

## Competitiveness Outlook of the Automotive Industry in the V4 Countries<sup>1</sup>

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### Abstract

*The aim of the paper is to analyze the possibilities of the automotive industry development in the V4 countries in the near future. Automotive is one of the most important industries in the Czech Republic, Hungary, Poland and Slovakia. However, it faces significant challenges on both the demand and supply side. The shortage of qualified and relatively cheap labour force, once the important comparative advantage of these countries is becoming a major problem in sustaining the competitiveness. Meanwhile the rise of protectionist policies and trade tensions also pose a significant threat to the export-oriented industry. The third important source of change is the technological advancement. Industry 4.0, electromobility and self-driving cars are reshaping the whole business model. In order to stay competitive, the V4 countries have to take all these factors in account and try to adjust their policies to these changes in environment.*

### Key words

*V4 countries, automotive industry, competitiveness*

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### Introduction

Automotive industry plays an important role in the economies of the V4 countries (the Czech Republic, Hungary, Poland and Slovakia). However, the initial comparative advantage of relatively low-cost and skilled labour force is quickly vanishing, as economic growth and rising wages result in record-breaking low levels of unemployment and labour shortages. The other threat is the rapidly evolving external environment in terms of changes in production processes and business models. It will be therefore crucial for the V4 countries to adjust to this development, otherwise their competitiveness might be endangered.

Another factor which must be considered is the high dependence of the automotive sector on exports. All the economies (except Poland) are extremely open and their foreign trade is focused on the European Union (EU) and Germany in the first place. Majority of their car companies are affiliates of foreign investors with domestic companies often lagging behind in terms of value added or position in global value chains. In the light of ongoing automatisisation, higher value added and innovations are even more important to keep the production and jobs from moving abroad.

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## 1 Methodology

The aim of the paper is to analyze the possibilities of the automotive industry development in the V4 countries in the near future in the light of changes in internal and external environment. Many of these changes are not definite at the time of writing of the paper, therefore there is a lack of data which might be used for an evidence-based predictions. Analysis, synthesis and international comparison are the methods used in this research paper. The data was gathered from secondary sources such as statistics of international organisations, automotive companies or other research papers.

## 2 Results and Discussion

According to the OICA (Organisation Internationale des Constructeurs d'Automobiles) statistics, 18 907 697 cars were manufactured in the EU in 2017, 19.1% of them in the V4 countries (OICA, 2018).

Automotive is one of the most important sectors in the European Union, as can be seen in numerous indicators. It represents 6.1% of the EU employment, creates € 90.3 billion trade surplus and accounts for 27% of total R&D spending, which is the most among all industries. The innovations also contributed to the decrease of 23.7% in CO2 emissions from car production in the last decade and to decrease of 31% in the water consumption per car produced. It means that the environmental footprint of the industry has substantially improved recently (ACEA, 2018). Yet the competitiveness of the automotive sector is challenged by the disruptive innovations, which affect the product, the business model and the very concept of transport as well.

The key disruptions in the automotive sector which will also lead to the changes in skillsets of employees are new business models such as shared mobility and connectivity-based services. New business models could add 30% to the revenues of the industry (Adecco, 2018).

Autonomous driving is an innovation which affects not only the car production, but together with car-sharing and ride-hailing platforms it changes also the overall meaning of mobility. According to research, average car is used only 5% of the time and otherwise it is parked (Kefferpütz, 2018). It is therefore possible that instead of owning a car, people will gradually prefer renting or sharing a car with others. In the ideal case, 15% of the cars sold might be autonomous in 2030. However, there are still many technological, legislative and ethical issues to be solved. The MIT Moral Machine research (Awad et al., 2018) presents different scenarios which might occur during the ride of autonomous vehicle. Its aim is to gather a human perspective on moral decisions made by machine intelligence, based on solving of moral dilemmas where a car has to choose the "lesser evil" between the two given situations. The respondent of the survey chooses the situation which he or she deems morally more acceptable. Any generalisation of the outcomes might be difficult, though: ethical decisions may vary greatly among different cultures. Collectivist cultures like China and Japan are less likely to spare the young over the old which might be a result of higher respect of the elderly people in these countries.

Other factors causing differences in moral opinions of countries include strength of institutions, level of economic inequality or geographical proximity of countries (Hao, 2018). It is therefore evident that the spread of autonomous vehicles must be based on the interdisciplinary approach.

The climate change poses a serious threat for many industries and automotive is one of the most impacted. The whole transport sector is responsible for 22% of overall emissions in the EU and they have even grown by 20% since 1990 (the overall EU emissions fell by 22% during this period). The EU environmental legislation is strict when it comes to CO<sub>2</sub> emissions: compared to the 2021 level, new cars would have to reduce emissions by 15% on average by 2025 and by 37.5% by 2030. Less strict targets are prepared for carmakers with share of zero- and low-emission vehicles higher than 15% in 2025 and 30% in 2030. According to the European Automobile Manufacturers' Association (ACEA), these targets are highly challenging for the industry. The target for 2021 was set at fleet average of 95g/km (Morgan, 2018). Many countries employ stricter environmental legislation than on the EU level – France and UK will ban combustion engines by 2040, all new cars will have to be zero-emission in Norway by 2025 and countries like Denmark, Ireland, Spain and China have set targets for electric car sales. This is especially important in the case of China as the largest car market in the world and the major importer of European cars. Moreover, the spread of the Smart City concept along with the principles of sustainable development will result in a more prominent role of cities in shaping of mobility besides the national legislation.

With these new measures adopted, car companies have sped up the development of electric cars. The European Commission along with other stakeholders such as member states, European Investment Bank and industry and innovation actors have launched European battery alliance in 2017. At least 10 to 20 'gigafactories' are needed to cover the EU demand. The main aim of the alliance is to create a manufacturing value chain producing sustainable battery cells (European Commission, 2019). Chinese companies produced 43% of electric vehicles in 2016 and the country also has the largest number of these vehicles in use (Kefferpütz, 2018). Electric cars need batteries and the more of these cars will be sold, the more important will batteries be for the automakers. Currently China, South Korea and Japan are the leaders in this segment.

To sum up, the car of the future will be sustainable, smart and shared (Kefferpütz, 2018).

As for the geopolitical threats, the two main are possible US tariffs and Brexit. The USA account for relatively small share of exports from the CEE (Central and Eastern European) countries. According to UBS, American market would shrink by 12% in case of 25% tariffs on car imports (Economist, 2019). The US government has 90 days to act after the Commerce Department releases a report on automotive industry and national security on February 17, which might advise to impose tariffs on European cars (Dommm, 2019).

It is difficult to predict the impact of Brexit on exports as the final agreement between the EU and UK has not been reached yet. According to some estimates Slovakia – for which the UK is the fifth biggest export partner – might lose 7 500 jobs in case of hard Brexit (SITA, 2018). However, CEE countries can look for other markets such as Japan, which has recently signed a free trade agreement with the EU. Another country with potential for strengthening of the trade ties is China, however, trade deficits of

CEE countries remain large and Chinese investments in this region are limited (Baláž & Kráľovičová, 2017). Chinese car market, the largest in the world, contracted for the first time in more than 20 years in 2018. 28.1 mil. cars were sold, decline of 2.8% compared to previous year. In December 2018 alone, the sales plummeted by 13% (Economist, 2019).

## 2.1 Automotive investment in the V4 countries

There were 227 automobile production facilities in the EU in 2017, 33 of which located in the V4. However this combined number is still less than 43 in Germany and the same number as in the UK (ACEA, 2018).

The production portfolio among the V4 countries is rather diversified. Out of 16 plants in Poland, only 2 of them are producing passenger cars. On the other hand, all four Slovak factories are focused on this type of vehicles. Production in Poland is mainly focused on buses and engines, but the overall structure of industry is the most diversified (it is the only country producing light commercial vehicles as well). Slovakia has the least diversified portfolio with only one plant (Kia) producing engines and all four factories focused at the passenger cars. Production in the Czech Republic is focused mainly on passenger cars and engines, but some of the companies manufacture also buses and heavy-duty vehicles. Hungary produces passenger cars, engines and buses as well.

Automotive industry is one of the most integrated into global value chains. Slovakia has the highest share of regional value chain trade (involving regional production partners) on the total value chain trade in manufacturing and the second highest share in the total economy. In both cases the Czech Republic, Hungary and Poland placed in the highest four spots among the EU 28 countries (Stöllinger, 2018).

Table 1 shows basic indicators of the V4 countries concerning production and sales of cars. Even though Slovakia is the smallest country in terms of inhabitants and the number of plants, it is by far the most productive with the highest number of cars produced per 1 000 inhabitants in the world and per direct automotive manufacturing employee. On the other hand, automotive industry is relatively least important for the Polish economy.

Reasons for the original automotive investment in Central and Eastern Europe stem from the comparative advantages of the region: relatively low-cost but skilled labour force and a gradually built supply chain (Automotive Logistics, 2018). However, the picture is changing: with unemployment rates at the record-breaking lows, the region is coping with the shortage of the skilled labour. There is also a positive aspect of the situation as the investments are no longer aimed only at assembling but some of them also at research and development.

Out of the 4 countries, Slovakia had the highest share of automotive industry on total capital expenditure (8.34%) in 2017. On the contrary, the lowest share (2.38%) was in Poland. Share in the Czech Republic was 4.43% and 3.88% in Hungary (Chlopčík, 2018).

**Table 1** Main indicators of the automotive industry in the V4 countries

<b>Indicator</b>	<b>Czech Republic</b>	<b>Hungary</b>	<b>Poland</b>	<b>Slovak Republic</b>
<b>Share of automotive industry on GDP (% , 2017)</b>	9	10	3.8	13
<b>Direct automotive manufacturing employment (active population ratio, %, 2016)</b>	3.22	2.04	1.44	2.60
<b>Direct automotive manufacturing employment (number of employees, 2016)</b>	168 408	92 816	187 334	71 240
<b>Motor vehicle production (2017)</b>	1 424 300	506 000	689 700	1 025 000
<b>Motor vehicle production per direct automotive manufacturing employee (2016)</b>	8.0	5.7	3.6	14.6
<b>Automobile assembly and engine production plants (2017)</b>	8	5	16	4
<b>Motor vehicle registrations (2017)</b>	301 805	142 703	577 293	108 279
<b>New passenger car registrations per 1 000 inhabitants (2017)</b>	26	12	13	18
<b>Motorisation rates per 1 000 inhabitants (2016)</b>	570	394	672	455

Source: ACEA, 2018, p. 10-32, ČTK, 2018

Nevertheless, the situation varies greatly among countries: Hungary is attracting multiple investments ranging from electric motor manufacturing to testing area for autonomous vehicles and seems to be the most prepared for the upcoming and ongoing changes in environment. Two companies, Horiba Mira and ZalaZone want to provide testing zones for autonomous vehicles. The latter one received funding from the government and claims that its test track will have 5G network and enable prototype tests as well as development of serial products.

Jaguar Land Rover will not create an engineering office in its plant in Nitra, Slovakia, but in Budapest instead. The company will employ 100 engineers supporting the European supply chain management, focusing on developing new models. It is the first JLR's office of this kind in continental Europe. According to Péter Szijjártó, Foreign Minister of Hungary, the choice of location was driven by the lowest corporate tax in Europe, tax benefits for research and development activities and high level of technical education (Daily News, 2018b).

Mercedes-Benz is building its globally first full-flex factory at its existing site in Kecskemét with costs up to 1 bil. €. The factory will allow for production of multiple vehicle architectures on the same assembly line, including compact cars, sedans and electric cars as well. The plant will also be carbon neutral and it will employ the concept of Factory 56, which Mercedes-Benz labelled as the car factory of the future, which means it will be digital, flexible and green (Daimler, 2018).

Audi factory in Győr is a main electric motor-manufacturing plant of the company. It uses modular islands, which is different from traditional assembly lines: robots and stations are not linked together and there is no predefined assembly sequence. Therefore, this solution allows for greater flexibility of the production process. The motors will be used in the first fully-electric model of the company, Audi e-Tron. The factory will also include research and development centre (Daily News, 2018a).

BMW has chosen Hungarian city of Debrecen to build its new 1 bil. € factory with production capacity of 150 000 cars a year. The plant will employ more than 1 000 workers. Infrastructure, logistics connections and supplier network were among the main reasons for this decision. Košice, Slovakia was also among the main contenders for this investment (BMW Group, 2018).

The role of automotive sector in Hungary is increasing: for the first time, the country placed in world top 20 automotive exporters in 2017. Share of automotive on the Hungarian industrial output is 28.8%. In 2017, production consisted of more than 500 000 cars and 2.5 mil. engines. The industry is heavily export oriented: only 8.3% of the output stays in the home market (Automotive Logistics, 2018). Hungarian government actively promotes the development of the automotive industry by building new infrastructure or changes in the legal environment favouring autonomous vehicle testing. This legislation might be an important comparative advantage for Hungary, unless other countries will follow this example.

Besides autonomous vehicles and automatization, electric cars and batteries are the third important innovative sector. In Europe, battery plants are in Sweden and Poland, where LG Chem plans to build a largest lithium-ion battery plant in Europe, able to supply 250 000 cars annually (Perez, 2019). Mercedes-Benz is another company which will build a battery factory in Poland, and also in Germany (Autonews, 2019). The third

major carmaker is Tesla which also eyes Europe for its Gigafactory producing batteries. Hungary has a potential to be an important producer of batteries for electric vehicles with Samsung, Shinhueng Sec and GS Yuasa companies all announcing their plans to build their factories in the country.

One of the main problems of Slovak economy is that it is divided between affiliates of foreign investors with higher value added and the second sector, which comprises of several large Slovak companies and small and medium-sized enterprises, which form the majority of firms. Nevertheless, their value added is generally lower than that of foreign affiliates (Kittová & Steinhauser, 2016). Another issue is that as an extremely open economy, Slovakia is heavily reliant on exports. In 2017, road vehicles accounted for 27% of the overall exports (OECD, 2019). Share of car production on the overall industrial production was 44% in 2017. UK is the third most important trading partner in the EU for Slovakia. Hard Brexit would certainly have the most serious impact on the automotive industry – every seventh car produced is exported there. It is even the second biggest market for KIA factory. Cars make up 40% of the overall Slovak exports to the UK (Poracký, 2019).

In terms of attracting new investment, Slovakia is often losing out to other V4 countries, notably Hungary, as show the examples of BMW and Jaguar Land Rover engineering office.

2017 was a record year for automotive companies in the Czech Republic. Production, sales and exports have risen by 5.2%, 7% and 6%, respectively. Number of employees has grown by 6% and average wage in automotive by 7%. Škoda plant has the highest share on production with 60.7%. Production of buses has grown by 5.5%, production of heavy duty vehicles increased by 11.7% (Sdružení automobilového průmyslu, 2018).

Production of passenger cars and light commercial vehicles in Poland grew by 0.6% in 2017, compared to previous year. Even though there are 16 production plants in Poland, FCA factory accounts for 39% of the overall production. As for the commercial vehicles alone, production has risen by 39.2% in 2017. Growth in bus production was nearly flat in 2017 – only 0.3%. When it comes to production of automotive parts and accessories, Poland lost the position of regional leader to the Czech Republic recently. The employment in automotive grew by 12.8% and wages by 7.1% in 2017. In the same year, exports of industry grew by 8.2% and accounted for 16.2% of total Polish export (Polish Automotive Industry Association, 2018).

Even though the situation of the automotive sector in the countries seems to be in a good shape, it might not stay this way for long. According to Ivan Hodáč, former Secretary-General of ACEA, situation in automotive industry in V4 is good, but investment in human resources is vital to maintain it. Cooperation and improved communication within the group but also with the EU institutions is strategically important (Rybecký, 2018). As for the human resources and employment, Slovakia is the most vulnerable to technological changes, which threaten nearly 70% of jobs – the most among OECD (Organization for Economic Cooperation and Development) countries. The third of the jobs is threatened by automatization. José Ángel Gurría, Secretary General of OECD noted that the success of the current economy model based on assembly plants might be coming to an end and the country must focus on improving the skills of students and employees (TASR, 2019)

## Conclusions

New technologies might create new jobs, but they also require new skillsets. It is positive that the new investment in CEE automotive is largely compliant with the Industry 4.0 principles. On the other hand, Industry 4.0 implementation is reflected in the higher levels of automatization, which in general means lower labour intensity – this is relevant at least for the workers with the current skillsets. Even though the fourth industrial revolution creates new jobs, the difference between skills needed for the position of e. g., data scientist (new position) and assembly worker (current position) is large. Therefore the retraining of the employees might not be feasible in many cases and unemployment will actually rise.

The problem when it comes to the V4 countries is that development of new concepts and products is happening in the parent companies and it depends on their decision if they will assign this research and subsequent production also to their affiliates in other states. As the global value chains in automotive industry are extremely complex, these decisions will be crucial also for the networks of subcontractors, as there are hundreds of these companies in the V4 countries. Another important factor is that many components used in cars with combustion engines will not be used in electric cars. On the other hand, electric vehicles contain many new parts which also puts a pressure on subcontractors to adjust their product portfolios.

The lack of diversification stays the most serious problem, notably in the Czech Republic and Slovakia. Shortage of skilled workers might lead to the employee fluctuation among the companies or inflow of foreign workers, even though the unemployment in Slovakia is still relatively high at 5% due to uneven allocation of investment among the regions. Recent information about downsizing in Volkswagen and KIA plants will certainly ease the pressure on labour market to some extent.

As shows the example of internet banking applications or contactless payments, Slovakia is a suitable market for testing of various innovations. However, Hungary seems to be the most successful country in attracting innovative investment.

Among the V4 countries, automotive sector is the most important relative to the overall economic output in Slovakia. However, it seems that the country starts to lag behind other V4 states in terms of new investment and its innovativeness. The biggest challenge for the country is to make a transition from “Assembled in Slovakia” to actually “Made in Slovakia”.

## References

- ACEA. (2018). *The Automobile Industry Pocket Guide*. Retrieved January 31, 2019, from [https://www.acea.be/uploads/publications/ACEA\\_Pocket\\_Guide\\_2018-2019.pdf](https://www.acea.be/uploads/publications/ACEA_Pocket_Guide_2018-2019.pdf)
- Adecco. (2018). *Inovantage: 4. priemyselná revolúcia v strednej a východnej Európe*. Retrieved February 6, 2019, from [https://adecco.sk/wp-content/uploads/2018/08/Adecco\\_Inovantage\\_SVK.pdf](https://adecco.sk/wp-content/uploads/2018/08/Adecco_Inovantage_SVK.pdf)



- Automotive Logistics. (2018). *Competing on a global stage*. Retrieved February 6, 2019, from <https://automotivelogistics.media/events/central-eastern-europe-summit/2018-2/competing-on-a-global-stage>
- Autonews. (2019). *Mercedes will boost battery production with factory in Poland*. Retrieved February 5, 2019, from <https://europe.autonews.com/automakers/mercedes-will-boost-battery-production-factory-poland>
- Awad, E. et al. (2018). The Moral Machine experiment. *Nature*, 563(7729), 59–64.
- Baláž, P. – Kráľovičová, M. (2017). "One Belt, One Road" Initiative – Opportunities, Risks and Consequences for Cooperation of CEE Countries with China. In *Proceedings of 17th International Joint Conference: Central and Eastern Europe in the Changing Business Environment*, Prague and Bratislava: Vydavateľstvo EKONÓM, pp. 21-31.
- BMW Group. (2018). *BMW Group To Expand Production Network in Europe*. Retrieved February 5, 2019, from <https://www.bmwgroup-werke.com/debrecen/en/aktuelles/new-plant.html>
- ČTK. (2018). *Automobilový průmysl v zemích V4*. Retrieved January 26, 2019, from [https://www.ceskenoviny.cz/index\\_img.php?id=447636](https://www.ceskenoviny.cz/index_img.php?id=447636)
- Daily News. (2018a). *Audi to Set Up HUF 6.15 BN R+D Centre in Hungary*. Retrieved January 26, 2019, from <https://dailynewshungary.com/audi-set-huf-6-15-bn-rd-centre-hungary/>
- Daily News. (2018b). *Jaguar to Set Up Next Development Centre in Budapest*. Retrieved February 5, 2019, from <https://dailynewshungary.com/jaguar-to-set-up-next-development-centre-in-budapest/>
- Daimler. (2018). *Mercedes-Benz Cars: World premier of the "Factory 56" – the most modern car production in the world*. Retrieved February 3, 2019, from <https://media.daimler.com/marsMediaSite/en/instance/ko/Mercedes-Benz-Cars-World-premier-of-the-Factory-56--the-most-modern-car-production-in-the-world.xhtml?oid=33455884>
- Domm, P. (2019). *Trade war headlines could get much worse before they get better as the US looks to Europe*. Retrieved February 9, 2019, from <https://www.cnbc.com/2019/02/08/trade-war-headlines-could-get-much-worse-before-they-get-better.html>
- Economist. (2019). The Big Freeze. *The Economist*, 430(9 126), 71.
- European Commission. (2019). *European Battery Alliance*. Retrieved February 3, 2019, from [https://ec.europa.eu/growth/industry/policy/european-battery-alliance\\_en](https://ec.europa.eu/growth/industry/policy/european-battery-alliance_en)
- Hao, K. (2018). *Should a self-driving car kill the baby or the grandma? Depends on where you're from*. Retrieved February 5, 2019, from <https://www.technologyreview.com/s/612341/a-global-ethics-study-aims-to-help-ai-solve-the-self-driving-trolley-problem/>
- Chlopčík, T. (2018). *Automotive industry in the Visegrad Group*. In *Proceedings of the 7th Business & Management Conference, Budapest*. Budapest : International Institute of Social and Economic Sciences and International Society for Academic Studies, z. s., pp. 1 – 18.

- Kefferpütz, R. (2018). *Car Wars: The Future of Europe's Car Industry*. Retrieved January 27, 2019, from <https://www.greeneuropeanjournal.eu/car-wars-the-future-of-europes-car-industry/>
- Kittová, Z. – Steinhauser, D. (2016). Science, Technology and Export: Slovak Case. In *Proceedings of 16th International Joint Conference: Central and Eastern Europe in the Changing Business Environment*, Prague and Bratislava: Oeconomica Publishing House, pp. 216-226.
- Morgan, S. (2018). *EU agrees on 37.5% CO2 reduction for cars by 2030*. Retrieved February 3, 2019, from <https://www.euractiv.com/section/transport/news/eu-agrees-on-37-5-co2-reduction-for-cars-by-2030/>
- OECD. (2019). *OECD Economic Surveys Slovak Republic*. Retrieved February 6, 2019, from <http://www.oecd.org/economy/surveys/Slovak-Republic-2019-OECD-economic-survey-overview.pdf>
- OICA. (2018). *2017 Production Statistics*. Retrieved February 9, 2019, from <http://www.oica.net/category/production-statistics/2017-statistics/>
- Perez, D. C. (2019). *ABB Will Power LG Chem's Largest Car Battery Plant in Europe*. Retrieved February 5, 2019, from <https://www.engineering.com/AdvancedManufacturing/ArticleID/18277/ABB-Will-Power-LG-Chems-Largest-Car-Battery-Plant-in-Europe.aspx>
- Polish Automotive Industry Association. (2018). *Automotive Industry Yearbook 2018*. Retrieved February 9, 2019, from [http://www.pzpm.org.pl/content/download/8551/48243/file/Rocznik\\_PZPM\\_2018i2019.pdf](http://www.pzpm.org.pl/content/download/8551/48243/file/Rocznik_PZPM_2018i2019.pdf)
- Poracký, M. (2019). *Problém s brexitom môže mať žilinská Kia. Ktoré firmy sú ohrozené?* Retrieved February 10, 2019, from <https://ekonomika.sme.sk/c/22034140/najvacsi-problem-s-brexitom-moze-mat-zilinska-kia-ktore-dalsie-firmy-su-ohrozene.html#ixzz5f7wzoShS>
- Rybecký, V. (2018). *Země V4 spojují své síly*. Retrieved February 5, 2019, from [https://www.autoweek.cz/cs-aktuality-zeme\\_v4\\_spojuji\\_sve\\_sily-7368](https://www.autoweek.cz/cs-aktuality-zeme_v4_spojuji_sve_sily-7368)
- SITA. (2018). *Brexit bez dohody by mohol výrazne zasiahnuť slovenské automobilky*. Retrieved February 9, 2019, from <https://ekonomika.sme.sk/c/20954249/brexit-bez-dohody-by-mohol-vyrazne-zasiahnut-slovenske-automobilky.html#ixzz5f4TMy8na>
- Sdružení automobilového průmyslu. (2018). *Automobilový průmysl dosáhl v roce 2017 historických úspěchů*. Retrieved February 10, 2019, from <https://autosap.cz/aktualita/automobilovy-prumysl-dosahl-v-roce-2017-historicky-ch-uspechu/>
- Stöllinger, R. et al. (2018). *Global and Regional Value Chains: How Important, How Different?* Retrieved February 6, 2019, from <https://wiiw.ac.at/global-and-regional-value-chains-how-important-how-different--dlp-4522.pdf>
- TASR. (2019). *Časť Slovákov môže mať problém, prácu im zoberú roboty*. Retrieved February 10, 2019, from <https://ekonomika.sme.sk/c/22049369/oecd-tretina-pracovnych-miest-na-slovensku-je-ohrozena-automatizaciou.html#ixzz5f8muuUkn>