not own vehicles, high rates of economic growth, investment in road infrastructure, as well as large fiscal incentives to stimulate domestic demand during the “Great Recession” resulted in an increase in demand of almost 20 million vehicles in just one decade. The limitation of financial incentives, as well as the growth of the number of vehicles per capita, resulted in a drop in demand after 2017, and this drop was further reinforced by the COVID-19 pandemic, as well as the lockdown measures that were particularly severe in China. However, since 2021, sales growth has been recorded, so that at the end of 2022, the Chinese market accounted for one-third of the global market.

For decades, the Chinese government has protected the domestic market with a policy of mandatory joint ventures between foreign companies and local companies, hoping to develop the domestic automotive sector through “spillover” effects. However, this strategy turned out to be wrong, so starting in 2019, the Chinese government decided to abolish this measure and face domestic companies with foreign competition. At the same time, the government encouraged the consolidation of domestic companies within the industry and the internationalisation of business. Today, Chinese companies dominate the domestic mass segment, while foreign brands dominate the premium segment. When it comes to the internationalisation of Chinese companies, more modest results have been achieved. In 2010, the Chinese company *Geely* took over *Volvo Cars* from Sweden, which until then operated within Ford, which was facing bankruptcy at that time. In this way,

4 Grigolon, L., Leheyda, N., & Verboven, F. (2016). Scrapping subsidies during the financial crisis—Evidence from Europe. *International Journal of Industrial Organization*, 44, 41-59.

5 <https://www.acea.auto/pc-registrations/passenger-car-registrations-4-6-in-2022-12-8-in-december/>

Geely gained access to modern technology, brand, and management knowledge, while *Volvo* gained access to the Chinese market and cheap sources of financing. Thanks to this, *Geely* became the first Chinese company with sales of over 1.5 million vehicles and the 14th largest car company, while *Volvo* became a premium brand that competes equally with leaders in this segment such as BMW, Mercedes, and Audi.

The “other group” consists of several very significant but heterogeneous markets and a larger number of marginal markets. In this grouping, Japan, India, Brazil, South Korea, Canada, etc. stand out. The Japanese market is one of the most important national markets. In the period from the “Great Recession” until 2019, sales in this market varied from 5.3 million in 2007 to 4.2 million in 2011, which was a consequence of the nuclear disaster in Fukushima. With the beginning of the pandemic, there was a further contraction of this market, so the demand dropped to 4.2 million units. On the other hand, the Indian market grew very intensively from 2 million vehicles in 2007 to 4.4 million vehicles in 2018. The pandemic led to a drop in demand in 2020, only to see rapid growth again in 2021 and 2022, when sales of 4.7 million vehicles were recorded, more than Japan for the first time. In this way, India became the third largest national market after China and the USA. Unlike Japan, where demand growth is not expected due to the demographic structure, economic stagnation, and high saturation of the market, the Indian market is expected to be one of the carriers of the global auto industry development in the future.

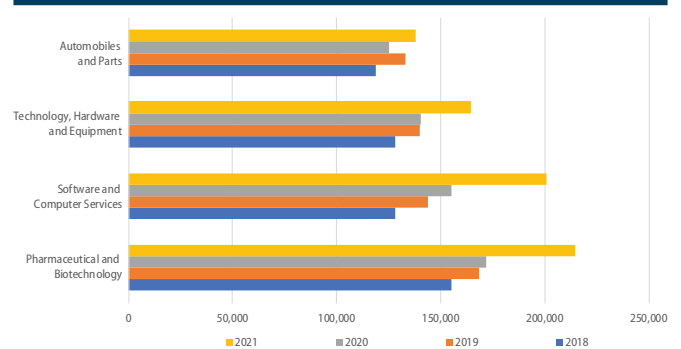
Technological and Institutional Aspects of the Auto Industry Development

After the “Great Recession”, the auto industry faced new upheavals, which were primarily the result of technological innovations. The technological challenges facing car companies today are related to the development of autonomous, electric, and digital vehicles, but also the development of ride-sharing and car-sharing services. All this imposes on car companies the need to constantly invest in research and development (R&D) projects, the profitability of which is highly uncertain. Therefore, the auto industry represents one of the industries with the largest investments in R&D, which puts it on par with industries such as pharmaceuticals and biotechnology.

From Graph 2, it can be seen that the investments of car companies and car suppliers in R&D in 2021 amounted to around 138 billion EUR. It should be noted that investments in R&D in the auto industry are only 35% less than in the fields of pharmaceuticals and biotechnology, although this industry has attracted

significant investments due to the pandemic and the search for an adequate vaccine. In contrast to the pharmaceutical industry, the pandemic had a negative impact on investments in R&D in the auto industry, when they fell slightly compared to the year before the pandemic. However, already in 2021, these investments exceeded the pre-crisis year of 2019. What can be an additional problem is that the growth of R&D investments in the auto industry is significantly slower compared to other industries from Graph 2. On the list of the largest investors in R&D in the auto industry in 2021, the VW company stands out with EUR 15,593 million, followed by Mercedes Benz with EUR 8,973 million, and Toyota with EUR 8,691 million. The high investments of auto companies in R&D are a consequence of the current technological turbulence in the industry, but also the decade-long delay of traditional auto companies in investing in the development of autonomous and electric vehicles.

Graph 2. R&D Investments in millions of EUR



Source: EU Industrial R&D Investment Scoreboard database

The development of autonomous and electric vehicles began with the appearance of the American company Tesla on the car market a decade ago. Namely, at that time, most of the traditional competitors viewed the development of these segments as “exotic” segments that serve more for promotional purposes than as future segments of value creation. Because of this, many companies refused to invest more seriously in this segment, while some built their competitiveness on the development of hybrids and vehicles that would use hydrogen as a propellant (e.g. Toyota, which only released the first purely electric models last year). Changes in technology and regulation have enabled this segment to transform relatively quickly into a large and potentially highly profitable segment.

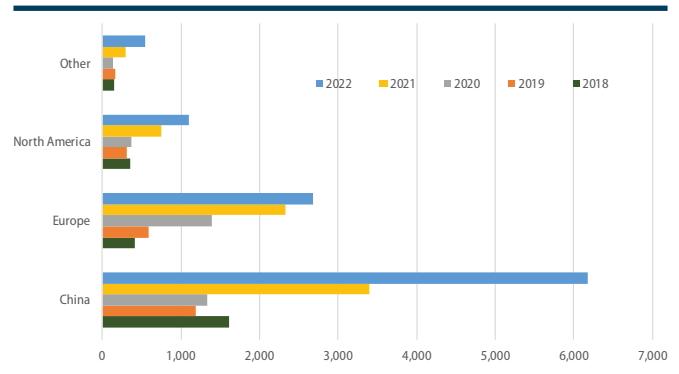
Technological breakthroughs in digital technologies, artificial intelligence, 5G technologies, and satellite internet have enabled the rapid development of autonomous vehicles and vehicles that can communicate with each other, with service providers, and with infrastructure. This type of vehicle development will

enable safer driving, greater driving efficiency, less pollution, as well as the creation of new services. On the other hand, consumers expect new vehicles to provide them with digital services of various types, but they do not consider them premium, that is, they are not ready to pay extra for them. This puts car companies in a position where they have to develop new services and solutions, but customers are not ready to pay for them.⁶ The main obstacles to the further development of autonomous vehicles are regulatory restrictions, which must define liability, both financial and criminal, in the event of traffic accidents. For now, the car companies refuse to take responsibility in these cases.

Due to global warming, environmental issues have become the focus of the world's attention. The auto industry is considered one of the main polluters of the environment, which is why many measures aimed at reducing pollution are aimed at the auto industry. State regulations are stimulating and restrictive regarding vehicles with reduced gas emissions. The restrictive measures refer to the tightening of the gas emission standards that new vehicles must meet, bans on entry into the central parts of cities for internal combustion vehicles, and the allocation of gas emission quotas to car companies, which is why companies are stimulated to work on the development of purely electric, hybrid or smaller and more efficient models with internal combustion. Finally, there are initiatives (California) to completely ban the use of vehicles with internal combustion engines as early as 2035. In terms of stimulating the purchase of "green vehicles", the measures are very broad: direct subsidies, cheaper registration, free parking spaces and investment in the development of a network of electric chargers. Research has shown that the demand for these vehicles primarily depends on financial incentives, and not so much on the attitudes of consumers regarding environmental protection, which is why it is important to preserve the incentives in the future.⁷

Significant financial and non-financial government incentives have resulted in the development of this segment. The segment of hybrid and purely electric vehicles grew from 2.5 million vehicles in 2018 to 10.5 million vehicles in 2022. What is even more significant is that the participation of this segment in the total demand in the same period grew from 2.2% to 13%. However, the growth of this segment was not equally dynamic in all national markets.

Graph 3. Sales of Pure Electric and Hybrid Vehicles in 000



Source: EV Volume database

China has set the development of the "green vehicle" market as one of its economic development priorities. By supporting the development of this segment, the Chinese state is trying to solve the issue of high pollution that burdens large industrial centres and to reduce dependence on oil imports, because it has large nuclear and hydro capacities in the production of electricity. By these measures, China has grown into the most important national market for electric vehicles. Sales of this type of vehicle in China reached nearly 6.2 million vehicles in 2022, accounting for nearly 60% of global sales. It is important to note that in 2019 and 2020, the sales of electric vehicles in China were lower than in 2018, but in 2021 and 2022, sales would increase several times. The decline in sales in 2019 is the result of the state authorities' decision to reduce the level of subsidies for the purchase of these vehicles, considering that the demand has developed sufficiently and that there is a consumer segment that is ready to pay the full price for this type of vehicle. It turned out that this assumption was wrong, so after only one year this type of incentive was renewed. In 2020, demand recovered slightly, but not to the full extent, which is a consequence of the pandemic and administrative restrictions on the movement of people in this period.

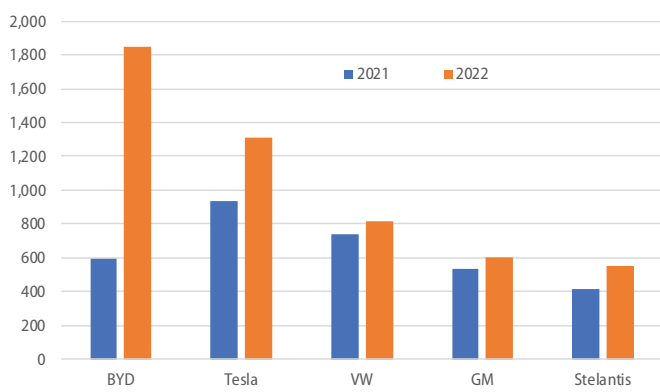
The European market is the second largest market for electric vehicles. Sales in this market amounted to almost 2.7 million vehicles, which represented over 25% of the global market. The growth of this segment in Europe was constant and was particularly pronounced during 2021 and 2022, which coincided with the easing of pandemic measures. It is important to note that this segment developed rapidly even during the period of contraction of the total demand for vehicles. The growth of this segment in Europe is the result of the strategic commitment to the development of "green" technologies and attempts to reduce dependence on oil imports from Russia and other countries.

⁶ PWC (2019) The 2019 strategy & digital auto report.

⁷ Higuera-Castillo E, Kalinic Z, Marinkovic V, Liebana-Cabanillas J F (2020) A mixed analysis of perceptions of electric and hybrid vehicles. Energy Policy 136: 1014-1021

The North American market is a pioneering market for electric vehicles. The company Tesla, which was founded in the USA, started developing purely electric vehicles more than a decade ago. It seemed that the US market would be the leader in the development of this market segment. However, sales increased from 360,000 electric vehicles in 2018 to 1.1 million vehicles in 2022, so the share of North America in global sales decreased by 4 pp, i.e. from 14% to 10%. Relatively little government support in the form of subsidies and incentives for infrastructure development contributed to the decline in the importance of the US market at the global level. Namely, except for certain liberal states in the USA, such as California, other states within the USA did not support this segment. The explanation for this can be sought in the USA policy that insists on energy independence, without focusing on environmental aspects, while in Europe priority is given to environmental aspects.

Graph 4. Sale of Purely Electric and Hybrid Vehicles In 000



Source: Companies' annual reports

Different institutional support and market trends also affected the position of certain competitors in the segment of electric vehicles. Namely, in 2022, the Chinese company BYD, which is relatively unknown outside the home market, made its way to the top of the list of the largest sellers of electric vehicles. With an annual sales growth rate of 211%, BYD, thanks to the “explosion of demand” in China, has reached sales of over 1.8 million pure electric and hybrid vehicles. The American company Tesla increased its sales by 40% in 2022, which caused it to drop to second place on the list of sellers of electric vehicles, with 1.3 million vehicles sold. Realising the lack of support from the domestic government, the Tesla company decided to look for sources of growth outside the US, so the company opened production facilities in Germany and China, with the aim of taking advantage of the growth in demand in Europe and China. Significantly smaller competitors in this segment are VW, American GM,

and Stelantis. The competition is very fierce as the five largest competitors control only half of the electric vehicle segment.

Factors of the Future Auto Industry Development

In the future, the development of the auto industry will depend on a number of technological, political, economic and demographic factors. The future of the auto industry will depend on the joint action of these factors, that is, the combination of their influences. Also, these factors will not affect individual markets to the same extent and in the same way.

When it comes to technological factors, the biggest changes will take place in the domain of vehicle digitalisation. Due to the growing demand for digital content, the vehicle will be less and less a purely mechanical product and more and more a combination of a mechanical product with digital content. It is estimated that in the near future, the share of software and digital content in the value of the vehicle will increase from 10% a few years ago to around 60% in the near future.⁸ These developments will have a multiple impact on the supply chain of auto companies. First, the supply chain will open up more and more to software companies that possess digital competencies. Given that it is not necessary to achieve economies of scale for this type of service, supply chains will also be open to small innovative start-ups. This development can have a positive effect on Serbia because a business ecosystem has already developed that works on the development of software for the auto industry (e.g. autonomous driving, software that contributes to driving safety, etc.). Second, traditional suppliers will lose their importance in the supply chain due to the development of purely electric and digitalised vehicles. This can be problematic for Serbia because in the previous period, especially in less developed parts of the country, we managed to attract a large number of traditional car suppliers. What is encouraging is that a number of these suppliers in Serbia have managed to harmonise their product offering with new trends.

Further developments in the segment of electric vehicles will depend on technological breakthroughs in the field of vehicle electrification. A few years ago, the biggest technological problem for the development of the segment was the relatively small limit that could be reached with one charged battery and the charging speed. Today, battery manufacturing technology has advanced significantly so that there are models that can travel more mileage with a single battery than an internal

⁸ Xu J, Liu X (2018) Technology is changing what a premium automotive brand looks like. Harvard Business Review.

Highlight 1: Global Restructuring of the Auto Industry

combustion vehicle with a full tank. When it comes to filling time, some improvements have already been made, but this process cannot be compared in terms of speed to filling fuel at the pump. This will represent one of the fields on which R&D projects in the auto industry will focus. An additional aggravating factor in terms of technology is the development of the infrastructure, i.e. the network of electric chargers. The development of the charger network is definitely a prerequisite for further rapid development of this segment. In addition to public investments, car companies also invest in the development of this network. In order to share the costs of infrastructure development, auto companies form strategic partnerships. So GM and Toyota are working together to standardise chargers and invest in the charging network, all with the aim of making up for the lack of government support.

When it comes to state regulations on environmental protection, its impact on the development of the auto industry will be reflected in two main issues. One direction will be the additional tightening of state regulations regarding gas emissions, through the reduction of quotas for manufacturers, but also through a potential ban on the production of diesel vehicles. All this should direct car companies toward the development of new and more affordable electric models. However, if we move along the supply chain, we will see that at the very beginning of the supply chain lies one of the main environmental issues of the auto industry. Namely, in order to further increase the production of batteries for vehicles, the exploitation of nickel, lithium, and manganese must be increased, and the development of mines of these metals is associated with great environmental risks. The risks are particularly high in small countries with a relatively high population density, such as Serbia.

Development Perspectives of Individual Car Markets

It is expected that the Chinese market will remain dominant in the auto industry in the near future, but the development dynamic will depend on the influence of certain trends. It cannot be expected that the market will grow with the same dynamic as in the second decade of the 21st century. Namely, the market has already reached a certain degree of saturation, the number of vehicles per 1,000 inhabitants was 223 in 2020, which is about 4 times less than at the US level.⁹ There is room for further growth, because this indicator in China is slightly above the global average. Further development of the market will also depend on the rate of economic

growth. Although the initial growth after the lifting of the COVID-19 measures was significant, over time the economic recovery faltered and the optimistic forecasts became moderate, so the question is whether China will be able to achieve the projected annual GDP growth of 5% in the coming years. Future growth will also depend on the further development of the confrontation with the USA, which has its own economic and technological consequences, which will be discussed further below.

When it comes to technology development, the development of the Chinese auto market could potentially be affected by sanctions that seek to limit the development of the microchip industry in China. Although these measures are not currently aimed at mature technologies in the production of microchips, there is a risk that these measures will get tighter for mature technologies as well. With large state funds, certain breakthroughs in the development of the latest microchips have already been made in China, e.g. of 7 nanometres, and expanded capacities for the production of “mature” micro-chips, which may indicate a controlled risk in this matter.

When it comes to the development of the electric vehicle segment, it is expected that China will be the driver of the development of this segment. There are two main reasons for these projections. First, through state-owned enterprises and a network of partner relations, Chinese auto companies fully control the higher levels of activities in the supply chain.¹⁰ Although it is only in third place in terms of the amount of extracted lithium ore,¹¹ China controls over 75% of lithium processing capacity, it controls just under 80% of electric battery production, close to 90% of battery anode production, etc.¹² Second, domestic manufacturers of electric vehicles have mastered the technology of electric vehicle production, and in order for this segment to develop further, it is necessary to lower the prices of products, that is, to offer “value for money” models. Economies of scale provided by the domestic market and government subsidies mean that Chinese manufacturers already offer electric models that cost no more than \$15,000. All this speaks in favour of the production of electric batteries for vehicles soon becoming a “mature” technology, so that electric vehicles will also spread to the lower-paying mass segment of the car market.

The success of Chinese companies in the domestic market raises the question of their perspective beyond national borders. The war in Ukraine and economic sanctions

¹⁰ <https://www.businessinsider.com/china-crushing-us-america-battle-energy-evs-batteries-tech-war-2023-5>

¹¹ <https://www.weforum.org/agenda/2023/01/chart-countries-produce-lithium-world/>

¹² Bloomberg <https://www.bloomberg.com/toaster/v2/charts/b096ac18e3814ffc96915c8c1324c0b4.html>

⁹ <https://www.oica.net/category/vehicles-in-use/>

against Russia have forced Japanese, European and American companies to leave the Russian market. Now this market is open to Chinese companies, which are gradually positioning themselves on it. The importance of this market is indicated by the fact that even during the war and economic sanctions, the Russian market in 2022 amounted to over 800,000 vehicles, which makes it the sixth largest in Europe.¹³ When it comes to the expansion of Chinese companies into the European and US markets, there are two limiting factors. Brand unrecognizability and poor image of the country of origin can be a limitation, which can be overcome in the medium and long term by investing in design, quality, and brand promotion. In the short term, it is possible to overcome this limitation by taking over a Western brand, as Geely did by taking over Volvo. This solution is currently unlikely due to political resistance in Western markets, which represents another limiting factor for the expansion of Chinese auto companies. It is very realistic that the state authorities of Western countries would not allow the takeover of a car company by investors from China.

The future of the European market is perhaps the most uncertain of the major auto markets. The market started to recover in 2023, so in the first quarter of 2023, sales of new passenger vehicles were almost 18% higher than in the same period of 2022. However, the data also shows that sales are almost 23% lower compared to the same period in 2019. It should be noted that in the period from mid-2022 to May 2023, the ECB increased the benchmark interest rate from 0% to 3.25%, which will discourage demand in the future.¹⁴ Additionally, the number of vehicles per 1,000 inhabitants is very high, about 640 vehicles in 2020, approximately three times more than in China, which may be a limiting factor for sales growth. Also, potential risks regarding energy stability, caused by the war in Ukraine, may in the future be a factor that will affect vehicle production costs in Europe. High production costs can represent an additional factor of discouraging demand, which is already burdened by falling real wages, economic uncertainty and rising interest rates.

The development of the electric vehicle market in Europe will depend on two important factors. First, considering the EU agenda, we can expect that in the future institutions will also provide incentives for switching to “green” technologies. However, European auto companies have a big problem because, unlike Chinese companies, they have failed to bring the higher levels of supply chain activities under their control.

Necessary raw materials are located in remote locations, e.g. Australia, Latin America and China. Attempts to start exploiting the necessary raw materials in Europe have not been successful so far, due to environmental risks. Thus, the lithium exploitation project in Serbia has been stopped, while some other projects in Germany and Poland are very uncertain.

Political risks for European car companies will be very high in the near future. In 2022, European car companies had to leave the Russian market because of the war in Ukraine. This decision not only affected sales, the Russian market fell by 900 thousand vehicles in 2022 compared to 2021, but also the assets that European companies had in Russia. Thus, Renault sold its share in Autovaza to the Russian authorities for a symbolic sum of EUR 1, but with the option to return in 6 years under the same conditions. Today, there is a risk that European companies will be dragged into the trade and technology conflict between the US and China. In contrast to the withdrawal from the Russian market, a potential withdrawal from the Chinese market could lead to an economic collapse of European car companies. For European companies, China is not only a market, but also an export platform for the Asian market, and a centre for research and development. For example, in 2022 China accounted for 33% of sales of BMW, the leader in the premium segment, about 30% of global production took place in China, while there are 5 research and development centres in China, the same as in the US.¹⁵

An additional problem for the European auto industry in the future is the US programme “*The Reduction Inflation Act*”. This program worth 500 billion USD aims to start the process of reindustrialisation of the USA with direct financial incentives and tax exemptions, with an emphasis on “green” and innovative activities.¹⁶ Such an extensive support programme threatens to leave consequences for the European car market. It is possible for companies that have production in the USA (not necessarily American) to become price competitive in the European market. Also, it is possible that this measure could encourage some European companies to shift part of their production to the US market, which would affect the balance of payments, GDP, investments, and employment in Europe.

The US market will continue to be one of the main auto markets in the near future. It is a market with 860 vehicles per 1,000 inhabitants, the highest degree of saturation in the world.¹⁷ This may represent a limiting

¹³ OICA sales statistics

¹⁴ <https://www.euribor-rates.eu/en/current-euribor-rates/2/euribor-rate-3-months/>

¹⁵ BMW annual report 2022

¹⁶ <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/the-inflation-reduction-act-heres-whats-in-it>

¹⁷ <https://www.oica.net/world-vehicles-in-use-all-vehicles/>

Highlight 1: Global Restructuring of the Auto Industry

factor for further market growth. Additionally, market growth is limited by demographic factors. It has been shown that younger generations attach less and less importance to vehicles as status symbols, and gradually turn to mobility services (ride sharing), so that there is a decline in the number of driver's licenses issued to teenagers.¹⁸ The development of demand will also be influenced by economic trends. Namely, in 2022, the FED started raising the reference interest rate. The benchmark interest rate has since risen from around 0% to over 5% in June 2023. The rise in interest rates in 2023 and the next few years will negatively affect the demand for consumer durables, such as vehicles. At the same time, the programme "*The Reduction Inflation Act*" represents an additional incentive for American companies to continue investing in digital solutions and the development of green solutions. Financial incentives could lead to a drop in production costs, which would be reflected in a drop in prices, which could to a certain extent compensate for the increase in borrowing costs.

The US-China confrontation is also affecting American auto companies. Namely, growing tensions, improving the quality of Chinese brands, and price competition led to a drastic drop in demand for American brands in the Chinese market in 2023. GM recorded a 25% drop in demand in the first quarter of 2023 in the Chinese market. Given that GM and Ford are already marginal competitors in Europe, it can be expected that these two companies will focus on the North American market and to a lesser extent Central and Latin America in the future.¹⁹

The electric vehicle segment in the US is at a relatively low level compared to Europe and China. It is expected that this will be the case in the near future as well. Namely, over 62% of respondents in the Deloitte survey prefer internal combustion engines over pure electric and hybrid vehicles. As the main reason for opting for electric vehicles, the respondents cite fuel costs.²⁰ That is why Tesla sees the sources of its future growth in China and Europe, which is confirmed by the opening of two large plants in Germany and China. While the capacities of the two factories in the USA amount to over 900 thousand vehicles, the capacities of the new plants in China and Germany are over 750 thousand and 250 thousand vehicles, respectively.²¹ Although Tesla is a pioneer in the development of electric vehicles, over time Chinese companies have become leaders in

this segment. With the exception of Tesla, GM and Ford, they do not possess superior competence in the development of electric vehicles. Therefore, GM and Ford are forced to rely on Chinese partners to develop these competencies. Thus, the new Ford plant in Michigan, worth 3.5 billion USD, will be entirely based on the technology of the Chinese CATEL company, which is one of the leaders in the production of electric batteries. The fate of this project will predominantly depend on further economic and political relations between the US and China.

Finally in the future it can be expected that the auto market will depend on the development of the Indian market. In the first five months of 2023, it sold 1.52 million passenger vehicles in India, an increase of 150 thousand vehicles compared to the same period in 2022.²² The expected high rates of economic growth and the relatively low saturation of the market, of only 33 vehicles per 1,000 inhabitants, will have a positive effect on the growth of demand in this market in the future. However, the limiting factors will be the underdeveloped road infrastructure, a large percentage of the poor population, and underdeveloped other services in the supply chain (after-sales services, financing of purchases, showrooms, etc.).

¹⁸ <https://www2.deloitte.com/uk/en/insights/economy/spotlight/automobile-impact-us-economy.html>

¹⁹ <https://www.businessinsider.com/china-auto-sales-automakers-ford-gm-making-losing-market-share-2023-4?op=1>

²⁰ <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consumer-business/us-cb-2023-global-automotive-consumer-study.pdf>

²¹ Tesla automotive annual report 2023.

²² https://www.marklines.com/en/statistics/flash_sales/automotive-sales-in-india-by-month