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AUTOMOTIVE INDUSTRY IN THE VISEGRAD GROUP

Abstract:

The article is focused on the current situation of automotive industry in the Visegrad Group. The main goal of the article is to analyze the current situation and define the major aspects of automotive industry in V4 countries. The main sources for the article are secondary data gained from publicly available databases. Analyses rely on basic macroeconomic indicators of V4 countries in comparison with German economy as the main leader of automotive industry in Europe. In the comparison of national's automotive industries are used following indicators: GDP, GDP per capita, unemployment rate, GVA and turnover of automotive industry, Capital Expenditures and vehicles production. All the informations were acquired from well-known and recognized national, European and other international institutions. The result of the analysis is a compact view of automotive industry's significance in V4 countries, which is according to initial assumption very high. One of the partial outcomes of the analysis is also a finding proving lack of relevance of some indicators frequently used as a sole scale for automotive industry importance. This have been proven especially on the absolute number of produced vehicles, which doesn't have to describe the capability of national automotive industry in a relevant way. The article also contains recommendations for further research in this field.

Keywords:

automotive, cars production, Czech Republic, Hungary, macroeconomics, market analysis, Poland, Slovakia, Visegrad

JEL Classification: M16, M31

Introduction

V4 , better said the Visegrád Group or the Visegrád Four, is a cultural and political alliance of four European countries – the Czech Republic, Hungary, Poland and Slovakia. The Visegrád Group was formed on 15 February 1991 at a meeting of the President of the Czechoslovak Republic, Václav Havel, the President of the Republic of Poland, Lech Wałęsa, and the Prime Minister of the Republic of Hungary, József Antall. This high-level meeting in the city of Visegrád, Hungary, created an imaginary historical arch linking the idea of this meeting to the idea of a similar meeting, which took place there in 1335 and was attended by John of Luxembourg, King of Bohemia, Charles I of Anjou (Charles Robert), King of Hungary, and Casimir III, King of Poland. The central motif of the meeting was the desire to intensify mutual cooperation and friendship among these Central European states. 656 years later the alliance was rebuilt showing its importance not only in the process of communism collapse and following restoration of democracy in Visegrád Group members.

These countries have in common not only its geographical position and political cooperation and partnership, but also other national aspects. The article is focused on the Automotive industry which is often marked to be a growth engine of national economies of the Visegrád Group countries. In absolute numbers the car production in these countries have risen up to be at the peak of European Automotive industry with approximately one fifth of the European car production. Also in relative numbers countries within the Visegrád Group keep up and in some of the statistics even lead the Worldwide Automotive industry. In case of car production per capita Slovakia and the Czech Republic are the leaders not only in the Europe, but also in the World. Thus undisputable significance of the Automotive industry in the V4 countries and the relevance of its further analyses and understanding.

1 Objectives and research methodology

The main objectiv of the article is to describe current situation of the automotive industry in the Visegrád Group countries and to determine the importance of automotive industry in terms of economical perspective. The main method used in the article is desk research and retrospective analysis of secondary data available from well-known and reliable sources. The Author by using this basic research method clarifies the relevance of the automotive industry in the V4 countries while using an example of German economy as a traditional leader of European automotive industry to be a benchmark for the analyses.

2 Economies of the V4 countries

As said in the introduction of the article, the Automotive industry is often cosidered to be a growth engine of national economies in the Visegrád Group and especially in the Czech Republic and Slovakia. For better understading of the context and significance of the countries within the Visegrád Group, is important to first examine mentioned economies and put them into context of European scale. For this comparison the economy of Germany is used, which is traditionaly recognized as a leader of European Automotive industry.

2.1 GDP of the V4 countries

Gross Domestic Product (GDP) is basic measure of the national economies. Its lack is in insufficient relevance of the information in terms of the level of the economy and therefore this measure should not be used as a sole scale. Hence, the author rather uses induced measure of GDP per capita. For the comparison of the Visegrád Group countries the author also shows data about GDP per capita of Germany. Germany itself is not only the leader of European Automotive industry, but is also considered to be one of the most advanced economies in Europe. The Table 1 below displays a development of GDP and GDP per capita of the Visegrád Group countries in comparison with Germany.

Table 1 GDP and GDP per capita of the Visegrád Group countries and Germany [EUR].

Country	Measure	2010	2011	2012	2013	2014	2015	2016	2017
Czech Republic	HDP	167 bn	169 bn	168 bn	167 bn	172 bn	181 bn	186 bn	194 bn
	HDP / obyv.	15 805	16 037	15 894	15 805	16 228	17 094	17 508	18 249
Germany	HDP	2 929 bn	3 038 bn	3 059 bn	3 077 bn	3 137 bn	3 184 bn	3 243 bn	3 324 bn
	HDP / obyv.	36 487	37 848	38 036	38 160	38 733	38 977	39 313	39 972
Hungary	HDP	106 bn	108 bn	106 bn	109 bn	113 bn	117 bn	119 bn	124 bn
	HDP / obyv.	10 698	10 910	10 775	11 042	11 530	11 947	12 237	12 748
Poland	HDP	379 bn	398 bn	405 bn	410 bn	423 bn	439 bn	452 bn	472 bn
	HDP / obyv.	9 880	10 379	10 557	10 701	11 054	11 483	11 827	12 368
Slovakia	HDP	71 bn	73 bn	75 bn	76 bn	78 bn	81 bn	83 bn	86 bn
	HDP / obyv.	13 199	13 558	13 764	13 948	14 312	14 845	15 325	15 845

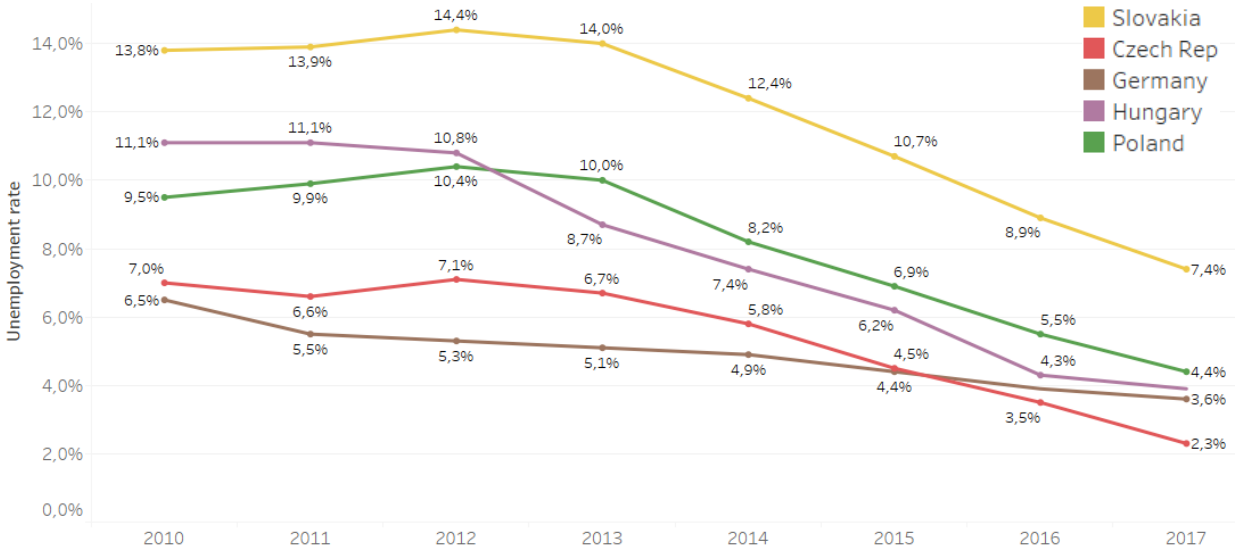
Source: IHS.com, 2018.

The level of the Visegrád Group countries is noticeable from the table above. Considering GDP per capita as a benchmark for the comparison, the order of countries is following: the Czech Republic, Slovakia, Hungary and Poland. Poland has the highest absolute value of GDP, but while looking at the level of the economy shown by GDP per capita Poland is the country with the lowest GDP per capita ratio among all the observed countries and all the years taken into account. It is also obvious that all the Visegrád Group members together with German economy have been in the growth phase since 2013

2.2 Unemployment rate of V4 countries

Important measure, which is used by the author in following analysis is the unemployment rate. The unemployment rate in particular countries together with the measure of GDP creates a basic overview about the current situation of chosen economies and their potential. Comparing two traditionally most similar countries among this selection, the Czech Republic and Slovakia, we can assume a future potential of these countries. Slovakia in this comparison has more than 3 times higher unemployment rate, which represents relatively higher reserve of the labour. Hence, we can assume the economy is farther from from its potential output and possibly also from the overheating state of the economy, unlike in the Czech Republic. The analysis of labour and its ability to work is extremly important for further growth not only in terms of the Automotive industry.

Figure 1: Unemployment rate of V4 countries and Germany.



Source: Eurostat, 2018.

Table 2: Unemployment rate of V4 countries and Germany.

Country	2010	2011	2012	2013	2014	2015	2016	2017
Czech Republic	7.0%	6.6%	7.1%	6.7%	5.8%	4.5%	3.5%	2.3%
Germany	6.5%	5.5%	5.3%	5.1%	4.9%	4.4%	3.9%	3.6%
Hungary	11.1%	11.1%	10.8%	8.7%	7.4%	6.2%	4.3%	3.9%
Poland	9.5%	9.9%	10.4%	10.0%	8.2%	6.9%	5.5%	4.4%
Slovakia	13.8%	13.9%	14.4%	14.0	12.4%	10.7%	8.9%	7.4%

Source: Eurostat, 2018.

The figure above displays decreasing unemployment rate in all observed countries. The V4 countries experience relatively higher decrease in unemployment rate than in case of Germany. The author believes that reason for this effect is especially lower salary, thus cheaper labour in these countries. Considering also geographical proximity and all of the mentioned countries are members of European Common Market in which guarantees the free movement of goods, capital, services and labour, we can assume that the production tend to move to a country with lower total costs.

3 Automotive industry of V4 countries

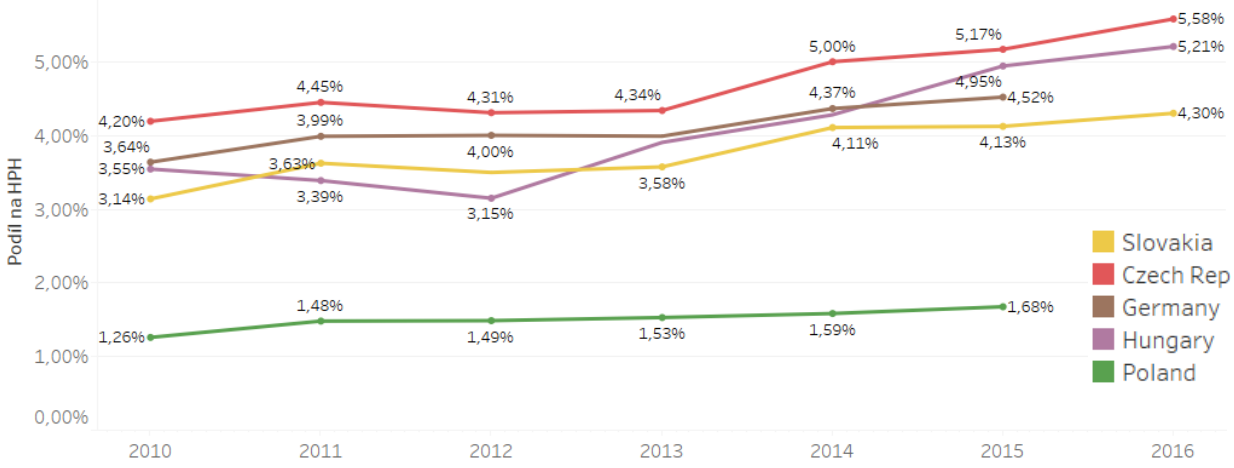
The Automotive industry is important part of the V4 countries. Accroding to the statistics of European Automobile Manufacturers Association (ACEA) in 2017 there were totally 230 production plants for vehicles or engine manufacturing in Europe. From these 230 production plants 33 are located in the V4 countries (comparing with German 41). Poland accounts for almost half of these facilities (16). It should be noted that only 2 of these 16 facilities are directly producing passenger cars, which corresponds with lesser number of final passenger cars production. Poland is currently more focused at the production of light and heavy commercial

vehicles (4 production plants), buses (5 production plants) a in 5 cases engine production. In case of other countries of the Visegrád Group the production is more focused on passenger cars. All the four Slovak sites produce passenger cars. Hungary, except for one factory for electric buses, is also fully focused on passenger cars or engines and the Czech Republic leads the statistics of passenger cars production. Further information about mentioned production plants is found in Appendix A.

3.1 GVA of the Automotive industry in V4 countries

To explain the significance of the Automotive industry for particular economy is suitable to use the measure of Gross Value Added (GVA), which is essential for calculation of GDP by output method. GVA is computed from the value of final production reduced by intermediate consumption, adding VAT and deduction of subsidies leads to GDP by output method. The author compares GVA created directly by the automotive industry. Automotive industry broader impact while counting GDP, but the exact number can not be precisely quantified due to connections to other industries – in case of the Czech Republic the following impact on total GVA is another approximately 3%. In these directly or indirectly connected industries are included all the different areas from primary to quinary sectors. Directly connected industries are for example production of tyres, drives, electric motors, generators, air conditionings and other components of vehicles. Other directly of indirectly connected industries are especially sales and repair activities of vehicles, financial services, fuel trade, transportation, infrastructure, but also education or healthcare.

Figure 2: Share of the automotive industry on total GVA.



Source: Eurostat, 2018.

Table 3: Share of the automotive industry on total GVA [EUR]

Country	Measure	2010	2011	2012	2013	2014	2015	2016
Czech Republic	GVA aut. ind.	5.95 bn	6.59 bn	6.26 bn	6.13 bn	7.09 bn	7.84 bn	8.87 bn
	% of total GVA	4.20%	4.45%	4.31%	4.34%	5.00%	5.17%	5.58%
Hungary	GVA aut. ind.	2.97 bn	2.92 bn	2.64 bn	3.36 bn	3.82 bn	4.60 bn	5.01 bn
	% of total GVA	3.55%	3.39%	3.15%	3.91%	4.28%	4.95%	5.21%
Germany	GVA aut. ind.	84.52 bn	96.92 bn	99.26 bn	101.53 bn	115.32 bn	123.96 bn	n/a
	% of total GVA	3.64%	3.99%	4.00%	3.99%	4.37%	4.52%	
Poland	GVA aut. ind.	4.01 bn	4.95 bn	5.13 bn	5.36 bn	5.78 bn	6.40 bn	n/a
	% of total GVA	1.26%	1.48%	1.49%	1.53%	1.59%	1.68%	
Slovakia	GVA aut. ind.	1.93 bn	2.32 bn	2.32 bn	2.42 bn	2.83 bn	2.94 bn	3.16 bn
	% of total GVA	3.14%	3.63%	3.50%	3.58%	4.11%	4.13%	4.30%

Source: Eurostat, 2018.

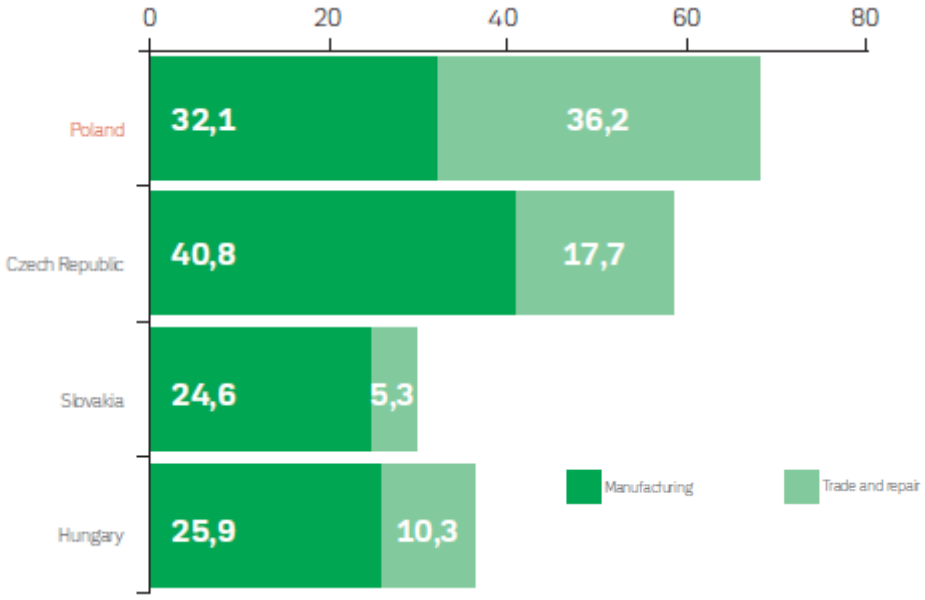
The data show an increase of significance of the automotive industry in terms of all the mentioned countries. The highest relative increase of the share of the automotive industry on total GVA in 2016 experienced the Czech Republic, which experienced also high increase of passenger cars. This trend currently continues not only in the Czech Republic where the growths are the most remarkable.

3.2 Turnover of the automotive industry in V4 countries

Taking into account manufacturing of motor vehicles, parts and accessories as well as trade and repair services related to cars and car parts, the Polish automotive industry is among the largest in Central and Eastern Europe. According to the most recent data available from Eurostat, in 2015, the turnover of automotive manufacturing companies in Poland amounted to EUR 32.1 billion. EUR 36.2 billion of turnover was generated by companies involved in the trade and repair related to cars, car parts and accessories. According to Eurostat data, in both areas of the Polish automotive industry almost 417,000 people were employed in 2015, 59% of which (260,400) in trade and services, and 41% (178,300) in manufacturing. Enterprise data cited above (as well as further in the study, unless specified otherwise) relates to the automotive industry in the strict sense. In case of automotive manufacturing, it does not cover tyres, glass and batteries manufacturers as well as some tier II and III suppliers, classified as part of other sectors of industry. Meanwhile automotive trade and services do not include CFM, leasing, automotive banks or car rental. For the sake of comparison, in the Czech Republic the turnover of automotive manufacturing companies was larger than in Poland (EUR 36,0 billion); however, due to the smaller internal market (although much more developed when analysed per capita), sales and repair generated a considerably lower turnover than in Poland (EUR 15.1 billion). Total employment in the automotive industry in the Czech Republic was 243,800 out of which 59,700 worked in manufacturing and 84,100 in trade and services. Taking into account the number of manufactured motor vehicles, Poland remains on the third place among the Central and Eastern

Europe countries. In 2016, Polish manufacturers produced 554,600. It means that the production of passenger cars grew for the second year in a row. At the same the production of commercial vehicles also increased, reaching 127,237 (according to OICA methodology). In the Czech Republic, the CEE leader in vehicle manufacturing, motor vehicles output reached 1,349,900, the vast majority of which were passenger cars. Production volume, constituting solely passenger cars, significantly increased in Slovakia, to 1,040,000 units in 2016. It's worth mentioning that Poland is a significant manufacturer of commercial vehicles not only compared to CEE, but also to Europe in general. Although Spain, France, Germany, Italy and Russia can boast of a larger output of commercial vehicles, these are countries with a larger automotive manufacturing industry and significantly larger internal markets. Poland's position in this respect will be further strengthened after 2017, i.e. after the new Volkswagen plant in Września will become fully operational. The second – along with vehicles production – key segment of the Polish automotive manufacturing industry is the production of automotive parts and accessories. The situation in this category is more stable, with output constantly growing due to investment and reinvestment projects. However, taking into consideration the full range of automotive components (i.e. including tyres, glass, batteries, engines as well as electric equipment and mechanical parts of combustion engines), Poland lost its position of the regional leader in the recent years, held now by the Czech Republic.

Figure 3: Turnover of automotive companies in V4 countries in 2015 [bn. EUR]



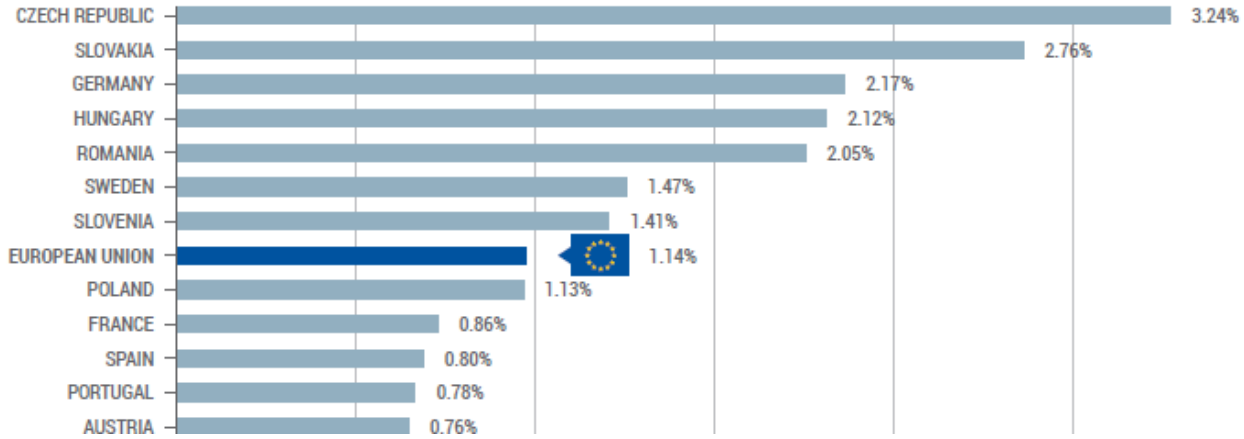
Source: Pzpm.org.pl, 2018.

3.3 Employees of the automotive industry in V4 countries

The automotive industry is important employer in all mentioned national economies. According to ACEA more than 12.5 milion european workers are employed directly or indirectly in the automotive industry, which represents approximately 5,7% of total employees in European Union. These numbers are showing not only increasing dependency on the automotive industry in terms of economic growth and employment policy, but also increasing share of investments to

infrastructure, innovations and overall higher living standard. Labour is in this way crucial, especially in current situation of cheap capital. Although labour can be replaced by capital, for example by increasing automation, but only until a certain degree and for proper functioning it is necessary to include at least a minimum level of labour.

Figure 4: Share of direct employees of the automotive industry in economically active population in 2015.



Source: ACEA, 2018.

Table 4: Count of direct employees in the automotive industry [thousand employees].

Country	2010	2011	2012	2013	2014	2015	2016
Czech Republic	144.45	161.20	158.77	156.35	162.29	180.02	189.33
Germany	781.00	798.00	825.00	837.00	854.00	871.00	n/a
Hungary	75.42	71.71	89.55	104.76	92.86	89.21	92.99
Poland	202.80	208.90	212.80	226.60	246.80	253.00	n/a
Slovakia	51.38	57.77	61.75	61.23	62.65	67.87	73.36

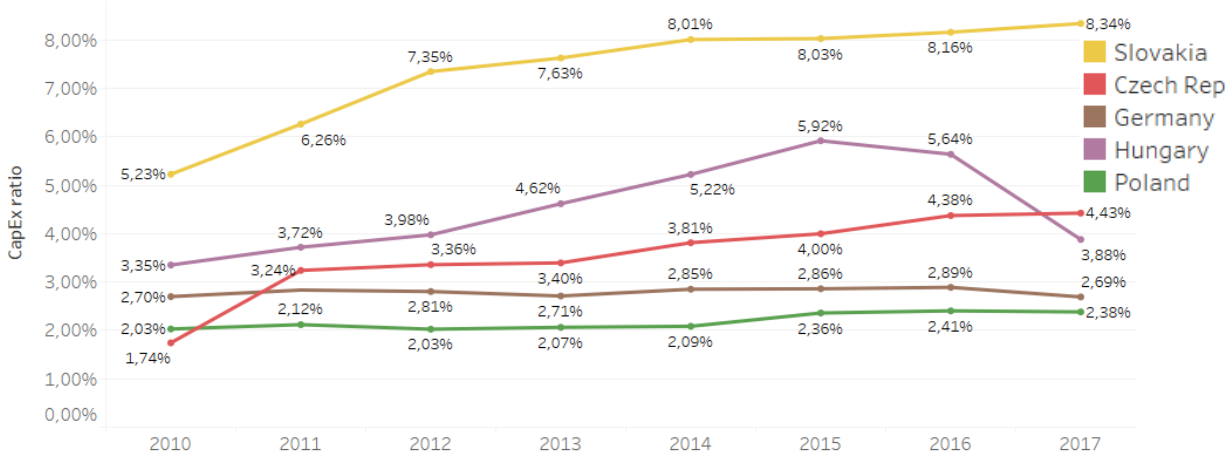
Source: Eurostat, 2018.

Among the V4 countries the most people employed in the automotive industry are in Poland. In relative numbers (see Figure 4) the highest share of economically active population is in the Czech Republic. Czech automotive industry in this perspective holds primacy in entire European Union and compared to Poland has more than 3 times higher share. The data shows higher dependency of the labour policy of Czechs and Slovaks on the automotive industry. Also Hungarian automotive industry is nearly two times higher than EU average.

3.4 Capital expenditures of the automotive industry in V4 countries

Another measure which is used in this article are Capital Expenditures. Capital Expenditures represent outcomes with a lifetime longer than one year. The lifetime of at least one year itself could be considered as the first sign of planned future in this area. This is reasonable even in case of maintenance investments, which represent at least another year of a lifetime.

Figure 5: Share of capital expenditures of the automotive industry in total capital expenditures.



Source: Eurostat, 2018.

Table 5: Capital expenditures in V4 countries and Germany [EUR]

Country	Measure	2010	2011	2012	2013	2014	2015	2016	2017
Czech Republic	CapEx aut. ind.	0.57 bn	1.07 bn	1.07 bn	1.06 bn	1.24 bn	1.43 bn	1.53 bn	1.62 bn
	% of total CapEx	1.74%	3.24%	3.36%	3.40%	3.81%	4.00%	4.38%	4.43%
Germany	CapEx aut. ind.	14.1 bn	15.9 bn	15.7 bn	15.0 bn	16.4 bn	16.6 bn	17.2 bn	16.8 bn
	% of total CapEx	2.70%	2.84%	2.81%	2.71%	2.85%	2.86%	2.89%	2.69%
Hungary	CapEx aut. ind.	0.58 bn	0.64 bn	0.66 bn	0.85 bn	1.05 bn	1.21 bn	0.98 bn	0.86 bn
	% of total CapEx	3.35%	3.72%	3.98%	4.62%	5.22%	5.92%	5.64%	3.88%
Poland	CapEx aut. ind.	1.31 bn	1.48 bn	1.42 bn	1.42 bn	1.58 bn	1.91 bn	1.79 bn	1.82 bn
	% of total CapEx	2.03%	2.12%	2.03%	2.07%	2.09%	2.36%	2.41%	2.38%
Slovakia	CapEx aut. ind.	0.75 bn	1.01 bn	1.08 bn	1.11 bn	1.20 bn	1.44 bn	1.35 bn	1.42 bn
	% of total CapEx	5.23%	6.26%	7.35%	7.63%	8.01%	8.03%	8.16%	8.34%

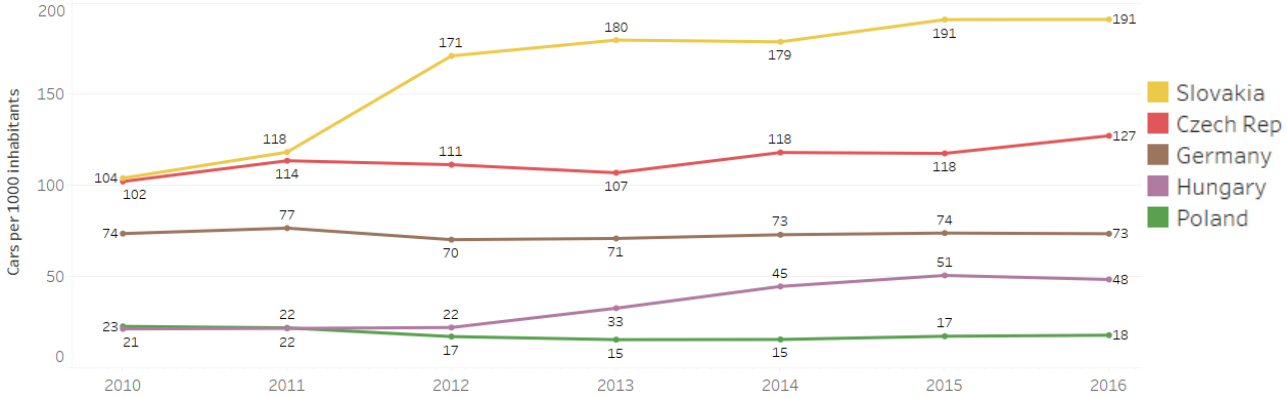
Source: Eurostat, 2018.

The data shows that apart from Hungary all the V4 countries‘ capital expenditures grow in the last year. In case of the Czech Republic and Slovakia capital expenditures rised multiple times between 2010 and 2017. In the Czech Republic the increase caused almost three times higher number than in 2010. In Slovakia capital expenditures of the automotive industry even exceeded 8% of total capital expenditures of this economy.

3.5 Production of vehicles in V4 countries

Among the V4 countries the Czech automotive industry clearly dominates the statistics of production of vehicles. The worst in this perspective is Poland. However, the automotive industry in Poland is not entirely focused on the most volume-producing part of the industry, passenger cars. Comparing the production of vehicles per 1000 inhabitants, Slovakia and the Czech Republic are the top countries not only in Europe, but also in the World. Slovakia is even more than 2 times better in this statistics than automotive icon, Germany.

Figure 6: Production of vehicles per 1000 inhabitants in V4 countries and Germany.



Source: IHS.com a OICA.net, 2018.

Table 6: Production of vehicles statistics in V4 countries and Germany.

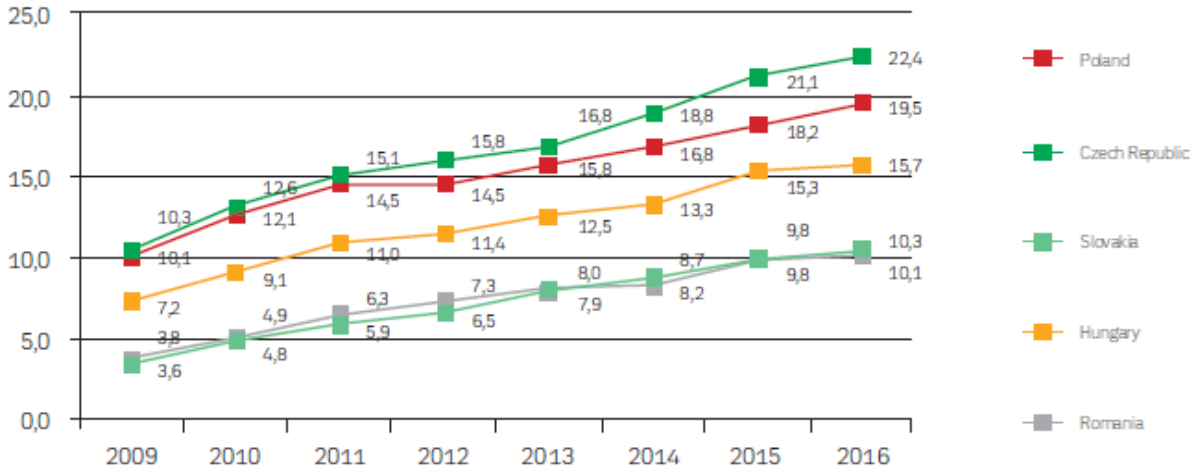
Země	Ukazatel	2010	2011	2012	2013	2014	2015	2016
Czech Republic	Production per 1000 ppl	102	114	111	107	118	118	127
	Total production	1.1 mil	1.2 mil	1.2 mil	1.1 mil	1.3 mil	1.2 mil	1.3 mil
Germany	Production per 1000 ppl	74	77	70	71	73	74	73
	Total production	5.9 mil	6.1 mil	5.6 mil	5.7 mil	5.9 mil	6.0 mil	6.1 mil
Hungary	Production per 1000 ppl	21	22	22	33	45	51	48
	Total production	0.2 mil	0.2 mil	0.2 mil	0.3 mil	0.4 mil	0.5 mil	0.5 mil
Poland	Production per 1000 ppl	23	22	17	15	15	17	18
	Total production	0.9 mil	0.8 mil	0.7 mil	0.6 mil	0.6 mil	0.7 mil	0.7 mil
Slovakia	Production per 1000 ppl	104	118	171	180	179	191	191
	Total production	0.6 mil	0.6 mil	0.9 mil	1.0 mil	1.0 mil	1.0 mil	1.0 mil

Source: IHS.com and OICA.net, 2018.

3.6 Supply chain of automotive industry in V4 countries

Central Europe cover key position due to its strategic position regarding availability to other parts of Europe. In case of the V4 countries it is precisely this fact together with the tradition, high-quality employess and relatively lower costs, which determine the countries within the V4 group to be strategic partner of European automotive industry. This fact is apparent also from the following figure of the exports. Figure 7 includes components, parts and accessories such as tyres, glass, batteries, engines, electric equipment and mechanical parts of combustion engines. These items are usually delivered to the production plants in Germany, which is traditionally the leader of the automotive industry in Europe.

Figure 7: Exports of components, parts and accessories [bn. EUR]



Source: Pzpm.org.pl, 2018.

Czech Republic

Thanks to long industrial tradition and ability to compete at the global level, the Czech Republic has one of the highest concentration of automotive production and research and development worldwide. According to the official statistics for 2016 127 vehicles were produced per 1000 inhabitants in the Czech Republic, which classifies this country to be one of the world leaders in this perspective. 1.35 mil. vehicles produced in 2016 represents 5th place in European vehicles production for the Czech Republic. Czech automotive industry employs more than 150 thousand people, creates over 20% of Czech industrial output and also over 20% of export. In the Czech Republic there is more than half of the TOP 100 global Tier 1 suppliers for the automotive industry, which underlines the importance and high quality of Czech automotive industry.

Following figure displays map of Czech automotive industry. The highest concentration of the automotive industsry is situated to the northern part of the country. In the north there are 3 out of 4 factories for production of passenger cars with the total capacity of approx. 1 mil. vehicles a year – Škoda in Mladá Boleslav and Kvasiny and TPCAjoint-venture of Toyota, Peugeot, Citroën in Kolín. Remaining factory is located in eastern part near the city of Frýdek-Místek with the capacity of 300 thousand passenger cars.

Figure 8: Supply-chain map of Czech automotive industry.

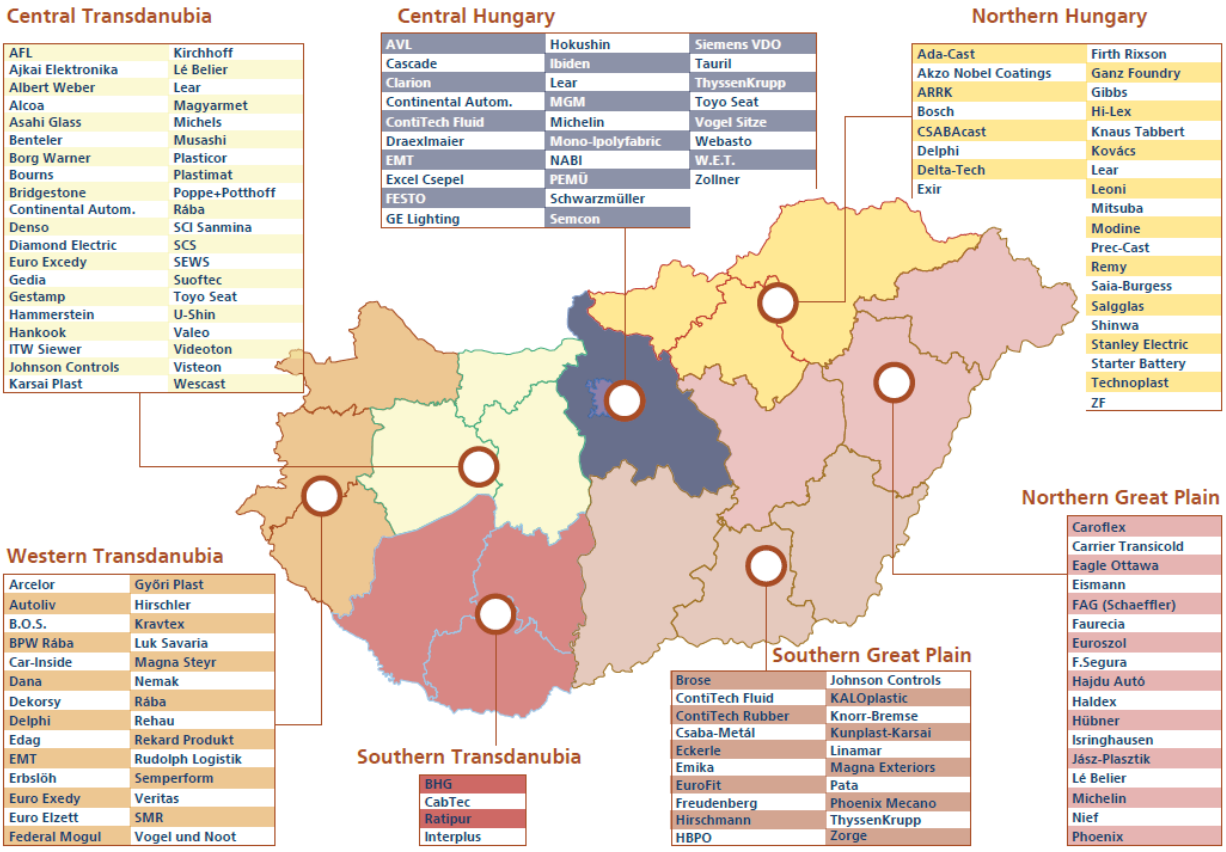
Source: Czechinvest.org, 2018.

Hungary

The automotive industry is also in Hungary very important with the share of approximately 14% of industrial production and 22% of total export. Hungarian automotive industry commenced its rise with the change of the Regime. In 1991, General Motors opened here production of Opel passenger cars and until the end of millennium Audi and Suzuki started their production here as well. Opel currenty doesn't produce cars and rather focuses on production of engines for foreign markets. In 2012 also German Daimler started to produce its passenger cars Mercedes-Benz nearby the city of Kecskemet.

Nowadays Hungarian automotive industry accounts for tens of local and international suppliers. The most important ones are Bosch, which has here the largest production facility in entire Bosch-group, Denso, Knorr-Bremse, Hankook Tire and Continental. The most of the production facilities are concentrated nearby the capital city Budapest.

Figure 9: Supply chain map of Automotive industry in Hungary



Source: Invest-export.brussels, 2018.

Poland

The automotive industry in Poland compared to the other V4 countries has the highest ration of Tier 1 and Tier 2 suppliers. Overall portfolie these suppliers covers the production of powertrain units (two Toyota plants, Volkswagen Motor Polska, Fiat Powertrain a GMMP), steering systems (Nexteer Automotive, TRW, Delphi, Mando Corporation), lighting systems (Valeo, Automotive Lightning), car body (Delphi, Valeo, Hutchinson), car body and underbody structures (Gedia, Kirchoff), tyres (Michelin, Bridgestone, Goodyear), car glass (Pilkington, Saint-Gobain Sekurit, PGW), interior parts (Boshoku, Faurecia), seating systems (Faurecia, Sitech, Johnson Controls, Lear Corporation), safety systems (TRW, Autoliv). Approximately 500 companies in Poland have ISO/TS 16949 certificate confirming quality management system required by automotive OEMs. Several R&D development centres operating in Poland is a testimonial of high technical potential of Polish staff.

Following figure displays map of automotive supply-chain in Poland. It is noticeable that the production is concentrated to the southern part of Poland especially due to proximity to other countries – Germany, the Czech Republic and Slovakia.

Figure 10: Supply chain map of Automotive industry in Poland

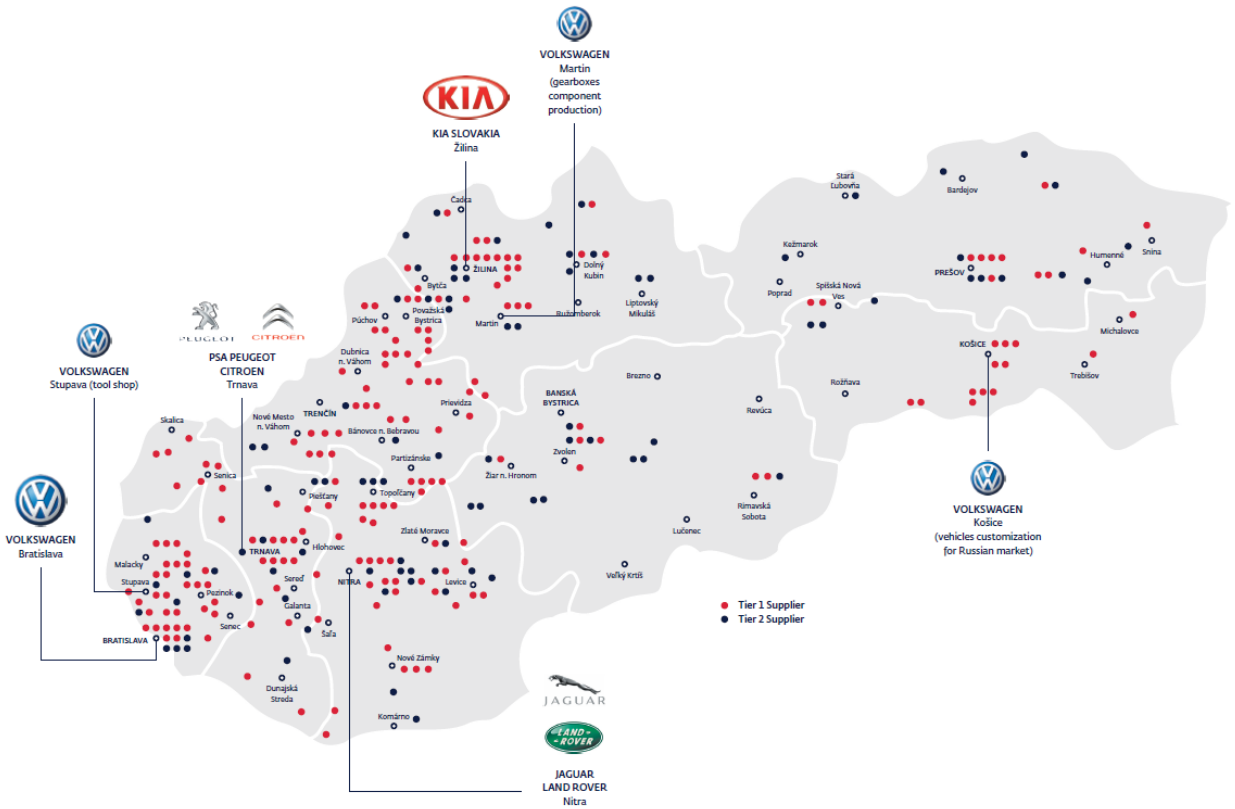
Source: Paih.gov.pl, 2018.

Slovakia

Like in Hungary, also the automotive industry in Slovakia has begun its formation after the collapse of the former regime of Communism. In 1990s German Volkswagen decided to build a production plant for passenger cars nearby Bratislava. Currently, the automotive industry is the main growth engine with approx. 40% share of total industrial production. Supply-chain in Slovakia accounts for more than 300 different Tier 1 and Tier 2 suppliers and having a great potential of an increase due to new car-brand to produce its vehicles in Slovakia – British manufacturer, Jaguar Land Rover Automotive PLC. This company announced in 2015 the construction of the production plant near Nitra, 100 km from Bratislava.

Following figure displays high concentration of the automotive industry in western part of Slovakia, where are situated the production facilities of Volkswagen, PSA (Peugeot, Citroën) and Jaguar Land Rover. In northern part of the country is located the only production plant for Kia vehicles in Europe.

Figure 11: Supply chain map of Automotive industry in Slovakia



Source: Sario.sk, 2018.

Conclusion

The article dealt with the significance of the automotive industry in the Visegrád Group countries in comparison with traditional automotive leader, Germany. The analysis acquired from the secondary data uncovered high dependency of national economies on the automotive industry, where especially Czech and Slovak automotive industry shows the highest significance of the automotive industry. Among the others these two countries are showing to be highly influenced by the automotive industry.

The automotive industry in general is the upward growth phase at the moment and the countries with strong relationship with automotive industry are experiencing extended growth. This is the situation of the Visegrád Group countries as well, where the automotive industry is highly developed representing the level of at least the European average.

The main risk in case of these economies is in the dependency on the automotive industry itself with continuing pressure on cost-reduction and following threat of moving the production facilities to cheaper locations even within the European Union. This risk is even more relevant in case of current situation of the rising salaries due to lack of workers. Another issue is represented by the ongoing situation of Czech economy, which operates at its potential and the economy itself has to face the overheating. In this situation the additional employees are acquired only by fluctuation towards the higher salary leading to cost-push inflation.

The author recommends here additional research connected with increasing significance of the automotive industry. It is also worth mentioning the severity of impact in case of moving the production sites abroad. This risk could soar especially with the potential join of new EU members from eastern Europe, for example Ukraine.

Appendix

Appendix A: List of production plants of the automotive industry in the V4 countries.

Country	City/Region	Manufacturer	Engine	PC	LCV	HDV	Bus	Brand
Czech Republic	Jablonec	TEDOM	ENGINE					
Czech Republic	Kolin	TPCA		PCs				Toyota, Peugeot, Citroën
Czech Republic	Koprivnice	TATRA	ENGINE			HDVs		Tatra HDV, military vehicles
Czech Republic	Kvasiny	VOLKSWAGEN AG		PCs				Skoda
Czech Republic	Libchavy	SOR					Bus	Sor
Czech Republic	Mlada Boleslav	VOLKSWAGEN AG	ENGINE	PCs				Skoda
Czech Republic	Nosovice	HYUNDAI MOTOR EUROPE		PCs				Hyundai
Czech Republic	Vysoké Myto	IVECO					Bus	Iveco
Hungary	Esztergom	SUZUKI		PCs				Suzuki
Hungary	Györ	VOLKSWAGEN AG	ENGINE	PCs				Audi
Hungary	Kecskemet	DAIMLER AG		PCs				Mercedes-Benz

Hungary	Komaróm	BYD					Bus	BYD electric buses
Hungary	Szentgotthard	OPEL GROUP	ENGINE					
Poland	Bielsko-Biala	FCA	ENGINE					Fiat, Lancia, Alfa Romeo
Poland	Bolechowo (Poznan)	SOLARIS					Bus	Solaris
Poland	Gliwice	OPEL GROUP		PCs				Opel/Vauxhall
Poland	Jelcz-Laskowice	TOYOTA MOTOR EUROPE	ENGINE					
Poland	Niepolomice (Krakow)	VOLKSWAGEN AG				HDVs		MAN
Poland	Polkowice	VOLKSWAGEN AG	ENGINE					Volkswagen
Poland	Poznan	VOLKSWAGEN AG			LCVs			Volkswagen
Poland	Poznan	VOLKSWAGEN AG					Bus	MAN
Poland	Slupsk	VOLKSWAGEN AG					Bus	Scania
Poland	Starachowice	VOLKSWAGEN AG					Bus	MAN, Neoplan
Poland	Tychy	FCA		PCs				Fiat, Lancia, Ford
Poland	Tychy	OPEL GROUP	ENGINE					Opel/Vauxhall
Poland	Walbrzych	TOYOTA MOTOR EUROPE	ENGINE					
Poland	Wroclaw	VOLVO GROUP					Bus	Volvo
Poland	Wroclaw	JELCZ				HDVs		Jelcz military vehicles
Poland	Wrzesnia	VOLKSWAGEN AG			LCVs			VW
Slovakia	Bratislava	VOLKSWAGEN AG		PCs				VW, Audi, Porsche, Skoda, Seat
Slovakia	Nitra	JAGUAR LAND ROVER		PCs				Jaguar, Range Rover
Slovakia	Trnava	PSA PEUGEOT CITROËN		PCs				Peugeot, Citroën
Slovakia	Zilina	HYUNDAI MOTOR GROUP	ENGINE	PCs				Kia

Source: ACEA, 2018

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