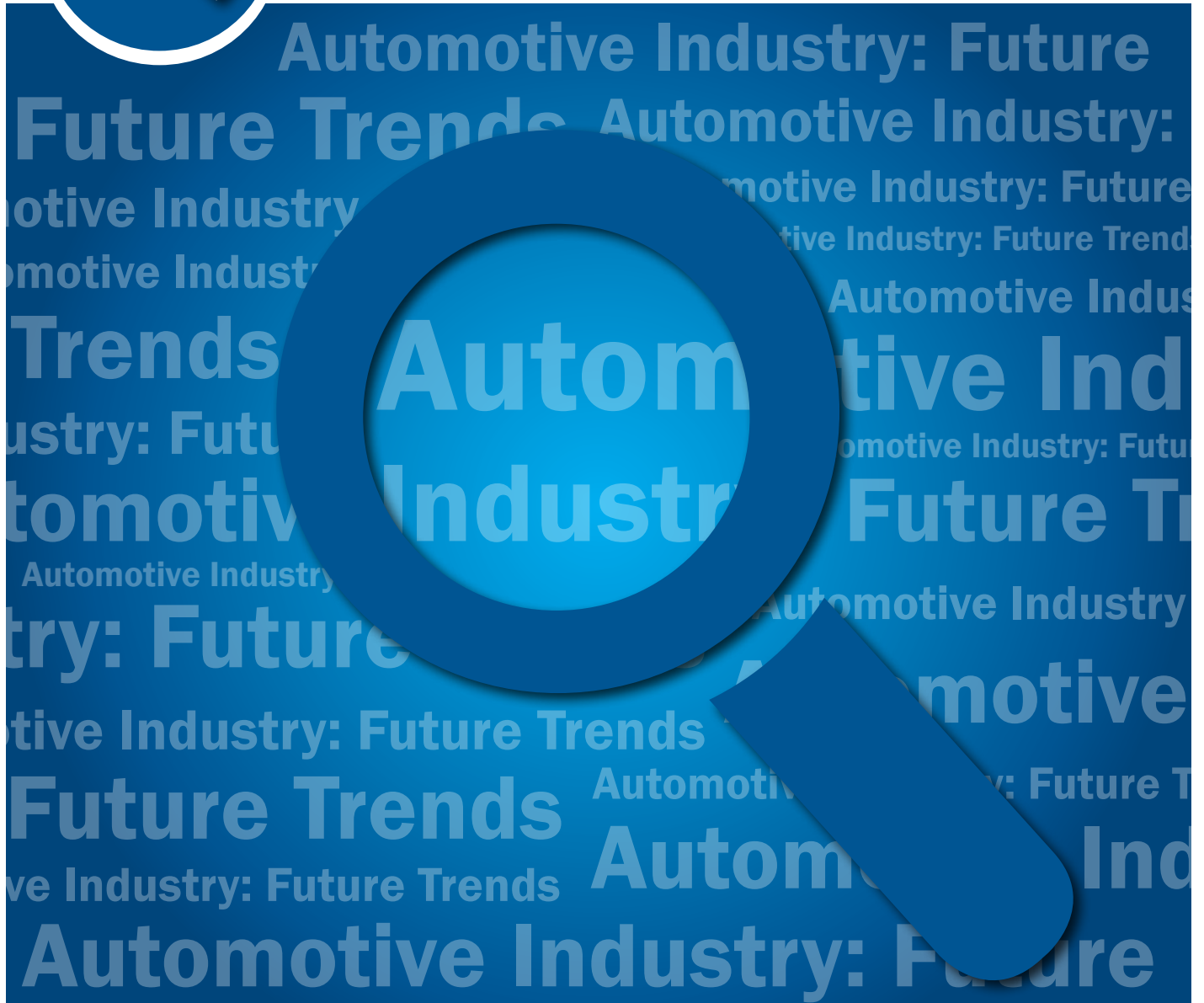




# SPECIAL ANALYSIS

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## Automotive Industry: Future Trends

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EU Office

**ERSTE**   
Corporate Banking

## Introduction

The automotive industry has recently been undergoing a number of major changes that have significant potential to transform the entire sector. And this is true not only as far as the new technical features of the cars themselves are concerned, but in the production process and the business model as well. The main trends include continuing pressure on car makers to reduce costs and increase the efficiency of production in their own factories and at suppliers' end. So the path to success in the future will lead through a diversified portfolio of products, global markets and investments in development and innovation.

Another factor that undoubtedly has an influence and in the future will continue to influence the automotive industry is the continuing tightening of environmental regulations (for CO<sub>2</sub> emissions) and safety standards (requirements for airbags, ESP systems (electronic control of vehicle stability for skid balancing), e-call features, reduction of consumption, etc. New means of powering vehicles are a chapter of their own, in which electric vehicles a primary role (although in the Czech Republic, for example, electric vehicles still make up only 0.1% of all vehicles sold). However, compressed natural gas and hydrogen fuels are also being developed. The most interesting user innovations taking place involve connecting vehicles with mobile phones and autonomous control systems.

Some car makers are already testing self-driving cars in live operation, but it remains to be seen when they will be introduced onto the market, because of, for example, who would be liable for potential traffic accidents.

## Importance of Automotive Industry for the Czech Republic

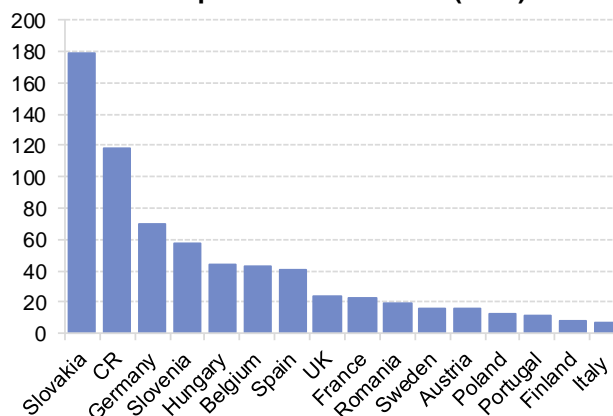
The automotive industry is very important for the Czech Republic, both in terms of economic performance and in terms of the labour market, where the automotive industry is among the main employers in the country. However, the performance of the automotive industry does not end at the Czech Republic's borders, since the Czech Republic, with annual production of 118 vehicles per 1,000 inhabitants, is among the world's automotive superpowers, holds 16th place in the global market and produces more than a million vehicles annually. Besides the three main car makers (Škoda Auto, Hyundai Motor Manufacturing Czech, Toyota Peugeot Citroën Automobile) and manufacturers of buses and trucks, the industry includes an extensive and diversified network of suppliers. This situation, together with several businesses' focus on research and development as well as design, makes the Czech Republic a compact centre for car production.

Motor vehicle production is essential for the Czech economy. The automotive sector makes up nearly 25% of the country's industrial production and exports and approximately 7.4% of GDP.

According to estimates, the sector employs over 150,000 people. The production of motor vehicles in the Czech Republic has long been on the rise, and in 2014 it reached 1.278 million vehicles. The overwhelming majority of them (a record of more than 1.247 million) consisted of personal and small commercial vehicles. They were followed by buses (3,891 vehicles), motorcycles (a stagnating 1,075 motorcycles) and trucks (821 vehicles), the production of which gradually decreased from 8,764 vehicles produced in 1997. It is apparent from these numbers that the production of personal vehicles makes up the "backbone" of the entire automotive industry.

Following the decline in growth after the economic crisis years, since 2013 there has been a recovery in the personal and small commercial vehicle industry. And this year, the number of manufactured personal vehicles is expected to reach a new record. In the first half of this year, more than 673,000 personal vehicles were manufactured in the Czech Republic, which represents year-to-year growth by more than 6%. Czech car makers and their suppliers increased revenues in 2014 by 14.7% to CZK 99 billion. Exports grew at a similar pace to CZK 845 billion.

**Produced cars per 1 000 inhabitants (2014)**



Source: OICA; Eurostat

This year's (1st half of 2015) positive (not only) economic development in the EU, where 84% of the country's exported vehicles end up, indicates that car production in the Czech Republic will again be at its highest level in history, and a record is also expected in part production. This is evidenced by the best results so far for Škoda Auto for the 1st half of the year (thanks mainly to record sales of the new models Fabia and Superb) as well as the success of the new series of Kolín-based TPCA and speeding up of production at the Hyundai plant in Nošovice.

How long the boom will last will depend on the situation in Western and Central Europe, on the continuation of sanctions against Russia, on the situation in Ukraine, as well as on oil prices and exchange rate developments. In view of the planned increase in capacity from Škoda Auto, which is related to expansion of the model series, and thanks to the success of the Czech branch of Hyundai, the capacity of Czech-based vehicle manufacturers in the years to come is expected to increase to 1.5 million vehicles per year.

In addition to the increasing number of manufactured vehicles, the number of registered cars is also expected to increase, and in the Czech Republic it has already exceeded 5 million. (According to data valid as of 30 June 2015, there are 5,060,000 registered vehicles.)

Not only is the number of registered vehicles growing, but the average age of personal vehicles has also been increasing since the economic crisis, which has also been reflected in the slower rebound in the number of new vehicles in use in the Czech Republic. People have begun postponing new vehicle purchases, and "older" vehicles are not being replaced very quickly.

It should come as no surprise that a third of all registered vehicles in the country are Škoda brand vehicles (1,731,000 vehicles as of 30 June 2015). That brand is followed by Volkswagen and Ford, which a 8% share of vehicles in use.

The situation in the first two places is similar in the case of registration of new personal vehicles for the first seven months of 2015. Škoda brand vehicles in this ladder as well make up a third of all newly registered vehicles in the country. Volkswagen is in second place with 14,000 newly registered vehicles, followed by Hyundai in the third position.

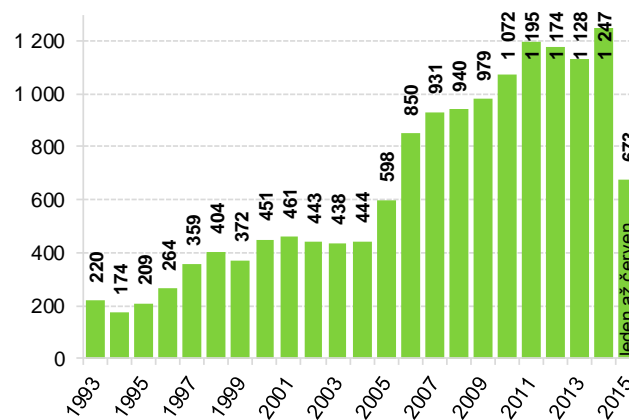
**New vehicles registration in 1-7/2015**

Brand	Produced cars	Share
Škoda	43 663	32%
Volkswagen	14 616	11%
Hyundai	10 939	8%
Ford	8 818	7%
Dacia	6 236	5%

Automotive Industry in CR		
<b>Production:</b> 991 bln CZK Growth: 14.7 %	<b>Export:</b> 845 bln CZK Growth: 15.2 %	
Share of industrial production: 24.7 %	Share of Czech GDP (estimate): cca 7.4 %	Share of total export: 23.4 %
<b>Average wage:</b> 31 515 CZK Growth: 2.7 %	<b>Employees</b> 155 550 persons	

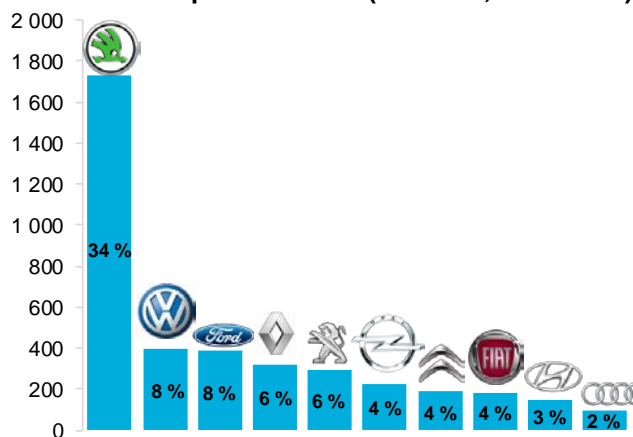
Source: Car Industry Confederation

**Production of passanger and small utility cars in CR**



Source: AutoSAP, thousands

**Car brand composition in CR (in thous., 30. 6. 2015)**



Source: AutoSAP; first ten brands

Opel	4 730	4%
Kia	4 651	3%
Renault	4 373	3%
Peugeot	4 279	3%
Seat	4 092	3%
BMW	3 314	2%
Citroën	3 060	2%
Audi	2 871	2%
Nissan	2 790	2%
Mercedes-Benz	2 653	2%

Source: AutoSap, first 15 brands

## Car manufacturers

In the Czech Republic, there are three major manufacturers of personal vehicles, which are members of large multinational corporations:

- Škoda Auto;
- Hyundai Motor Manufacturing Czech;
- Toyota Peugeot Citroën Automobile (TPCA).

**Škoda Auto:** Škoda Auto operates 13 factories in 6 countries in Europe and Asia and exports personal vehicles to more than 100 countries. In 2014, it achieved its highest sales ever in history, selling 1,037,200 vehicles. Škoda has long invested into the expansion of its Czech factories in Mladá Boleslav and Kvasiny. In order to complement its strong position in Western Europe (sales growth +11.8% in 2014), it has focused on growth on the Chinese market, which with the sale of 281,000 vehicles in 2014 is the largest individual market. Škoda Auto is part of the VW concern, which in 2014 achieved revenues of CZK 266.5 billion.

**Hyundai Motor Manufacturing Czech:** In 2008 the capacity of the plant in Nošovice was set at 200,000 cars per year, which the car company achieved after just two years since its launch. After beginning three shifts in 2011, the maximum yearly production of Hyundai in the Czech Republic rose to 300,000. In 2015, the company plans to manufacture 330,000 vehicles, thanks to speeding up of production lines. Hyundai produces three models in the Czech Republic, ix20, ix35 and i30, but some of the production is intended for the sister car manufacturer Kia Motors Slovakia in Žilina, Slovakia.

However, even it supplies the Czech Hyundai factory, and both factories comprise a complex of units cooperating with each other. In 2015, the production of the Tuscon SUV model began. In 2014, the company achieved revenues of CZK 106.3 billion.

**Toyota Peugeot Citroën Automobile:** The capacity of the factory in Kolín is 300,000 vehicles annually. Currently TPCA produces a new generation of Toyota Aygo, Peugeot 108 and Citroën C1 models, which are fuel efficient small urban vehicles with low emissions. Approximately 80% of the deliveries for TPCA production come from the Czech Republic. More than 99% of the production is exported to the European market, especially to France, Italy, the UK, the Netherlands and Germany. The factory has approximately 3,000 employees. In 2014, the company achieved revenues of CZK 39.8 billion.

## Industry-wide Associations

The most important automotive industry association in the Czech Republic is the Automotive Industry Association (AutoSap). It currently includes 13 manufacturers, 103 suppliers and 32 specific organisations, which account for approximately 85% of the sector's revenues. The Association's aim is to develop the automotive sector in the Czech Republic, to promote its members' interests, to present a single voice in relation to public administrative bodies and to keep statistics about the entire sector.

At the European level, there is the European Automobile Manufacturers' Association, which represents 15 manufacturers of motor vehicles active in Europe.

# Automotive Industry in the EU and the World

The development of the number of registered and manufactured vehicles has undergone major changes in the world in recent years. Europe has already lost its dominant position, and Asia is moving full speed ahead and is even gaining a majority share of registered new vehicles. As far as the largest markets for vehicles are concerned, the huge Chinese market is excelling, and compared to other economies is growing at a much faster pace and soon will have more than 20 million registered vehicles.

Both Europe and America were hit by the economic crisis, which also had an effect on the automotive industry. The decline in production in 2009 compared to 2008 was by more than 5 million personal vehicles in both Europe and America.

However, the outlook for the EU's economy for future years is entering positive numbers, and with the growth of the economy it is also expected that vehicle sales will increase, as has happened in recent years.

The automotive industry is not only important for the EU as far as economic performance is concerned, but in addition the sector is a major employer in the EU as a whole just as it is in the Czech Republic. Germany has the most employees working in the automotive industry with more than 800,000 employees, which greatly exceeds the number in other member states.

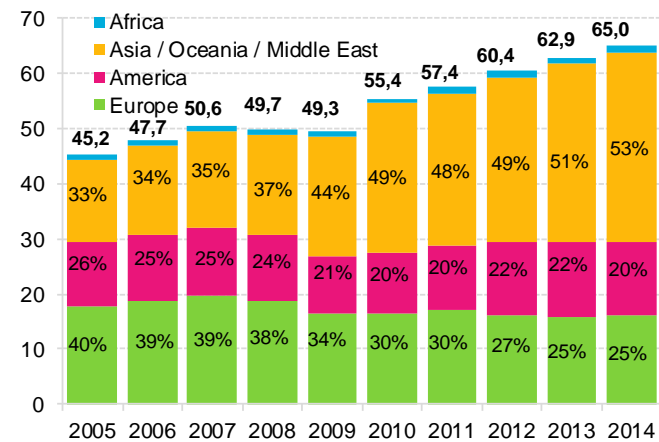
The changes happening in the automotive industry are also reflected in employment. There has been an apparent shift from "traditional" automotive superpowers, such as France, Italy and the UK, where the numbers of staff working in the automotive industry has declined as a result of production being shifted to Eastern European countries and even Asia.

For example, the number of people working in this industry in countries such as the Czech Republic, Romania, Hungary and Slovakia has risen compared to the year 2000.

There have been other changes in the automotive industry, not only changes in production preferences and the destinations where vehicles are exported, but regulatory changes as well. The most important regulatory areas in the automotive industry include environmental and safety standards. In both cases, EU standards are followed.

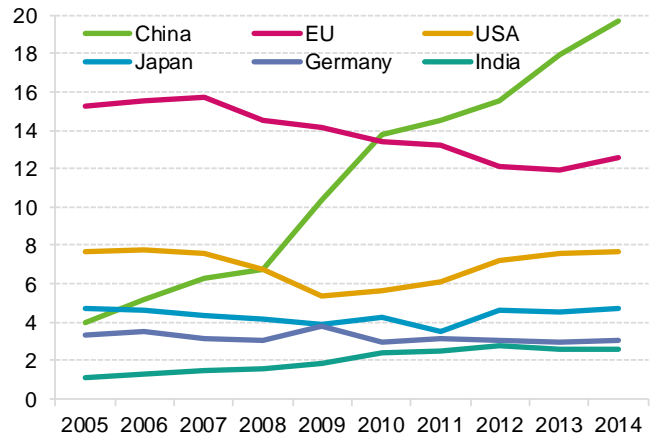
As far as environmental standards are concerned (according to Regulation (EU) No. 333/2014), newly manufactured personal vehicle must not release more than 130 grams of CO2 per kilometre driven in 2015. In 2021, new personal vehicles will not be allowed to release more than 95 g of CO2 per km.

**New Passenger Cars Registration or Sales (in mln)**



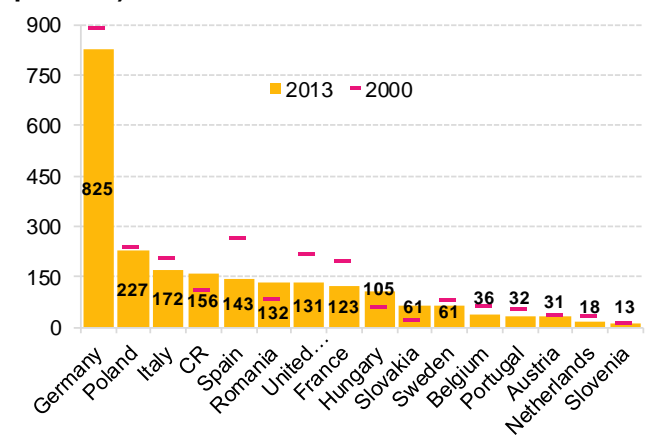
Source: OICA

**Development of personal cars registrations (mln)**



Source: OICA

**Employment in automotive industry in EU (thous. persons)**

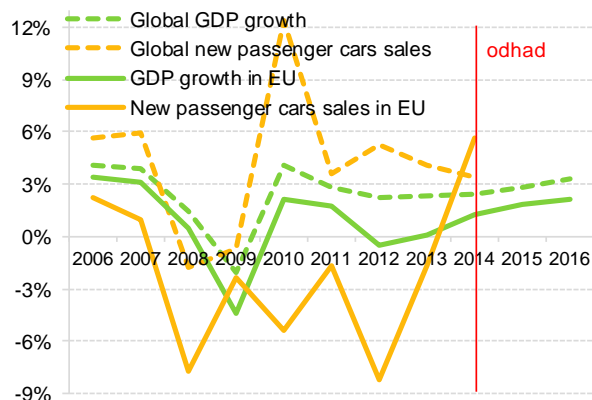


Source: Eurostat; member states with more than 10 000 employees; \*data for 2012

The European Commission's goal is not only to improve the environment and support alternative fuels, but also to reduce vehicles' consumption. Various European regulations regarding safety standards define mandatory safety equipment that vehicles must have.

Besides standard seatbelts, airbags as well as ABS and ESP systems, all new personal vehicles will also be required as of 1 April 2018 to be equipped with an e-call system, which will call for help automatically in the event of an accident.

**GDP and car sales growth in the world and in EU**



Source: European Commission; OICA

## Trends in the Automotive Industry

The automotive industry is undergoing a number of major changes that have significant potential to transform the entire sector. This is true not only as far as new technological features in cars themselves are concerned, but in the production process and the business model as well.

### 1) Fuel alternatives: Electricity, natural gas and hydrogen

Every large car company is investing in new fuel alternatives. The most important is electric power, but Škoda Auto, for example, also supports compressed natural gas (CNG). Liquefied natural gas is being promoted for freight transport on roadways. Mainly Japanese car companies believe in hydrogen (Toyota has already mass-produced the Mirai hydrogen vehicle), and Audi has developed a new eco-friendly e-diesel fuel consisting only of water and air. Mass expansion of particular fuel alternatives will depend primarily on the availability of refuelling and charging stations, on vehicle prices and on the distances they can travel.

**Electromobility:** The cost for each kilometre travelled in an electric vehicle is between 1 and 3 cents, and their greater development is currently being prevented by the high acquisition cost, the battery life and an insufficient number of charging stations. Greater development of electromobility at the European level is not expected until after 2020, depending on tightening of the EU's emission rules, development of technology (especially batteries) and individual member states' policies. (Several member states, with Germany leading the effort, are supporting purchases of electric vehicles, through tax incentives, free parking and providing subsidies towards vehicle purchases, among other incentives.)

### 2) New technologies: connectivity and autonomous control systems

The most interesting user innovations taking place involve connecting vehicles with mobile phones and applications and in autonomous control systems. Today, it is already possible not only to connect and synchronise a vehicle with a smartphone, but also to use it to control the vehicle. (For example, Mazda offers a system that makes it possible to start the engine via a mobile phone.) Autonomous control systems, thanks to advanced sensors, help keep the vehicle in the proper lanes, brake in emergencies, monitor surrounding objects, park or enter a garage.

Self-driving cars are already being tested by Audi, BMW, Toyota, Mercedes and even Google. However, they are not expected to be put in regular operation until at least 2025, because so far it is not clear who would be liable for potential accidents. In the nearer future, however, links between vehicles and their GPS navigation will be developed and smart traffic control systems will be implemented, including vehicles communicating with each other. One of the consequences of the development of new technologies could be the arrival of new operators in the sector (in particular, from IT sector, such as Google), but they will have to invest huge resources into the development of their cars.

### 3) Industry 4.0: Production digitalisation

A major opportunity for the Czech automotive industry is the 4th revolution in industry, involving its digitalisation. In practice it will mean interconnection of all intelligent devices, production lines and products, all production systems,

storage facilities, logistics and service into a single intelligent information network, within which the smart devices of customers, manufacturers and suppliers will communicate with each other without human assistance and react to clients' needs in real time.

Already within a few years, people will not have to go to a dealership to buy a car, but can set up a customised "unique" car via the internet, containing all possible components. The only difference is that the customer will not buy the car, but will lease it for a specific period.

The production process will be carried out in such a way that after ordering the vehicle's intelligent system will analyse the order and send requirements to component manufacturers. With the help of robots, they will assemble the vehicle and automatically deliver it in ready form. Moreover, the production line will not be owned by the factory, but will only be borrowed from the manufacturers. The borrowing time can be for 20 years, for three months or for just a few orders. Everything will be overseen by smart factories, in which robotisation and automation of production will continue and where chips, sensors and 3D printers will be implemented, which will also grow productivity in the sector. The employees' main role will be checking robots and cooperating with them.

#### 4) Tightening of environmental and safety standards

Tightening of requirements regarding CO<sub>2</sub> emissions (in accordance with EU regulations from today's 130 g/km to 95 g/km in the year 2021), as well as tightening of safety standards (requirements for the mandatory safety gear, airbags, ABS and ESP systems - electronic stability control, the e-call system, which as of 1 April 2018 all new vehicles will be required to have, will require major investments by car companies.

Fulfilment of the requirement regarding CO<sub>2</sub> emissions alone will cost car companies selling their vehicles in Europe up to EUR 13 billion. That is why car companies increasingly use new materials, such as nano fibres (e.g. in filters) or carbon fibres, which enable reduction of vehicle weight (and hence consumption) while maintaining strong standards.

#### 5) Continuing cost reduction

Car manufacturers will apply further pressure to reduce costs and increase production efficiency, both in their own factories and in those of their suppliers. As a result, large car companies will reduce the number of suppliers and give preference to those who are able to supply parts globally and innovate their products.

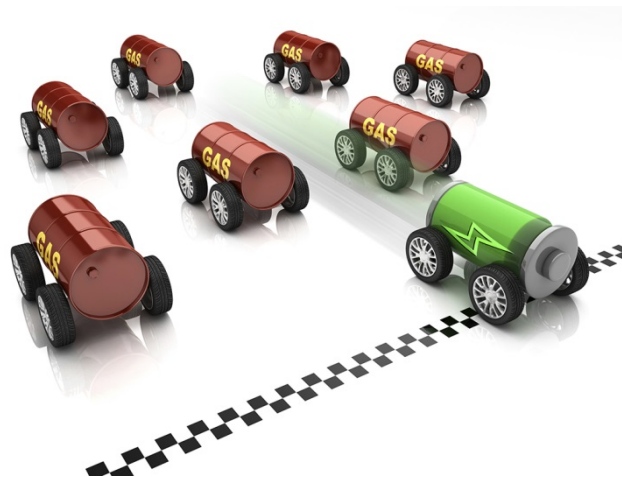
Car companies will also focus more on their suppliers, mainly on the effectiveness of their production and the prices of components. The aim is to minimise recalls (recalling of vehicles for service), for which suppliers are usually to blame and which harm car companies.

#### 6) Car sharing

Among members of the upcoming generation ("Generation Z") the need for people to own their own cars will decline. They will be much more interested in how to get from point A to point B. They will be helped in this by smart phones, applications, non-stop internet access and mainly concepts for shared mobility (car sharing).

Car sharing functions based on the principle that one "travels by car only when necessary". The service is focused on people who do not use a car every day and travel fewer than 10 km per year. It will be appreciated by, for example, families who sometimes need to have a second car available as well as by students and young people. Access to a vehicle will be possible at any time, usually via a chip card, a smart phone app or SMS. This is a cheaper and more flexible type of car rental service. The user signs a contract only once and pays only for the number of kilometres he actually travels. Car sharing already functions in the Czech Republic.

Its biggest Czech providers include Car4Way and Autonapůl. The main providers of the service in Germany include Cambio, which offers more than 2,000 vehicles. The importance of car sharing is growing mainly in cities and very urban areas. However, even in the future people will not stop wanting to own their own cars, mainly due to independence and the desire for freedom.



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