REPORT

Country report: Car industry in Slovakia

Prospects for just transformation in the country with foreign capital dominated car industry

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Abstract

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1 Introduction

The concept of just transition is supposed to provide both, decrease of emissions to stop global warming and to ensure that the transition wont cause social unrest and unemployment. The depth of the transition and the way how it should be ensured is a multi-dimensional question and requires discussion on understanding the term and policy ideas (Heffron & McCauley2018). Just transition policy approach is "the country – specific mix of macroeconomic, industrial, sectoral and labour policies that create an enabling environment for sustainable enterprises to prosper and create decent work opportunities by mobilizing and directing public and private investment towards environmentally sustainable activities" (ILO 2015).

There are four ideal-typical approaches to just transition: transformation, structural reform, managerial reform, and status quo (Morena et al., 2020). While the transformation expects deep changes in the way we live to mitigate the climate change, the structural change expects some aspects of the economy to undergo restructuralization while the capitalist mode of living will not be tackled. In the managerial approach it is expected that technical modernization will ensure decrease in emissions and some parametrical social reforms will ensure social justice. The status-quo approach use jobs creation as the only criterium of a positive aspects of transition on workers (Keil 2021). The prevailing strategy at the international level (e.g. EU or ILO) corresponds with managerial reform emphasizing that via technologies and some changes in social policy it is possible to avoid unemployment and at the same time reverse climate change. The approach is also known as ecological modernization, but the critics emphasize that the mere replacement of current technologies to lower-emission ones may not be enough and deeper reforms may be needed to attain sustainability (Kreinin 2020).

In the context of the automotive industry in the specific country, the way how the transformation is managed will vary depending on its importance in the economy and abilities of local actors to influence it. We may expect that the automotive industry where the foreign capital dominates will cause limited options for stakeholders to influence the transformation at the national level. Also the higher dependence of the economy on the automotive industry, the more stakeholders will be interested to slow the change or to escape the change by pointing on other polluters to preserve workplaces in the industry as long as possible.

Slovak economy is highly dependent on the automotive industry which settled there mostly via foreign direct investments. In the perspective of the global value chains automotive industry in Slovakia is at the integrated periphery (Pavlínek 2020) which means that companies here posses mostly production function while activities of higher value added are less frequent. Companies operating in Slovakia are not involved into the specific governmental policies, have limited local R&D capacities but at the same time employ significant number of workers.

For this reason, transition in the integrated peripheries may be characterized by the disconnection between changes in production and changes in consumer behaviour. The reason is that cars produced in the integrated peripheries are mostly exported thus their production is unconnected to the consumption. Nevertheless, the debate about just transition requires to discuss both, the changes in production and consequences for employees and changes in consumption and related policies and strategies at the local level. To follow both topics we interviewed a wide spectrum of the stakeholders and experts and discussed both, the transformation of the industry in terms of job opportunities and transformation of

consumer behaviour and infrastructure accessibility and willingness of consumers to reduce their emissions from mobility.

In the first part, through references to statistics and literature, we define position of the automotive industry in Slovakia and the impact of individual mobility on the environment in Slovakia. In the second part we analyse challenges the industry is currently facing and in the third part we identify just transition strategies from the perspective of various stakeholders.

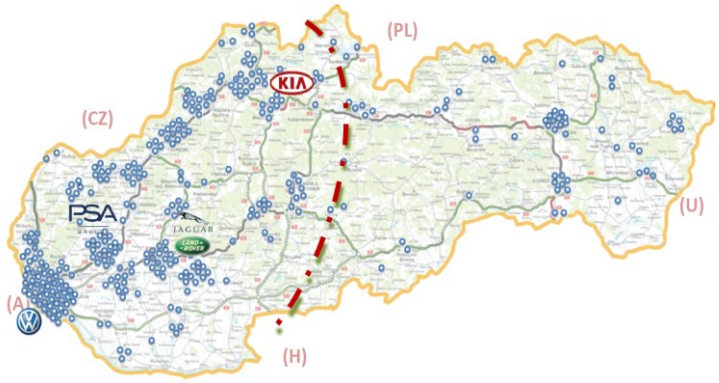
1.1 Past and present of the automotive sector in (Employment, economic relevance etc.)

Value creation of the Slovak automotive sector

Most of the Slovak automotive industry was created by the foreign capital which has been flowing into the country since the 1990s when Slovakia restructured its economy from planned to open-market. The first investment was the take-over of Bratislava based car manufacturing company from socialism called Bratislavské automobilové závody. Volkswagen bought and invested into the company in 1991 establishing the first big foreign investment in automotive industry in the country. Other investments of final producers came later and were all established as a green-field investments. In 2006 PSA Peugeot founded its company in Trnava, around 60 kilometres from Bratislava. KIA has established its production site year later, in the north-west part of Slovakia in Žilina, around 120 kilometres from Bratislava. The last investment came only recently, Jaguar Land Rover started production in Nitra in 2018.

All final producers and suppliers thus concentrated mostly on the west part of Slovakia, causing uneven geographical spread of employment opportunities and high concentration of the automotive industry employment in some areas (see Figure 1).

Figure 1 Map of location of automotive companies in Slovakia



Source: ZAP

All those investments were induced by government effort to attract foreign direct investments. Since the 2000s the Slovak governments engaged in the competitive bidding to attract foreign direct investments, large part of which were from the automotive industry. The bids were composed of tax holidays for 10 years, construction of roads infrastructure in the surroundings of the major investors´ plants, establishment of foreign schools for managers´ kids and building luxury accommodation for foreign managers (Pavlínek 2017). For instance, the price paid to KIA company per job created was more than 75,000 EUR, and Slovakia provided similar support also to key suppliers of the company. The support provided to the latest Jaguar Land Rover (JLR) investment is estimated at 44,600 EUR per supported job, but if the costs on building industrial park construction is added it is 214 ths EUR per job. To compare, Hyundai in Czechia got 44 ths EUR per a job created and TPCA 32 ths EUR (Kolesár 2007, in Martišková 2019).

Inflow of final producers induced further investments on the suppliers side, creating a locally based supply chains employing local workforce but in dominantly foreign owned companies. It is estimated that more than 90% of the value added is from foreign companies in the automotive industry. The strategy of attracting foreign investors was justified by the expectation that foreign companies will root in Slovakia and knowledge transfer from foreign to domestic companies will ensure multiplication effect in the form of the growth of the industry and improvement of Slovakia´s position in the global value chains. However, this expectation was not fulfilled and interactions between foreign companies and domestic companies remain limited (Pavlínek 2018). Moreover, domestic companies are situated at lower levels of suppliers' hierarchy, which may put them in the more vulnerable position in the upcoming transformation of the industry. "The state has thus facilitated the presence of production in the territory of Slovakia, while doing less to strategically contribute to improving the position of its territory in GPN" (Martišková, 2019, p. 46).

As a result, Slovak based automotive industry creates 13 per cent of GDP and employs 120 ths employees directly and about the same amount is estimated to be bounded to cars production indirectly. Despite high importance in term of employment, the level of foreign control remains highest among the V4 countries leaving the country in vulnerable position (see Table 1).

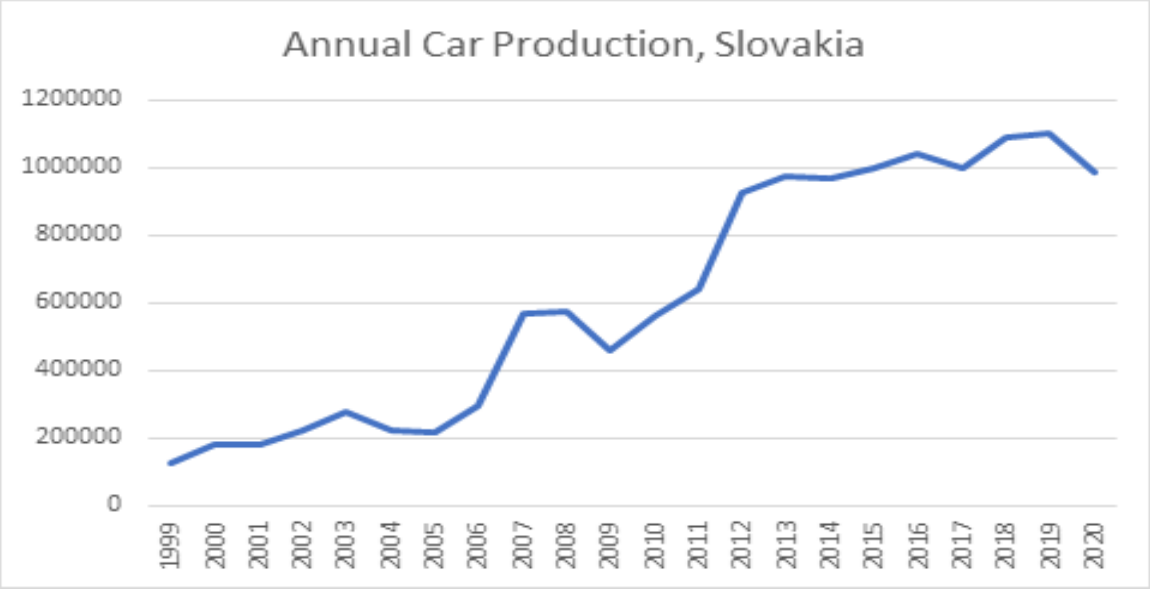
Table 1 Index of foreign control in the European automotive industry, Top 3 and Bottom 3, 2015.

Country	Index Value	
Slovakia	97.1	Top 3
Hungary	94.9	
Czechia	91.4	
France	22.5	Bottom 3
Italy	20.9	
Germany	14.6	

Note: The index is the average value of the share of foreign controlled enterprises in terms of production value, value added at factor cost, gross investment in tangible goods, number of persons employed and turnover or gross premiums written

Along with the high foreign control Slovak automotive production is homogenous, oriented almost solely on private cars. The production peaked on 1,107 ths. cars in 2019, in 2020 the figure ended at 985 ths pieces, the result to which the pandemic of COVID-19 contributed the most. Since 2004 there is no production of any other commercial vehicles, except of a launch of specialized off-road buses production in 2016, but this is rather a niche production (Gažo et al 2022).

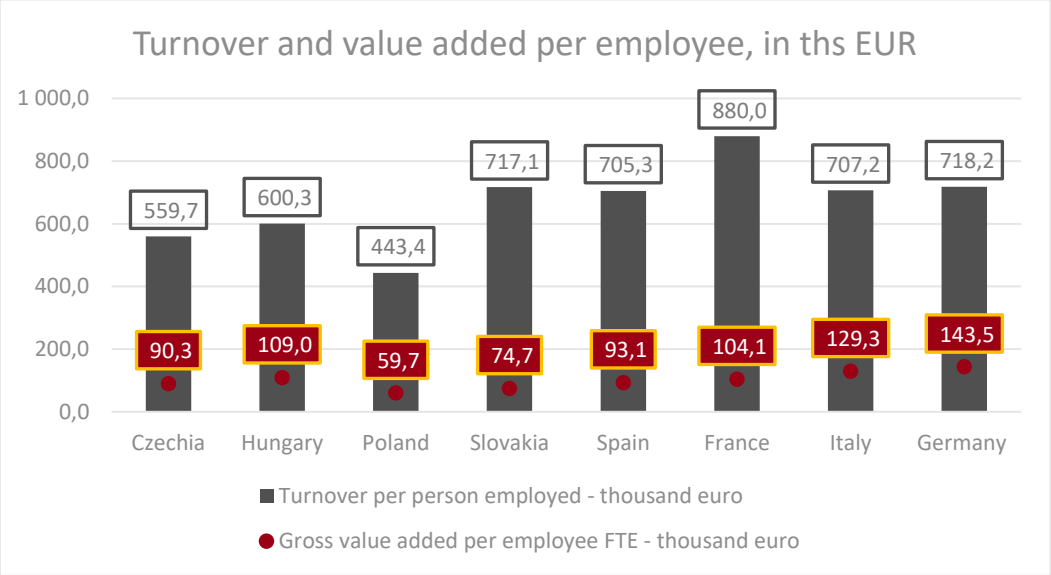
Table 2 Annual car production



Source: OICA annual reports, own compilation

We follow the turnover and value added data in the relation to employees to better capture the position and difference between the main automotive countries in Europe. Among the selected countries, Slovakia reaches comparable turnover per employee to the Spain, Italy of Germany and the highest among V4 countries, but the value added per employee is the lowest after Poland. The share of the value added per turnover per employee is the lowest in Slovakia reaching 10 per cent, while it is 20 per cent in Germany. This points out on the disconnection between the labour costs and the price for the product. It also reveals the different function of employees in the different countries where lower value-added function (e.g. assembly) is located in the CEE region. Assembly is quite labour intensive function thus another reason may be the mere difference in denominator (Slovakia having relatively more employees per turnover) (see Table 1Figure 2)

Figure 2 Turnover and value added per employee in motor vehicle production (C291), in ths EUR

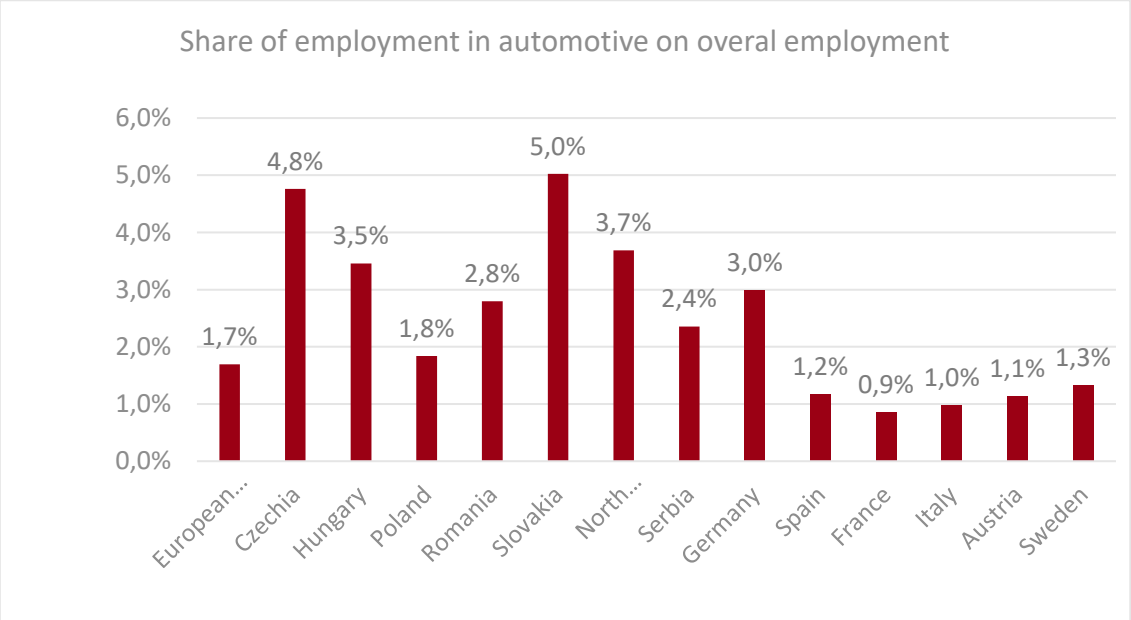


Source: Eurostat 2021 [sbs_na_ind_r2], data for 2018

The employment structure of the Slovak automotive sector

Automotive industry based in Slovakia employed almost 120 ths. employees directly. In overall, Slovakia´s share of jobs in automotive is the highest in the whole EU reaching 5 per cent (see Figure 3).

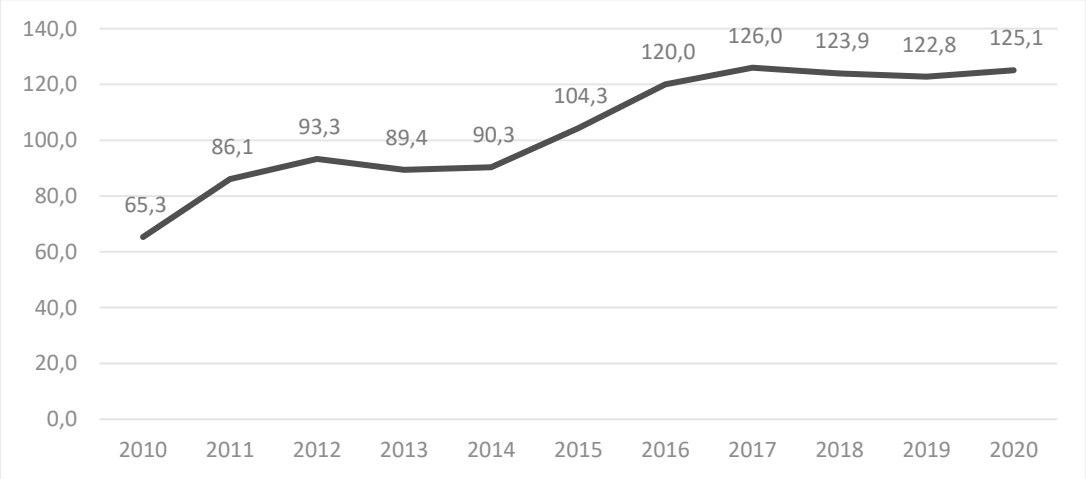
Figure 3 Jobs in the automotive sector as a share of all jobs in Slovakia and other countries



Source: Eurostat lfsa_egan22d, own compilation

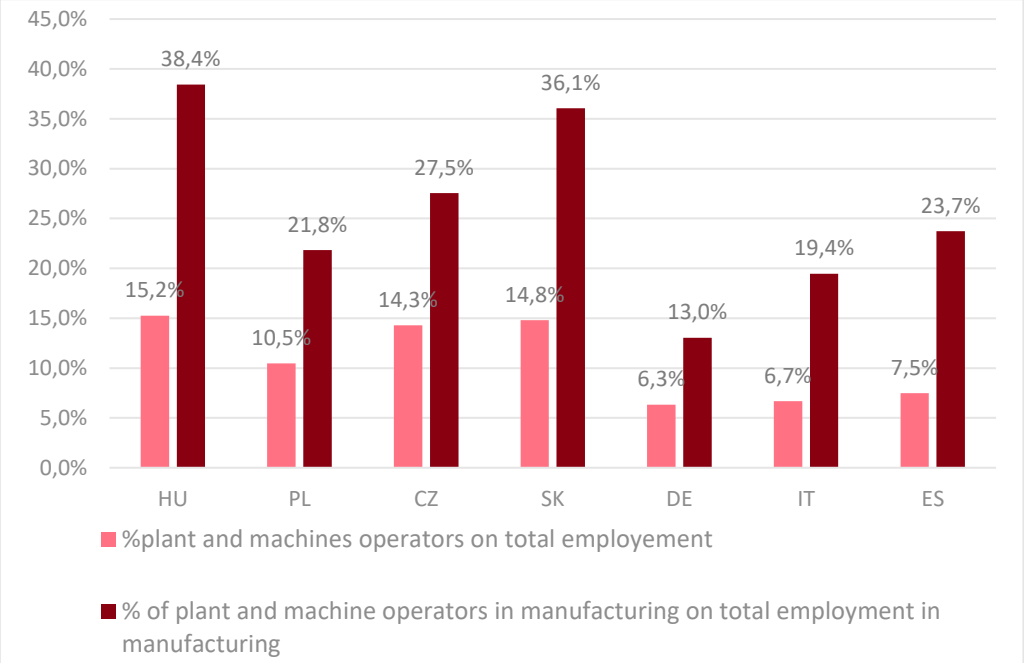
Workforce in the sector increased by 53 per cent in Slovakia since 2010 with insignificant impact of COVID-19 pandemic in 2020 (see graph). Job opportunities increased was mostly because of increasing production volumes and inflow of foreign investments. Data from European restructuring database showed that only between 2010-2016 number of jobs created in Slovakia via foreign investments reached 16 ths. which is around 30% of all jobs created in this period (see Figure 4).

Figure 4 Employment development in automotive sector in Slovakia



The structure of jobs created corresponds with the dominant production function of majority of sites established in Slovakia by FDIs. As it is visible on the Figure 5, Slovakia, similarly to Czechia or Hungary has significantly higher share of plant and machine positions compared to Germany, Italy or Spain. While in the Western EU countries, plant and machine operators constitute between 13 to 23 per cent in selected countries, in Slovakia it is 36 per cent of all employees in manufacturing, similarly to Hungary. Data for automotive only are not available.

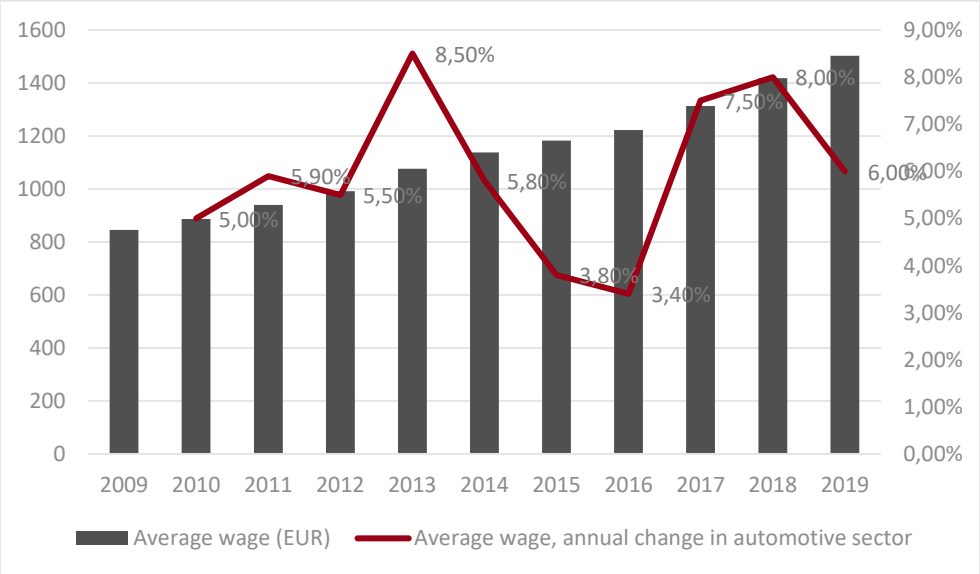
Figure 5 The structure of employment in automotive sector in Slovakia



Source: Eurostat 2021 [lsfa_eagan2]

Average wage in the automotive sector in Slovakia exceeds average national wage by almost 40 %, nevertheless, blue collar positions earn significantly less than the average. Continuous increase of wages in the last 10 years contributed to the real increase in wages of workers in automotive when it exceeded inflation rates. This has changes, as in 2022 inflation rocketed and wage increases do not copy the inflation levels anymore and decreases in real terms.

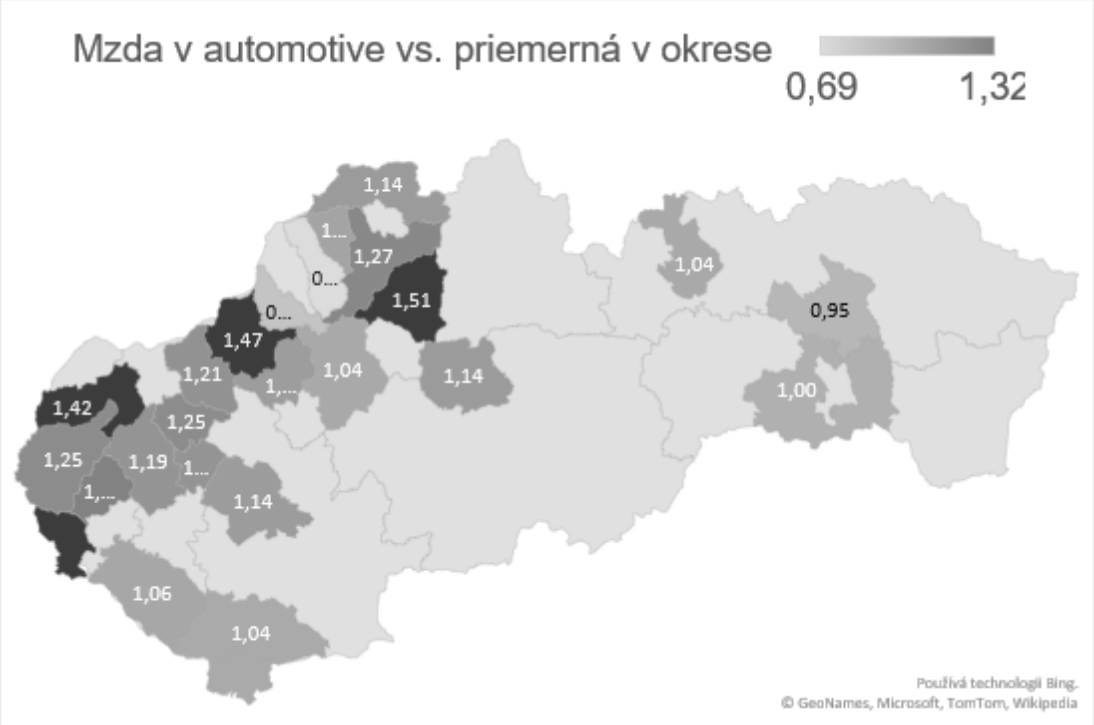
Figure 6 Average wage in automotive sector in Slovakia



Source: Eurostat, own computation

At the local level, mostly regions with final producers, where is also high concentration of the suppliers, reporting above average wages.

Figure 7 Wages in the automotive industry compared to national average wage



Source: Own computation based on the data of Slovak statistical office (2019)

Using data from the Slovak Statistical Office for 2019, we can identify districts (okresy) and regions (kraje) where the automotive industry has the highest importance in terms of employment and wage level. We assign a point to each of the four indicators we have created comparing the:

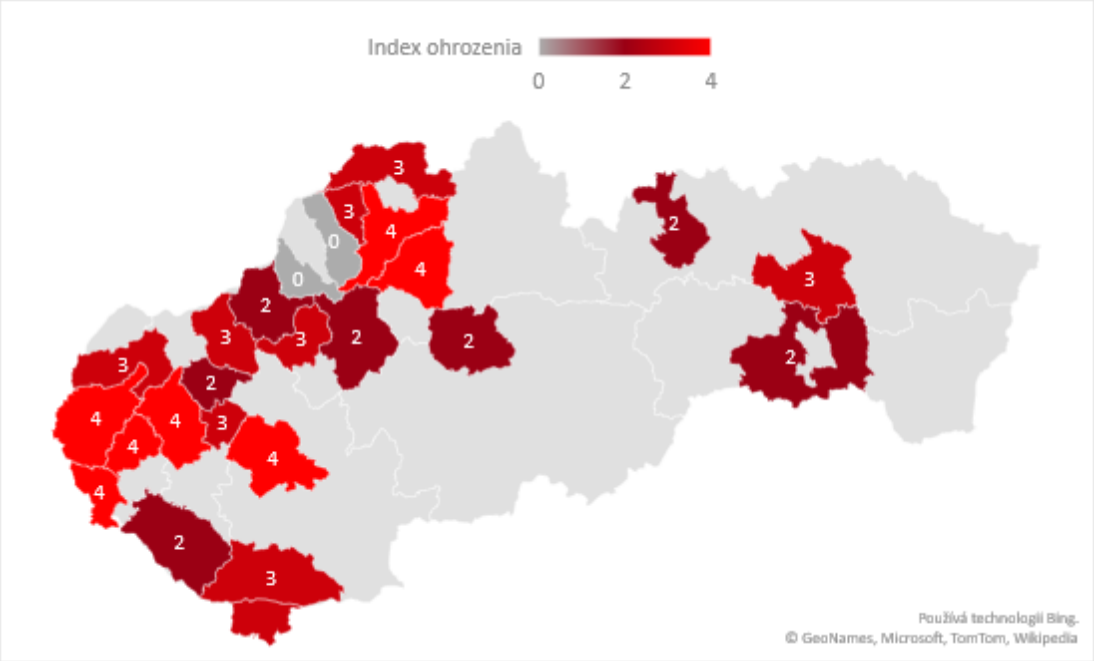
1. the share of automotive employment on overall employment in the given district
2. the share of automotive employment on industrial employment in the given district
3. the share of average wage on overall average wage in the given region
4. the share of average wage in automotive on overall average wage in industry in the given region

Regions where more than two companies in automotive are present can be distributed into the four clusters, ranging from the cluster where automotive industry is very important (reaching the score 4), to the region where industry is moderately important (score 3), to the regions where industry is partially important (score 2) to the regions where automotive is present but not that important (score 1 and 0).

Out of the 78 districts in Slovakia, in 58 automotive workplaces are present, in 18 of them more than 5 per cent of workplaces are in the automotive sector. This points out on high level of concentration of the automotive industry in particular cities and regions. In Figure 8 the risk index of Slovak regions is depicted suggesting that in 15 regions automotive industry is having important impact on employment and wage levels. It is important to follow this

aspect when discussing future of the automotive industry, especially when preparing adaptation policies at the local and regional level.

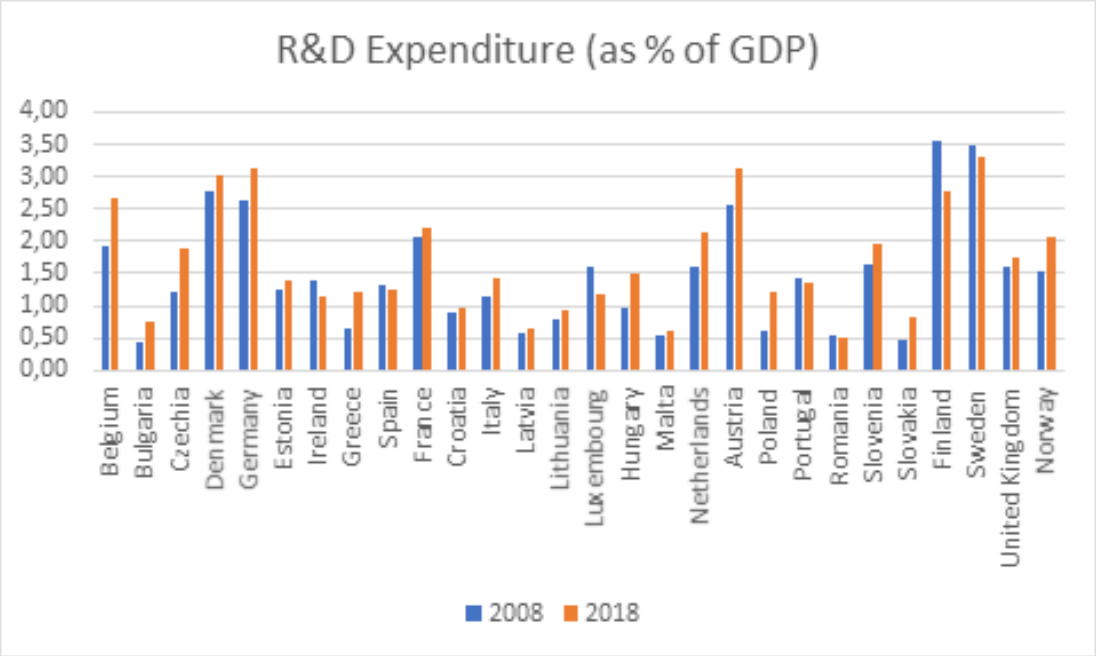
Figure 8 Risk index in Slovak regions



Source: Own computation based on the data of Slovak statistical office (2019)

Peripheral position of the automotive industry is visible in the R&D segment. Despite in the CEE countries, automotive industry is a major investor in R&D, the level of R&D expenditures as a share of GDP is still low compared to other European countries. Business sector contribute to these expenditures by 64 per cent, much lower compared to Germany where it is 84 per cent. Number of people working in specialized position in business R&D is only 7 ths. from which only 4 ths. work in manufacturing (see Figure 9)

Figure 9 R&D expenditures as % of GDP



Source: Eurostat [rd_p_persocc], rd_p_bempoccr2]

There is a high share of manual workers threatened by automatization (in SK). As a consequence, in the automotive sector (NACE code C29) 67 ths employees are in the high risk of automatization (60% of workers in the automotive industry) and half of these workers are manual workers in assembly lines (36 ths) as it was presented by the research of Luptáčik et al (2021). Digitalization and automatization is further expected to decrease requirements on manual workers, decreasing their value added in production.

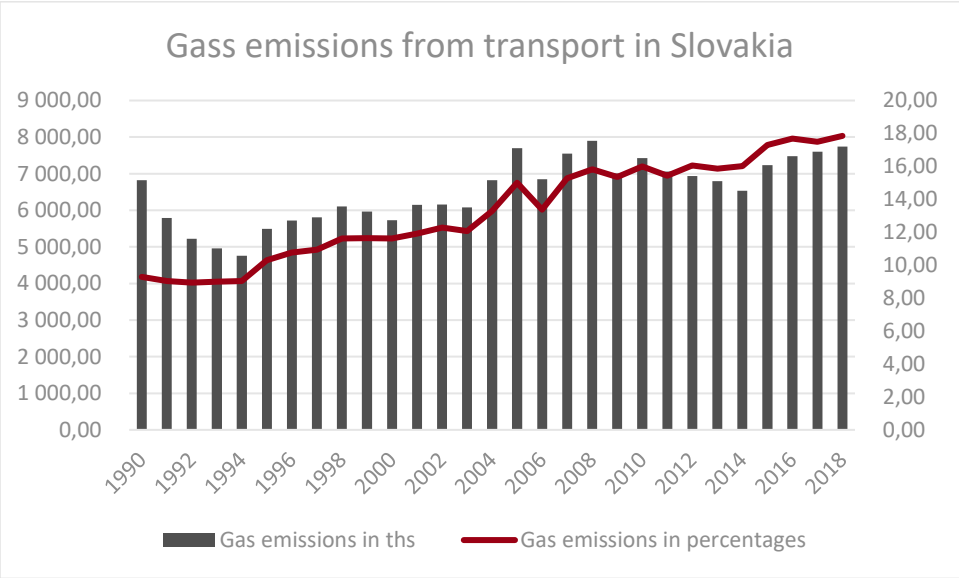
Demand/Usage of electric vehicles (/vehicles with alternative drive systems)

In Slovakia more than 2.39 mil. cars were registered in 2020, of which 2000 were electric. Together with plug-in hybrids, the share of alternative power train vehicles on stock of the cars is only 0,1 percent. Among newly sold cars, electric cars (BEVs) constitute 1.2% and hybrid plug-ins (HEVs) 9.9 per cent which is deep under the EU average (ACEA Progress report 2021 https://www.acea.auto/files/ACEA_progress_report_2021.pdf#page=8). Despite the low share, the number of electric and plug-in hybrids is increasing yearly (graph), although this pace is not speed enough to reach shares similar to the EU average in the near future. The main reasons why the share is such low are high price of the electric cars and underdeveloped infrastructure for charging. In 2020 there were only 924 charging points in Slovakia. This decreases demand for alternative power trains which politicians try to stimulate by subsidies, although the last subsidy was released in 2020 and the new one is planned on 2022.

CO2 emissions of cars in Slovakia

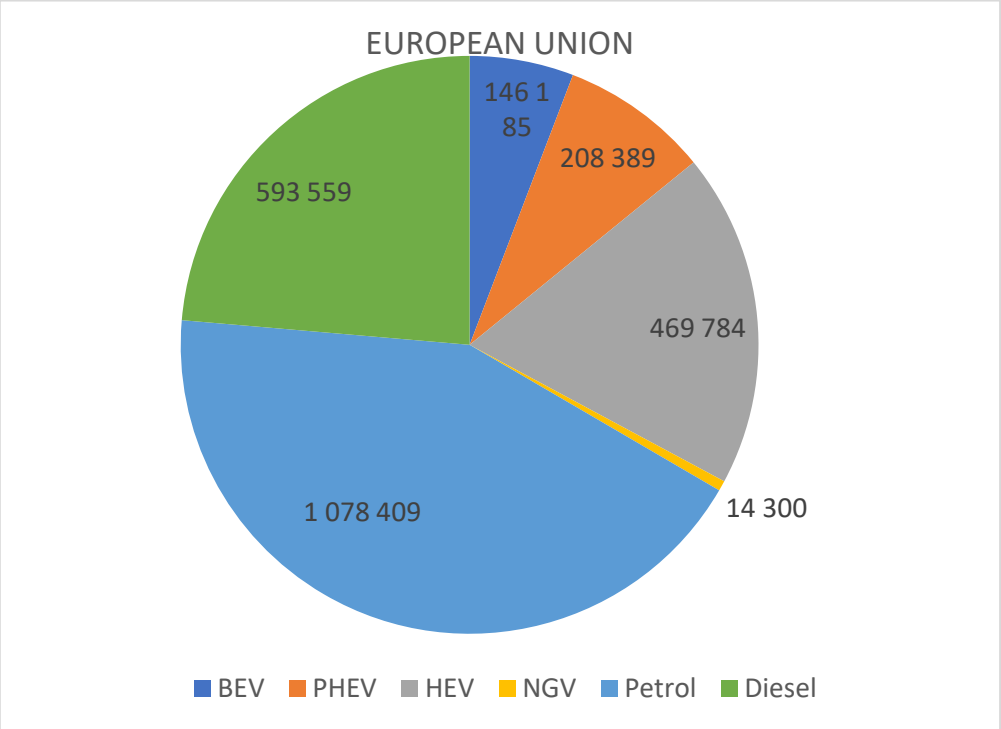
The share of transport on emissions has been constantly rising in the last 30 years in Slovakia reaching 18 per cent in 2018. Growth of cars stock has contributed to this growth along with the relatively high age of the cars which reaches 14 years, compared to 11,5 of

the EU average (ACEA 2021, https://www.acea.auto/files/report-vehicles-in-use-europe-january-2021-1.pdf#page=10).



Source: OECD, greenhouse gass emissions database

Purchase power: All EU 13 comprises less then 1% of EVs cars registration, new cars registration jumped by 2pp since 2001



Source: ACEA

Industrial relations in the automotive industry in Slovakia

Industrial relations in the automotive sector are part of the wider manufacturing sector. At the sector level, the collective agreement for manufacturing sector was covering workers in the automotive until 2019. Since then, employers are avoiding signing collective agreement at the sector level. Trade union membership reaches around 30 at the company level. Coverage level has halved between 2000 and 2016 which increased the importance of the labour law and especially the Labour Code. Industry also employs a large number of agency workers and foreigners, who are not organized, which further deteriorates trade unions bargaining power. It is estimated that trade union membership oscillates around 20 per cent at the sector level with high variance at the company level.

Trade unions were further weakened by the split in 2016 when the largest trade union organization of OZ KOVO operating in Volkswagen announced its dissolution from OZ KOVO. Trade union organization in VW Bratislava had traditionally the largest share of members, around 75%. In 2017, Modern Volkswagen Unions (Moderné odbory Volkswagen) organized historically the first strike at the final producer in the automotive sector in Slovakia. They demanded significant wage increases and after 7 days of work stoppage they reached an agreement with management. This brought, however, lower percentage increases than in KIA or PSA (now Stellantis) which bargained without strikes.

Further development suggested that Modern Trade unions were unable to gain significant position in the automotive industry and remained present in VW and Jaguar Land Rover factories as well as in few suppliers, mostly in the west part of Slovakia. The lesson learned from this development was, that traditional trade union OZ KOVO representing employees in the metal sector, lost part of its membership base in the automotive, and thus fragmentation mostly weakened position of employees vis-à-vis employers (Gažo at al 2021)

Current and future legal regulations

To stimulate the demand for the cars, Slovakia has introduced several rounds of subsidies to purchasing electric and hybrid cars in between 2018 and 2022. The main characteristic of this support was that is unsystematic and low scale, supporting several thousands purchases per year.

In 2018 it was 3 mil. EUR which supported purchases of 761 vehicles and 70 trucks. This support was appreciated by the Automotive Employers Association in Slovakia (ZAP) as contributing to “rising awareness and broader public discussion about vehicles on electric powertrain” (ZAP 2018).

At the end of 2019 new round was called to support EVs purchases. The fix sum of 8 ths € had been available to those purchasing battery vehicle and 5 ths € for those purchasing a hybrid car. Financial allocation was used in only 4 minutes after the registration was launched. Together 689 EVs and 97 plug-in hybrids were supports. Since 2019 no other round of subsidies has been announced, the next round is announced to 2022 and it was recommended by the Minister of Economy to better not wait for the subsidies when considering a purchase of the alternatively powered vehicle (citation).

One of our respondents criticized the measure because the subsidy is not targeted enough. “*When subsidizing electromobility we should be able to consider where it would make the strongest impact. Electric cars has zero emissions when riding but rides shorter distances, so lets take this feature as advantage and support its use in the agglomerations in the*

logistics of pharmaceuticals, or post and delivery services. Because it makes no sense to have 20 percent electric cars in the fleet making only 8 per cent of rides"(SK08)

In 2020 the further support was stopped because of the COVID-19 pandemic. Other policies to support electromobility included speeded up depreciation schemes for two years and exemption for BEVs from tax ownership

In 2019 the Action plan for the development of electromobility in Slovakia was introduced, composing of 15 suggestions how to improve and speed up implementation of the electromobility in Slovakia (see list below). In 2020 the evaluation report suggested that 7 measures were already implemented in legislation, while the remaining 8 was in the legislation approval procedure (E-mobility 2020).

1 Include the topic of electromobility in all relevant national strategies and policies

2. Continuity of direct support for the use of low emission vehicles

3. Long-term financial mechanism to support the development of charging infrastructure

4. Support for battery research, development and production

5. Information campaign

6. Implementation of the legal, technical and business environment for electromobility in the Slovak Republic

7. Accelerated depreciation of electric vehicles and charging stations for electric vehicles

8. Applying green public procurement principles to the purchase of motor vehicles

9. Distinctive labelling of electric vehicles

10. Use of dedicated lanes by electric vehicles

11. Low Emission Zones

12. Simplifying the administrative process for building charging infrastructure

13. Legislative introduction of the obligation to build charging infrastructure when building new parking spaces

14. Installation of charging stations in the parking lots of state institutions

15. Adapting electrical qualifications for the manufacture and servicing of electric vehicles

Infrastructure building was considered as the main obstacle to the EVs development by our respondents. The charging infrastructure is supported from the national and EU level resources. 46 milion EUR was allocated to build additional infrastructure in Slovakia in upcoming period (2022 onwards) and situation slowly improves here.

In 2022 Slovakia had one giga factory InoBat, a start-up focusing on tailor made solutions for different transportation customers (cars, buses, airplanes). Currently they operate smaller factory of 10GwH, but also are running R&D center. Interestingly, InoBat is Slovak owned company. The company itself however, does not aim to be mass producer of EVs batteries, but focuses on niches in the electrification.

Concerning labour market adaptation, there is a strong request from the employers that school graduates should be more prepared on current challenges and demands in the automotive sector (SK01, SK07). Ministry of education responds to these calls claiming that formal education has several goals and interests and could not serve only to employers in the automotive industry. There is relatively developed system of dual education in secondary

schools where companies can train future employees there. The industry, however, is in need of requalification and retraining policies.

In 2020, The Ministry of Education prepared a Strategy on life-long learning which aimed to allow employers to implement their own education programmers needed for employees requalification (SK12). Nevertheless, what the representative of ministry of education observed are obstacles to participate on life-long learning (LLL) on employers and employees side. In employers side the substitution effect of EU funded projects prevail and thus employers ´ willingness to invest own resources to education programs is low. As a result only when EU funds are available employer provide education activities to employees. On the other hand, employees' low level of willingness to participate on LLL programs is also present and reduces thus the potential for their education (see also Table 3). On the top of that, in 2020 government removed the Strategy of life-long learning from the resilience fund budget, which basically meant that strategy was approved but there were no resources to support its implementation.

2 Challenges driving the transformation of the car industry

2.1 Climate change and environmental improvements

As outlined in the previous part, Slovakia is lacking behind the implementation of alternative power engines in vehicles. The share on overall car flees is low, as well as a share on the new purchases. The average age of the car fleet is also above the EU average. All these factors contribute to the fact that emissions from the transportation has been rising constantly in the country. As it concerns public transportation, there is still a relatively functioning network of public transport, although rationalization of public expenditures had hit the accessibility, especially in the rural areas.

In this respect it is interesting to concentrate on the railways and its potential to partially replace and partially complement the demand for individual mobility. As an expert in one of our interviews pointed out, there is a potential in Slovakia, because there is relatively dense network of railways, although many of them need revitalization and modernization. It is also the main reason why travelling by trains is not attractive since outdated infrastructure causes delays of the trains and does not allow higher speed operation (SK08).

2.2 Digitization and electrification

Digitalization and electrification in the automotive sector can be studied from two perspectives. The one comprises the production aspect and implementation of new technologies in the production processes, generally named as a concept of Industry 4.0. In terms of the impact on employment the literature expected decrease in job opportunities because of the substitution effect of technologies implementation (robots and cobot technologies) (citation). In terms of working conditions, new technologies were expected to decrease employees autonomy, increase the speed of production and increase demand for qualifications and higher educated workers (Martišková 2020).

In the Slovak automotive industry, the implementation of the technologies did not have negative impact on job opportunities, mainly because production capacities were increasing and thus compensating for labour demand decrease because of technologies installation. At the same time, this effect should be considered temporary because it is mostly attributed to high demand for cars in the automotive industry before the COVID-19 pandemic. The fact that stakeholders did not observe changes because of new technologies implementation hampered their initiatives in life-long learning at the company and national levels which may have serious consequences on the upcoming changes connected to changes in products produced by the automotive industry (Martišková, 2020).

The second perspective on the digitalization and automatization in the automotive industry is from the products perspective. The combination of less labour intensive production of electric cars, and increased technological level of the new cars produced is expected to result in decreased demand for manual work and increased demand for high skilled workers. At the same time, those staying in the manufacturing jobs will most probably need to upgrade their knowledge about the basics of electricity handling which are relatively highly qualified

positions which might be difficult to reach for those working on the current manufacturing workplaces. The mere change of products produced in the car industry may thus invoke changes in the labour demand towards requalified and highly skilled jobs, combined with decrease of job opportunities in production.

In Slovakia, similarly to other CEE countries, the effect of products change is expected to be delayed because the strategies of MNC in automotive suggest to launch more technologically advanced production in their home countries. Currently, each of the final producers operating in Slovakia are producing at least one electric model, along with production of conventional vehicles. Given the volumes of production of conventional vehicles, production of electric models have not lead yet to significant layoffs in the companies.

Changes related to both, production processes and products, are implemented as a result of competition among car companies, and restriction imposed by the EC on cars emission and are partially driven by the lack of the labour force in the industry. It is important to note, that those changes are uncoordinated at the sector or national level. As a result, impacts on the labour force are handled differently in different companies. The level of adaptation of the workforce depends mostly on individual interactions between trade unions and employers while supportive policies at the sector/national level are missing.

The fact that retraining policies are not common was highlighted by our respondents and is also visible from the statistics available in Eurostat. Slovakia has the lowest figure in the rate of participation on retraining at least four weeks yearly, only 3.2 per cent of employees in the industry sector and the second lowest figure in the time spent by retraining, only 21 hours per year per employee. Interestingly, 38 per cent of companies in the industry sector claimed that they have defined education system for employees, which however may be formal and not providing real benefit for employees (see Table 3).

Table 3: Participation and offer of retraining in selected countries.

	The rate of participation in retraining in the last 4 weeks, 2019		Average time spent by retraining by one participant, 2016		Companies with defined education system for employees	
	Total	Industry	Total	Qualified manual workers	Total	Industry
	%	%	hours	hours	%	%
Czechia	9,9	7,3	41	20	53,7	56,3
Germany	12,8	9,1	81	54	52,1	56,6
Hungary	7,3	5,3	74	29	23,3	27,6
Poland	7,6	4,3	120	81	17,0	19,2
Slovakia	4,4	3,2	43	21	38,2	38,5

Source: Eurostat

To conclude, weak displacement effect of both types of technologies implementation hampered any pressures to develop reskilling and retraining policies at the company/sector level. Also, poorly developed requalification programs are related to low demand for requalified workers (preferred is recruitment from outside than requalification inside), also unprepared legislation for new types of jobs (e.g. „soft-electricians“). The transformation of the automotive industry will be thus a huge challenge for the country which at some respect only hosts the foreign capital and have limited tools how to influence the decisions of multinational companies.

In the last 30 years, policy makers mostly gained experience with policy of attracting FDIs as a functioning tool to decrease unemployment and increase GDP of the country. Despite this strategy was successful at the first place, this should have been a first step, not the only one step the Slovak had done. As a result government has limited capacities and experience in the two crucial areas for the just transition: in R&D and in employees' education and requalification policies.

3 Just Transition

For the purpose of this report we conducted eleven interviews with relevant stakeholders in Slovakia (see Table 2 below). All interviews were conducted through online tools such as Zoom or Skype, and lasted around 60 minutes each. Interviews followed a pre-defined protocol of questions which respondents received ahead of the meeting. Interviews were transcribed and analysed with a qualitative text analysis software (Dedoose), using a pre-defined set of codes. In the text we are using the designed codes of the respondents to indicate source of the quotation.

3.1 Expected changes in the industrial sector

Changes in the industrial sector are perceived as necessary because of the climate change mitigation, although employers' representatives, but also trade unionists emphasized that this should not be reached at the price of high unemployment and decreased comfort for car users. "*In our view on what is happening in Europe, it is difficult for the car producers to adapt on the changes required. The fuel engine has been developing for 100 years and now we want to switch to electromobility in 9 years. The question also is whether the electromobility is the right direction where to go.*" (SK01). There is also the question of consumers accepting the changes in the product portfolio. Employers in the interview mentioned the threat of decreasing variety of products because of the strict norms on low emission cars: "*Simply, the producer will not be able to afford to produce all cars producing now, he will be produce different cars. He will produce small cars with small consumption, with small engine and you won't buy anything else. So you will be forced to buy what a regulator demanded, because there will be nothing else on the market. And what if the consumers' won´t accept it? That would be a disaster!"* (SK07). The representative of Ministry of transportation was even more sceptical to the proposed changes: "*All strict norms in the EU means only that the production is shifted to the third countries solving little from the global climate change*" (SK09).

With the upcoming changes the main aim for Slovak employers is to keep the employment level and to keep competitiveness level of the automotive industry based in Slovakia (SK01, SK07). Similarly, trade unions also claimed that because of the need to reduce emissions automotive industry should not get ruined. *"For us as representatives of employees, we are not interested to see automotive industry to suffer because of the Green deal, digitalization and robotization or anything else… So for us, we should more consider the social dimension of the changes and balance it so that it wont have a one-sided effects on the employees, because employees are the weakest element in the whole chain."* (SK03).

Specifically for Slovakia, the question of functional upgrading of the production sites was revealed by respondents. Especially employers recognized the need to attract more research and development into Slovakia but lack of research infrastructure and limited cooperation with academia halt the prospect for the change. "*Automotive industry is incredibly innovative, but innovations are prepared elsewhere, outside Slovakia. To be able to do it here, we need conditions, it means research institutes and people able to work in there. However, in the last 30 years we have mostly ruined education in the research and development area, so who would do that today?"* (SK07)

It is expected that an impact of the change will be unevenly spread among suppliers. Need to innovate will tackle the whole industry, but while multinational companies are ready and preparing various strategies and new products, smaller supplier companies, especially those oriented on the production of components to fuel engines, will be endangered by bankruptcy, since their capacities to innovate are limited and public universities are not able to provide them with necessary support (SK07).

In terms of changes in the use of the cars, the local perspective of the representative of the Bratislava region suggested that the switch to electromobility is needed and important at the local level. "*The expectation is that more people will use the public transportation as complement to individual mobility. This would decrease the number of cars, especially in the densely populated areas, such as Bratislava region*" (SK06). Expert on transportation added that integration of various means of transportation (cars, buses, trains) are not coordinated which further decreases the attractiveness of the public transportation. (SK08). Another challenge in this respect is the EU direction requiring compulsory shares of electrobuses on public transportation by 2025. For instance for Slovakia this would be hardly doable since the price of electrobus is high and without efficient modes of public transportation, electrobuses may turn out to be unprofitable (SK08).

3.2 Expected changes in employment

Trade unions expect that the number of workers in the industry will decrease, therefore they demand requalifications which will allow employees to change the sector where they work. Trade unionists in our interviews demanded better requalification policies for employees (SK03), financial compensations for jobs lost (SK05) and decrease of working time as a measure to improve working conditions in the sector (SK04).

Requalification is difficult to achieve at the local level. *"We have dual education for the secondary level, but we have no means to motivate universities to better connect their curricula with needs of the automotive industry*" claimed representative of the local authority (SK06). As it concerns future decrease of employment opportunities in the region, he did not expressed concern since he expect the workforce will be adaptable and will find job opportunities in other sectors in the region. It should be added that employees in the regions where other job opportunities are limited and where the local labour market rely heavily on the automotive industry will be in much worse position.

Decrease in employment is expected because of the eradication of the production of engines and vehicles using them. "*I'm not sure how exactly the production of batteries looks like, but I'm sure it is not done manually and that the process is highly robotized and automated which I'm sure will have huge impact on employment level, especially on the low qualified positions*" (SK05). Trade union representative at the company level revealed his experience with introduction of production of electric vehicles at the production site. *"All employees had to undergo training on handling electric vehicles components to keep the safety levels. And of course, if the share of electric cars will increase we expect decrease in labour demand and layoffs"* (SK04). Employers also perceive companies producing components to fuel engines as a most probable source of unemployment in the automotive industry in the future: "*If the current political pressures will remain, we may expect rise in unemployment especially in these companies"* ((SK07).

There is no agreement between employers and employees how qualified the workforce in the automotive is and what needs do they have with respect to transition of the automotive

industry. For employers, the workforce is ready. *"In the companies they are ready because the car which will be produced in the future may have a different power train, but it will always be needed and assembled thus people are ready for the job*" (SK07). Trade unions on the other hand perceive current employees' abilities and training monotonous and easy to learn which put them in the position of low qualified workers. "*I do not think we can make from some manually working guy working in assembly line; whether we can requalify him on maintenance technicians of programmer of the machines. These are completely different jobs than a manual tasks he is performing now"* (SK03). Similarly a trade unionist from the company level also expressed concerns whether the manual workers are qualified enough and whether those performing manual tasks would be able to requalify on specialized positions of programmers and maintenance technicians (SK04).

3.3 Strategies for a Just Transition

3.3.1 Political Strategies: Recommendations from ministries and/or political parties on how to manage the transformation

There are two main aspects of the transformation: production side and consumer/user side. While production side is more in the competence of the companies in interaction with EU level regulations, the consumer side is something ministries and political actors can influence. This is also the reason why respondents in this part were mentioning mostly the user side of the transformation.

On the consumer side, respondents mostly revealed the need to build charging infrastructure for electric cars. Importantly, the introduction of electric cars should be more coordinated, subsidized where having a huge impact (e.g. in logistics in agglomerations – delivery services). To support use of the electric cars by individuals´ regular chargers close to the living districts should be built instead of high-speed chargers at highways (SK08).

Experts and employers mostly complained that from the government level the coordination of the change is missing or is partial which further halt the change in the country. "*Everyone concentrates on immediate view but the complex long-term approach is missing. We have various strategies in Slovakia but those are not fulfilled and it is a big problem… we jump from the one to another without a specific aim*" (SK07)

Trade unions also perceive the role of the state as crucial to support the change, nevertheless there are concerns about the readiness of public institutions to mediate the change. *"Important stimulus should be a Recovery fund. Had we prepared enough good projects, we would have jump by two ladders thanks to that funds. But I'm afraid that with what we have now [in the government] it won't lead us that way"* (SK03).

Common dialogue between all relevant parties is needed but only trade unions called for it. Employers mostly complained that at the government level, that there is no one to handle this complex issues. This is especially urgent when it comes to requalification strategies and education policies.

Public transportation development is another area where public sector should take the lead. There are several worth to follow examples at the local level such as the Strategy of transportation development in Bratislava or Košice, mostly regarding the support for public transportation, to attract more people to travel by train and busses instead of cars.

Along with the diversification of transport possibilities, a window of opportunity opens for the strategic decisions on what production to attract/support in Slovakia. Relatively perspective seems to be a locomotives and trains production. Nevertheless, currently mostly diesel locomotives are produced in Slovakia and no attention is paid to the issue by policymakers (SK10).

In general most of the pressure is from the EU level, while at the national level, the government lacks a comprehensive strategy (SK03, SK09, SK10).

3.3.2 Entrepreneurial strategies: Which new products can / are currently already being switched to by automotive companies / suppliers

Enterprises in the sector are from more than 90 percent owned by foreign companies. For this reasons, entrepreneurial strategies evolve from the multi-national corporation strategies decided in the home country. Final producers and TIER 1 suppliers are in general in better position than smaller and lower tier suppliers. Each of the final producers had been producing at least one model of EVs. Some of the TIER1 suppliers (e.g. Schaeffler or Continental) focuses on the development of digital equipment to cars to remain competitive. For some local companies this means that they are enlarging their R&D departments and see the main obstacle the lack of qualified workers. For this to change they miss dialogue with the policymakers.

Interestingly, companies are also thinking about products diversification as there is expected decrease in demand for cars. Especially trucks and buses are recognized as significant polluters and thus part of the attention is concentrated on their alternative power trains, especially hydrogen technologies. Nevertheless, there is no other than cars production situated in Slovakia thus this strategies of MNCs do not impact the country for now.

Companies´ representatives also demanded higher speed of charging infrastructure building seeing it as a precondition for speeding up the EVs use in the country. Another important obstacle remains the price of non-ICE vehicles, which are far beyond possibilities of majority of car users in Slovakia.

3.3.3 Trade union strategies: What do the unions propose in face of the upcoming changes

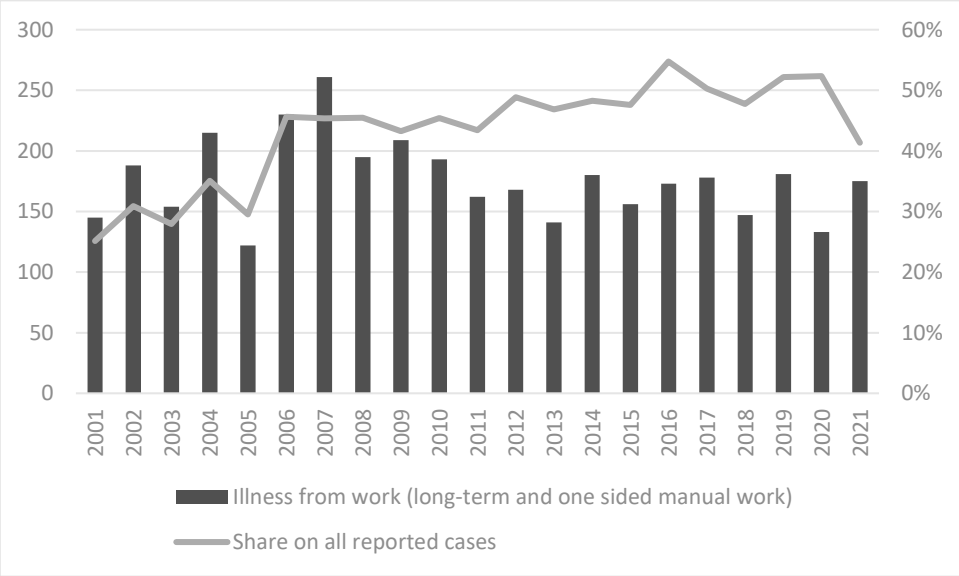
Despite the sector level collective bargaining does not possess a strong role in employment relationships, trade unions proposed the right on requalification for redundant employees in sector level collective bargaining in 2019. *(SK03)* Employers opposed the proposal arguing that requalification policies and related costs should be financed by the government and not by them.

Except this initiative trade unions do not have strategy to face upcoming changes in the sector. What they demand is the diversification of solutions in the effort to reduce emissions. "*Maybe not to focus only on one criteria of reduction of CO2 by switching to electromobility, but also to increase the share of public transformation, especially railways. Although those are a bit different aspects and consequences employers do not like to talk about because it could lead to the decrease in demand for cars"* (SK03)

Trade unions see big opportunity in digitalization and automatization, first because of a chances to improve working conditions for manual workers and second because there might be an opportunity to reduce working time.

Reduction of the manual work is highly important topic to trade unions, because high share of manual jobs causes high number of in-work injuries and illnesses. If individual suffer from long-term illness caused by the manual work, this often mean for manually working employees inability to find a new appropriate job. Statistically there are around 170 work-in illnesses reported per year, in automotive and related industries, and it constitutes almost half of all reported cases in the country (NCZI, 2021).

Figure 10 Long-term ilnesses in the automotive industry in Slovakia



Source: NCZI (own compilation)

Working time reduction efforts of the trade unions tackles mostly reduction in the current overtime and night work. In Slovakia 11 percent of employees work at night, which is by far the largest number in the EU-27, where the average is 4.3% according to Eurostat. At the company level, trade unions also aim to decrease working time from 40 hours per week set in the Labour Code to 37.5 at least. These reduction is set via collective bargaining at the company, and in some selected sectors at the sector level.

4 Conclusion

Slovak automotive industry will face challenges which may result in changed structure of employment in the sector, including its reduction. Strategically and from environmental point of view, simple change in the power train of cars may not be enough to attain decarbonization of the industry and thus further challenges will be emerging.

Slovak economy should aim to decrease its dependence on the automotive industry, for instance by diversifying production into the whole mobility sector including production of trains, buses, or bicycles and in developing new smart technologies allowing to minimizing the need for individual transportation by cars. This can be perceived as an opportunity for the region, but huge R&D investments and retraining policies and strong state incentives would be required.

Slovakia experienced restructuralization already in the 1990s and 2000s when a lot of people lost jobs and had to find work in other sectors. The policy of attracting FDI successfully decreased the unemployment but this was not supported by retraining or active labour market policies. As a result CEE governments have limited capacities in the two crucial areas for the just transition: in R&D and in employees education/retraining.

To make decarbonization processes successful, trade unions need to get involved in the debates and change the focus in collective bargaining.

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EUROSTAT database. For each data, exact codes of data sources are provided at the figure or table to enable their easy retrieval

6 List of contact persons (especially from trade unions and companies) for interviews or contacted stakeholder groups, if applicable

Code	Type of representative	Date of interview
SK01	Final car producer, management	February 2, 2021
SK03	Sector-level representative of trade unions	December 10, 2020
SK04	Trade union representative at final car producer	January 22, 2021
SK05	Trade union representative at final car producer	January 27, 2021
SK06	Representative of local level administration unit	January 26, 2021
SK07	Representative of employer´s association	December 10, 2020
SK08	Expert on transportation policies	February 24, 2021
SK09	NGO activist	February 19, 2021
SK10	Expert on railway infrastructure and policies	March 18, 2021
SK11	Ministry of transportation (written answers)	March 19, 2021
SK12	Ministry of Education	October 27, 2021