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REPORT

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Exchange Group: Just Transition in the European Car Industry

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1 Introduction

1.1 Developments in the automotive sector

The Czech automotive industry is one of the world's longest established, with roots going back to the end of the 19th century. It endured the tumultuous 20th century, undergoing wartime conversion during World War II and nationalisation under the subsequent socialist government. In the years following Czechoslovakia's Velvet Revolution in 1989, the factories were re-privatised (with varying success) and foreign capital began to establish new production facilities.

Czechia's flagship brand, Škoda Auto – headquartered in Mladá Boleslav, northeast of Prague – first took form as a bicycle and motorcycle producer (Laurin & Klement) in 1895, before being bought by the Škoda Works industrial group in the early 20th century. It would become one of the prestige enterprises of the socialist regime, providing a key source of foreign currency and manufacturing more than 3.6 million cars between 1968 and 1989 (Vilímek and Fava 2017). Today, with new greenfield production facilities, three OEMs operate in Czechia, alongside suppliers from all tiers of the supply chain, and the country is one of the world's leading producers of cars per capita – producing around 135 cars per 1000 inhabitants annually.

Production has risen drastically in recent decades – Czechia produced 197,000 cars in 1991, rising to over 1,400,000 in recent years (Figure 1).[1] As of 2020, it is the third-largest car producer in Europe, behind Germany and Spain. Even in such a manufacturing-dependent country, the automotive sector is the single largest industry, accounting for about a quarter of total industry and around 9% of Gross Domestic Product. All three OEMs present, however, are owned abroad: Škoda (VW, Germany), Toyota Peugeot Citroën Automobile (TPCA; France-Japan joint venture[2]) and Hyundai (South Korea). The industry directly employs 181,488 people, rising to around 400,000 when indirect employment is accounted for.

While Czechia's automotive factories originally met domestic automotive needs (with 66% of Škoda sales in 1990 going to buyers in Czechoslovakia [Pavlínek 2008]), the industry is now primarily export-oriented, shipping 84% of production to external markets across the world. With the establishment of more automotive firms in the country, suppliers and the industry at large have become less dependent on Škoda. However, the latter remains by far the largest manufacturer (Figure 2) and, with 30,000 employees, is also the country's second-largest private employer.

[1] Covid-19 initiated a drop of 20% – the biggest year-on-year fall in recent history.

[2] As of the start of 2021, this transferred into the sole ownership of Toyota, with plans for the production of a hybrid Toyota Yaris model.

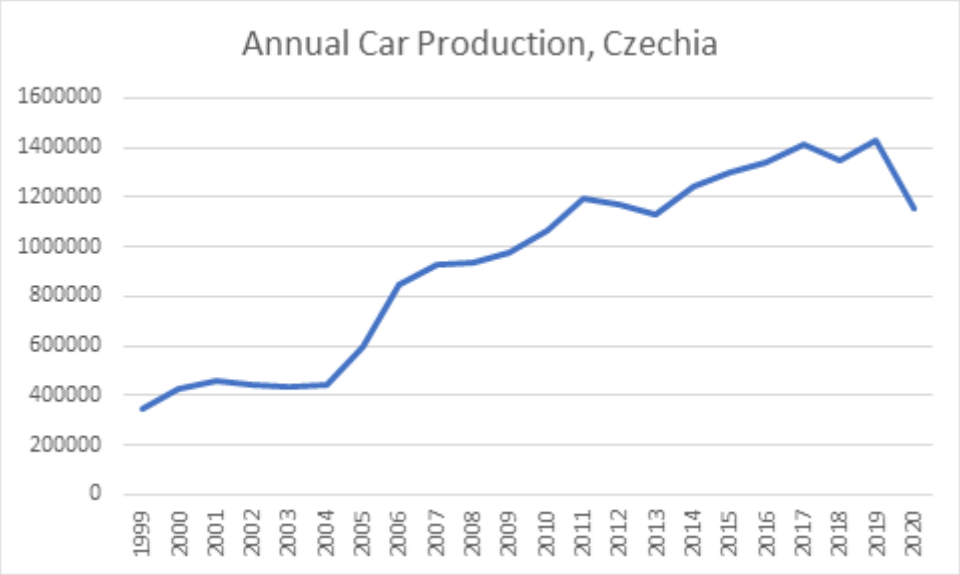

Figure 1. Annual Car Production. Source: OICA

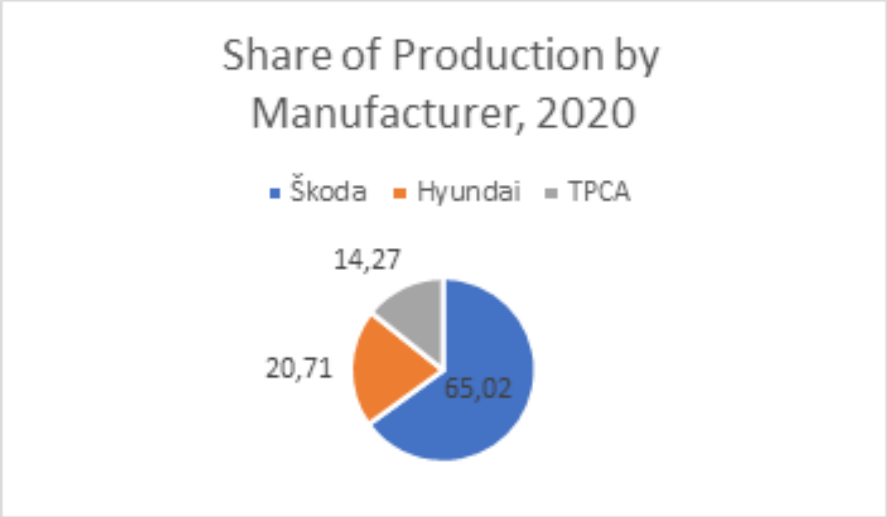

Figure 2. Share of Production by Manufacturer. Source: AutoSAP

After competition between Volkswagen and Renault to take over the former state enterprise, Škoda ended up protected by agreements made between the state and its new owners (Volkswagen) upon privatisation. Putting Czechia in an unusual position in the Central and Eastern Europe (CEE) region,[3] these agreements were intended to protect the brand and guarantee the maintenance of key production and management functions in Czechia. There have been recurring tensions, however, with Czech politicians and commentators claiming

[3] Dacia in Romania is perhaps the most comparable example.

that Volkswagen has constrained the success of the Škoda brand – and thus the broader Czech industry – focusing it on budget market segments and seeing it as a threat to the success of 'core' VW brands (Cremer 2017).[4]

The industry's dependence on foreign capital is comparable to neighbouring CEE countries. One index of foreign control shows that the Czech automotive industry is one of the most dependent on FDI, the third highest in Europe (Table 1). Consequently, the vast majority of job creation in the sector over recent decades has been by foreign firms (Table 2). This, of course, has implications for the room-for-manoeuvre and decision-making power of local actors in coming transitions, to be discussed further in Section 3.3.1.

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	
Czech Republic	91.4	
France	22.5	Bottom 3
Italy	20.9	
Germany	14.6	

Table 1. Top three and bottom three countries selected from Pavlínek (2018)*. 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.*

[4] There have, for instance, been recent controversies around the moving of production the flagship Škoda Superb to VW's Bratislava plant. While VW defended the move, it was criticised by Czech unions.

Country	Total Jobs	Domestic Firms	Foreign Firms	Share of foreign firms (%)	Share of domestic firms (%)
Czechia	72.598	3725	68.873	94.9	5.1
Germany	50.926	47.591	3.335	6.5	93.5

Table 2. Job creation by foreign and domestic firms 2005-2016. Source: Pavlínek (2020)

As with other CEE locations, inward FDI was attracted not just by optimistic projections of emerging markets in the region (which ultimately would not materialise to the extent foreseen), but also by the presence of cheap and non-militant labour and Czechia's location at the heart of Europe, near Germany, the continent's largest market. Czechia also held pre-existing manufacturing competences and skills in automotive production.

Primarily, however, relocation came down to costs – capital saw that it could lower labour costs substantially by operating in Czechia. In the 1990s, labour costs were roughly 90% lower than they were in Germany and, while this has since narrowed, there remains a gap of about 75%. If foreign capital ostensibly 'saved' the Czech industry, then the benefits flowed in the other direction too, in the form of a 'spatial fix' for automotive capital seeking a lower cost base in the face of global competition (Lin 2021). Pavlínek and Ženka (2016) reflect directly on the question of whether high FDI is overall beneficial to the Czech socio-economic situation or whether it further peripheralises the industry (see also Eder 2021). They note, for example, a higher prevalence of value-added and non-production functions (such as strategic planning, R&D, supplier selection) in domestic firms, when compared with foreign-owned firms, indicating a tendency for the automotive sector to maintain the country as a low-cost 'extended workbench'.

The Czech automotive sector extends far beyond the OEMs, comprising suppliers at all tiers of the supply chain. Echoing the wider automotive industry, this aspect has also been globalising. While 70% of the components for the Škoda Felicia model (1994-2001) were produced in Czechia, this fell to 31% for the later Octavia (Pavlínek 2008). Škoda cars are now designed and produced on the Volkswagen Group's modular and standardised MQB (*Modularer Querbaukasten*) system – a system designed to speed up production, lower costs, and provide flexibility for shifting production between different sites. With such globalisation, standardisation and consolidation, local suppliers have increasingly been edged out of the market (Lin, 2021). The ones which remain area generally found further up the supply chain, undertaking lower value-added activities.[5]

Employment Situation

A CzechInvest database of automotive suppliers lists 929 suppliers located in Czechia, with the majority in Tiers 2 and 3. Around a third of these have their primary focus on Internal Combustion Engine (ICE) components. Compounding this vulnerability to a shift away from ICEs, employment is concentrated in particular regions (Figure 3), particularly central and

[5] Conversely, however, some suppliers have taken advantage of the internationalisation process to reduce their dependency on Škoda and forge more diverse international links. In 2017, for instance, Czechia was the largest supplier of automotive parts to Germany (Dębkowska *et al.* 2019). According to reports, shock absorbers produced by Hitachi in Czechia are just one part which will be used by Tesla in their new factory in Germany.

northern Bohemia (home to Škoda, amongst others) and Moravia-Silesia, in the east of the country, bordering Slovakia (where TPCA and Hyundai established in 2005 and 2006, respectively). This geographical distribution means that transitions in the sector will be unevenly spread across regions (Drahokoupil *et al*. 2019).

Due to labour shortages, agency and migrant labour have long played an important role in the automotive sector, with temporary workers often coming from countries like Serbia, Poland or Ukraine. On top of more precarious living and working conditions, these agency workers are often the first to be dismissed when economic crisis hits (as was once again the case during Covid-19) (Kureková 2018).

Average wages in the sector are relatively high and rising – consistently remaining about a quarter higher than the average Czech wage. However, vast disparities exist both within companies (e.g. production vs. administration and management roles) and across different tiers (e.g. higher wages amongst OEMs vs. lower wages in suppliers) (Figure 4).

Figure 3. Indicative map of regional clustering of automotive companies. Source: CzechInvest

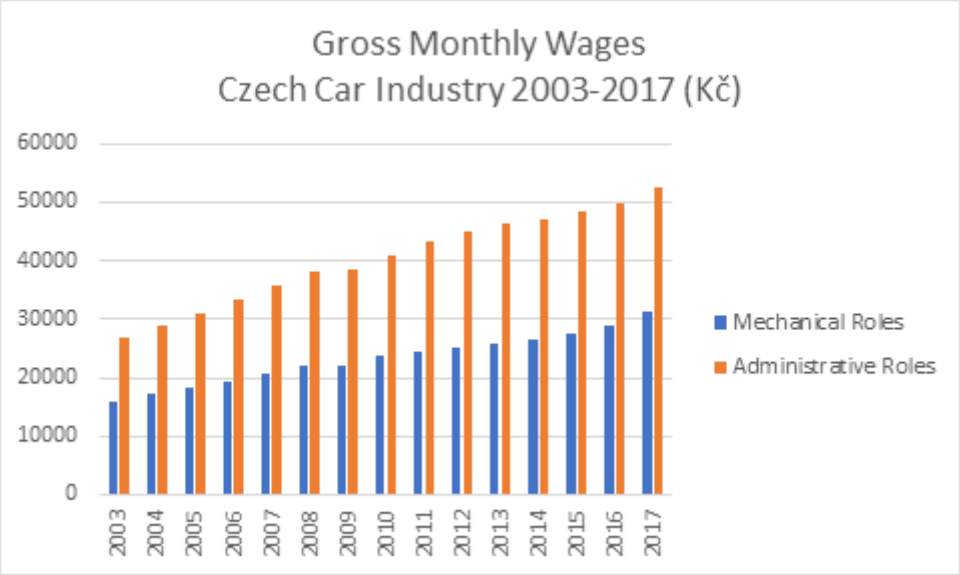

Figure 4. Source: AutoSAP

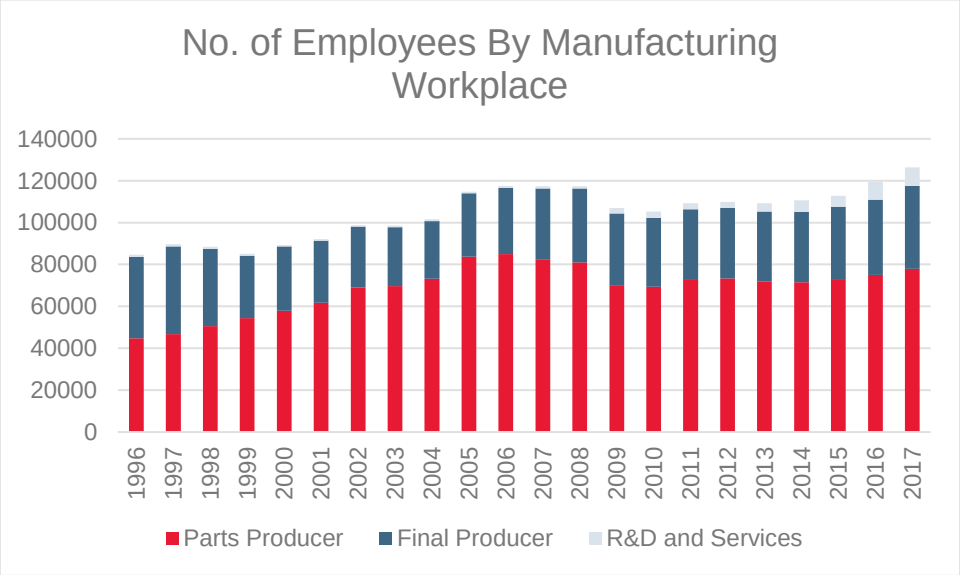

Figure 5. Source: AutoSAP[6]

In general, weak industrial relations have been noted in the CEE region (Drahokoupil 2015), meaning that the strength and position of the labour movement is often externally constrained – whether by the market or by the distant headquarters of parent companies. Unions operate in a context of international competition, whereby parent companies could simply move jobs to lower-wage regions (usually further east).

The Czech government and unions did not adopt a system of German-style works councils in the 1990s, opting to encourage “union pluralism, allowing any union with three members to

[6] It should be noted that AutoSAP membership includes some bus, freight and motorcycle producers, though the vast majority of employment is in the car industry.

claim the right to sign any collective agreement that might apply" (Drahokoupil et al. 2015: 230). Unionisation rates in the automotive industry, while above the average in Czechia as a whole (11.7%) (Visser 2019), fall below the western European average. The largest trade union in the Czech automotive sector is OS KOVO, the historical metal-workers' union, which is also a member of the IndustriAll European Trade Union. As in other CEE countries, unions have a substantial presence in Tier 1 facilities, but this tends to drop in smaller suppliers. The union landscape has also been changing in recent years: There has been a trend for workplaces to break away from traditional unions in favour of so-called 'modern unions'. Škoda is the prime example of this, splitting away from the main union movement in 2013 and substantially weakening OS KOVO's coverage.

1.2 Current and future legislative developments

The backdrop for development of the Czech auto industry has for decades been one of strong state support – at least for large corporations and OEMs. The state has pursued the expansion of the industry for the sake of increasing output and jobs. Enormous subsidies have been provided to attract foreign automotive companies, with Czechia and its neighbours engaging in race-to-the-bottom bidding wars to attract employers from oversees (Kureková 2018). In the Czech context, the state has offered corporate tax relief, customs duty exemptions on imports, grants for job creation, and the provision of land and infrastructure. Between the years 2001 and 2017, state investment incentives for the automotive industry averaged at around 5.2 billion Kc annually (€200m) (Drahokoupil *et al.* 2019).

The European Union is a key source of external regulatory changes in the industry, not least its Green Deal roadmap for climate neutrality by 2050. Road transport has proven particularly obstinate to GHG emission reductions, and thus the Commission's 'fit for 55' package (a 55% GHG reduction by 2030) will require a particular focus on this sector. It is likely that from 2035, only the sale of zero-emission vehicles will be permitted within the EU.

In 2015, the Ministry of Industry and Trade together with the Ministry of Transport and the Ministry of the Environment developed The National Action Plan for Clean Mobility (NAP CM). As a member state of the EU, Czechia had to establish a national policy framework to support the development of alternative fuels in transport. In connection with the preparation of the National Plan of the Czech Republic in the field of energy and climate in 2018, NAP CM was updated in 2020. Besides supporting the purchase of vehicles for municipalities and businesses, related infrastructure and training, research and development in this area, the update concerned mainly meeting the target of 14% share of renewable energy in transport by 2030 (MPO 2020). The National Plan for Clean Mobility aims for between 220,000 and 500,000 electric cars, 800 to 1,200 electric buses, and 19,000 to 35,000 charging stations by 2030.

Another important document related to NAP CM was developed in 2017 in cooperation among Ministry of Industry and Trade, representatives of the automotive industry, energy companies and other stakeholders. The 'Memorandum on the future of the automotive industry in the Czech Republic' was an attempt by the Government of the Czech Republic to emphasize the changes in the automotive industry, for which it must have a strategy prepared in advance and implemented in time (MPO 2017).

In July 2021, the government also published a Hydrogen Strategy, pledging support to development of the fuel until 2050. The mobility section of the Hydrogen Strategy builds on NAP CM and further develops the role of hydrogen in the process of transition to emission-free mobility. As stated in the strategy, the production of hydrogen passenger cars in Czechia is primarily carried out by Asian car manufacturers (Toyota, Hyundai) with only a few hundred

cars produced so far. In terms of efficiency, it is more appropriate to use and support hydrogen technology in urban transport, freight transport, or rail transport. (MPO 2021)

Regarding employment legislation, there is no higher-level or sector-wide collective bargaining process in place for the automotive industry. OS KOVO has recently challenged this in court, but with no success. To counteract the driving down of labour standards, however, some regulations have been tightened over recent years. Recent Ministry of Labour proposals, for instance, would see agency employment comprising a maximum of 10% of the employees of any particular company.[7] On the other hand, disruption in production for this cyclical industry has also shaped labour regulations: In the wake of the 2008 crisis, work conditions were flexibilised in order to adapt labour supply to fluctuations in production. Initially resisted by unions, the 'flexikonto' system (led by VW subsidiaries, as it is modelled on German manufacturing) is an increasingly common system of flexible work accounts where workers are paid while not working, and later work these hours back (Myant 2019).

[7] https://www.oskovo.cz/aktuality/mpsv-navrhne-omezeni-podilu-agenturnich-pracovniku-ve-firme

2 Challenges driving the transformation of the car industry

The automotive industry plays a key role in the economies of much of CEE, with Czechia being no exception. However, with transport responsible for around a quarter of Europe's GHG emissions – a proportion which has remained stubbornly high compared to other sectors – it has become increasingly clear that radical transformations are on the horizon if climate targets are to be met. The Czech automotive sector therefore finds itself at a crossroads – facing (post-dieselgate) regulatory responses to climate crisis, Covid-19 exacerbating volatile supply chains (coupled with input price rises and semiconductor shortages), new technologies (and new industry competitors), competition for jobs from lower wage production locations, and new protectionism from China (a market which it depends on for growth).

2.1 Climate change and environmental considerations

By tightening fleet emission regulations for producers, the EU has been pushing an accelerated timetable to electromobility, with current market penetration of BEVs now exceeding that of other major world regions. This is happening in a structurally uneven way, however, with Czechia on the 'integrated periphery' in terms of both production and consumption: For now, BEV production and use in Europe are concentrated in 'core' countries such as France and Germany, while Czechia remains primarily dependent on ICEs. Indeed, the overall age of the EU car fleet has been getting older and countries such as Poland, Slovakia and Czechia continue to rely on second-hand ICE cars imported from Germany and elsewhere.[8]

While Czechia has generally sought to water down EU emissions regulations, the Czech government and industry has increasingly signalled its orientation towards opportunities arising with the latest industrial trends and regulations (see discussion of battery production in Section 3.1). Beyond the National Action Plan mentioned above, a further influence of near-term developments in Czechia is the Recovery and Resilience Fund. While the NGO Bankwatch has criticised Czechia's €7bn recovery and resilience plan as inadequate, 15% of the plan is aimed at transport and clean mobility – primarily electrification of railways and the building of charging infrastructure. The country aims to build at least 19,000 charging stations (both electric and hydrogen) by 2030, with an envisioned rise to 220,000 EVs in use.

Industry and unions, as represented by OS KOVO and AutoSAP, can at times be aligned in seeking to slow down environmental regulation if it is deemed to be 'too much, too fast', and thus negatively impacting on the competitiveness of the Czech industry. This was seen, for instance, in their allied response to regulations of emissions from HGVs.[9] In general, however, it seems to be accepted that BEVs are the primary direction OEMs must take in the short-to-medium term. Škoda and Hyundai currently produce BEVs in Czechia and, while current production is low,[10] Škoda plans a 50% reduction in fleet emissions by 2030 (compared to 2020 levels). In 2019, Škoda invested €25m in a battery production line, producing 100,000 high-voltage traction batteries for plug-in hybrid (PHEV) cars across the VW group by early

[8] The EU13 comprises 20% of EU population but accounted for only 8% of new car registrations in 2018 (a figure which has been relatively static for decades).

[9] https://www.oskovo.cz/aktuality/vyrobci-odbory-pozaduji-prijatelne-emisni-normy-co2

[10] Out of 104,576 cars produced in January 2021, 3,493 were either EV or PHEV – 3.34% of the total, according to the industry body, AutoSAP.

2021. By 2030, the company projects the share of electric cars in its fleet at between 50-70%, with e-components and vehicles being produced at all of its Czech plants by that date.

Interviewees expressed skepticism about the source and motive of these developments, however, questioning the true ecological credentials and motivations of these shifts, and the fact that – once again – the industry is being shaped by outside actors:

"*In Czechia, the basic attitude is that the bad Brussels dictates it [emissions regulations]. This is a basic attitude among the public, experts, automakers, politicians, and so on. And this is the basic enemy against which everyone stands.*" (CZ08)

"*So we will slowly change the world, and if you make a car, you will pay a fine and it will be shared in Brussels. And they'll get it as a salary, or they'll put it into research and buy a device that sucks up CO2 and improves the climate, and Greta [Thunberg] will be happy.*" (CZ02)

"We are afraid that preparedness is not great. Businesses themselves do not know how their future will develop, they are often in the hands of foreign owners, so decision-making power is severely limited." (KOVO)

There appears to be growing justification for such skepticisms given that BEV production in Europe is often focused on large luxury cars (including electric SUVs) whose weight and material intensity offset the reduction in emissions which would be needed for real sustainability transitions (Morgan 2020; de Blas *et al*. 2020).[11] Furthermore, while cars may be cleaner at the tailpipe, the overall impact of automobility may still rise – people aren't travelling more, but research has shown that cars are emptier (i.e. a lower load factor), ownership is wider, and thus the material cost of replacing cars given current mobility patterns will be enormous. In Czechia, as elsewhere, if electromobility is going to be viewed as worth pursuing, it is important to decarbonise the power sector and alter broader mobility patterns (reducing overall demand for individual mobility) – otherwise there is the risk of creating a vast electric mobility infrastructure powered by dirty fuels.[12] This is particularly pertinent in the Czech context, given how wedded the state is to energy from fossil fuels.

One interviewee indicated that the very individualistic and resource-intensive ideology of the car – whether fossil-fueled or not – is unsustainable and that it needs replacing with greater public transport use and much smaller personal vehicles (bicycles, small electric cars and scooters) (de Blas et al. 2020; Morgan 2020). (*"There is always talk of how painful this change is, but no one talks about how painful the current situation is"* [CZ06]) Taking a step back, then, it is increasingly clear that state and industry's preferred approach – simply swapping one technology for another (i.e. EVs for ICEs) – is neither coherent nor effective. Rather, a genuine shift in mobility patterns (and thus production) is required.

2.2 Digitization and electrification

While Czechia has yet to set a date for the phasing out of ICE sales and lags behind western Europe in the rate of electrification of its transport fleet, the pace of electrification across the continent is quickening. Unfortunately, modelling of the impact this will have on the Czech industry has not been done in any detail. Even in terms of Europe as a whole, estimates and models vary drastically, depending on the assumptions made. A 2017 study by Transport & Environment (T&E) highlights that, while overall jobs in the economy could grow in the transition to BEVs, importing BEVs from China could result in a loss of a quarter of jobs in the

[11] It should be noted that this trend for large SUVs is also being seen in Czechia, where they now make up nearly half of new car sales. This trend contributes to the fact that the size of the average car in Europe has increased substantially over recent decades.

[12] Czech renewable energy production is below the EU average and the country – located in the so-called 'lignite triangle' – is still dependent on coal for over half of its energy supply.

European automotive industry. Given that BEVs require far fewer components than ICEs, they are likely to drastically simplify the production process. Suppliers of ICE components – of which there are many in Czechia – will have to find new product lines, while new suppliers (e.g. of batteries) will emerge. Given the speed of announced shifts in production by European OEMs, the majority of jobs should be maintained in Europe, but the quality, content and geographic location of those jobs is likely to drastically change. This will then impact on different segments of workers in different ways.

Asian companies – and China in particular – have come to dominate battery and BEV production and hold many strategic resource reserves (not least lithium for batteries). While currently being key suppliers, they are also a threat to traditional stalwarts of the European automotive industry. It is partly due to fears of falling behind that the European Battery Alliance has been founded, and that the Czech government has recently signalled substantial interest in developing its own lithium reserves and battery manufacturing facilities.

Whlie Europe lags behind China in both production and the required infrastructure for the use of BEVs[13], electrification of the transport sector has been gaining traction in Europe with the increased prominence of renewable electricity and intensifying climate goals. In Czechia too, there are shifting regulatory attitudes towards 'green' mobility (current incentives for BEVs include an exemption from road tax and free parking in Prague), though the bottom line is that consumers within the country remain unlikely to purchase them *en masse*, due to the elevated cost. It is no surprise that Škoda's first ever fully electric SUV (*ENYAQ iV, 2021*) was sold in Oslo, and not Prague.

As part of the 2015 National Action Plan for Clean Mobility, municipality purchases of EVs were subsidised, which drove a large proportion of the meagre sales to date. Our interviewees therefore generally saw the current context for EVs in Czechia as insufficient (just 7,109 BEVs were registered in total at the end of 2020), citing, among other things, the low number of charging stations available across the country (less than 800 at the time of writing):

"*This is what I experience every day as a climate activist. It's annoying actually to go against the flow with that activism. When I buy an electric car, here in the Czech context, I am the jerk who paid more. And I still cannot drive 800 kilometres, but only 300 kilometres.*" (CZ06)

Interviewees also noted that the readiness of Czech society, at least on first glance, was quite low: "*I think that mental or ideological readiness, as you say, is very low. We try to present the user experience with the car, how it is driven, how comfortable it is, how it works, rather than waving the flag that it is a low-emission hybrid car."* (CZ08)

While some interviewees understood the imperative for environmental improvements more than others, we encountered skepticism around the feasibility of a comprehensive and rapid transition to EVs:

"*In Czechia, we have between 5-6 million vehicles in the fleet and the change every year is between 200-250 thousand new vehicles. If you calculate it, if we constantly change the fleet, then the real exchange of all vehicles in that fleet will take place no sooner than in 25-30 years.*" (CZ03)

Finally, there has been much talk of car companies repositioning to becoming (perhaps software-oriented) 'mobility providers', with the very notion of car ownership itself in flux. Signalling the possibility for new business models, Škoda is already looking at shifting beyond being a car company – though it is hard to know how seriously to take this. In 2019, for instance, the company's DigiLab had already significantly expanded its BeRider electric scooter sharing scheme in Prague to 700 vehicles. The scooters have a range of up to 70km and are boasted as part of Skoda's transformation into 'mobility solutions' as part of its Skoda

[13] Current distribution of this infrastructure is very uneven, with 70% of the EU's charging stations located in just three countries: the Netherlands, France and Germany. This demonstrates a huge divide in how such technologies will be adopted.

Auto 2025 Strategy. They do not produce the scooters in question, but operate as service providers. The company is also involved in developing car-sharing schemes, such as Uniqway, and the software HoppyGo, which has over 100,000 registered users in Czechia. The latter is a sort of AirBnB for cars, matching the owners of underutilised cars with those in need of borrowing one. How these initiatives are viewed with respect to the core business of car sales remains to be seen.

2.3 Digitization and automation in production

The automotive sector has historically been at the forefront of automation, standardisation and robotisation processes, and the Czech industry is no exception. OEMs in particular drive an intensified search for economies of scale in the context of increased global competition. Recent moves towards modularity of design and automation (mentioned in Section 1.1), for instance, mean that corporate headquarters can more easily shift production between plants. Labour hours per vehicle have thus been reducing (Cody 2015), and given the relative simplicity of EVs, this process could accelerate.

Czechia spends more on automotive R&D than its neighbours in the Visegrád (Kureková 2018), with one study estimating that this expenditure is greater than the rest of the CEE region combined (Pak 2016). This then affects the production process, which is rapidly getting digitised and automated: One recent study found that the Czech automotive industry has a relatively high rate of robotisation – particularly in OEM production facilities – even given the low labour costs which would be thought to disincentivise such developments (Martišková, 2020). This seems to back up the OECD's predictions that the Czech economy – with rising wages and an above-average focus on manufacturing – is particularly susceptible to disruptions from automation. In a study commissioned by the Czech government, Fat'un *et al*. (2018) showed the threat posed to jobs, predicting that 40% of assembly jobs could be substituted by technology on a 5-year time frame, rising to 70% on a 6-15 year time frame. This is more likely, even in lower-wage countries, given that the comparative cost of automation is dropping (Drahokoupil *et al*. 2019)

Škoda, for instance, has upgraded its production processes and introduced digitization and automation throughout the production process, using the rhetoric of 'Internet of Things (IoT)' and 'Industry 4.0' in its business. In logistics, for instance, AI apps have been developed to assist with efficient freight loading, and robots are used for moving heavy goods or picking parts from inventory and moving them to the production line. This has also included smart bracelets which track employees, ostensibly for their own safety. On the production line at the Kvasiny plant, the much-publicized 'dProduction' software is a digital notification system which scans employee ID cards in order to controls and monitor the production workflow. This replaces the manual stamping of job cards and paper-based communication. All such innovations raise questions not just of work quantity and labour displacement, but also of work quality, the pace of production, and surveillance of employees. One interviewee discussed the implications of such communications technologies in the automotive workplace: "the remote control of everything possible. It's terribly reliable, it can transfer an awful lot of data and information in a very short period of time, which existing wifi can't do…In the end, when the 5G network connects all ten lines, there will be only one person at some central counter and he will have all ten… And [the other] nine people will lose their jobs. This is the digitization of Industry 4.0 and the fact that they don't tell us what is going on." (CZ01; see also Lin, 2021)

3 Just Transition pathways

In the face of the vast challenges touched on above, ensuring good work for employees and prosperity for communities, while simultaneously protecting the planet, is a key goal. The notion of Just Transition has not yet been used in Czechia in relation to actual and potential disruptions in the automotive industry or manufacturing in general. Instead, the term has become more familiar in relation to the end of coal mining in particular Czech regions (for economic, technological and ecological reasons). For instance, the government's ongoing RE:START strategy for the economic restructuring of Czech coal regions was established to support regions (namely Usti, Moravia-Silesia and Karlovy Vary) affected by declining jobs in this industry.

Ultimately, though, there will be enormous differences in the impacts on workers and the environment, depending on what actions are taken by various stakeholders in the sector. This spectrum of actions extends from business-as-usual/laissez faire, with little pro-active coordination or government intervention and industrial policy, to strong political will and labour organising fostering just transitions and mobility transformations. A vast range of possibilities lies between these poles. Faced with the phase-out of ICEs by 2035 in the EU, the discussion in Czechia so far has been dominated by a 'green growth' or green capitalist discourse which assumes a win-win process of continued industrial growth through higher car sales and ecological improvement. By not questioning current mobility patterns and social processes, however, the Czech industry – and the automotive sector as a whole – could be taken by surprise when limits to this approach appear and the requirement for more radical changes become clear.

3.1 Expected changes in the industrial sector

Decarbonisation through a shift towards BEVs, as prioritised by the EU, means that many products and activities in the automotive value chain are at risk of disappearing completely (Eder 2021). This is particularly the case in more peripheral countries like Czechia, which have less domestic control of value chains, focus mainly on the production of ICEs and budget product lines, and which have relatively low levels of R&D activities.

Given that BEV's have a fraction of the parts requirements of ICEs, there are valid concerns that this reduced demand for automotive components would ripple through the supply chain. This is also a particular risk for a country like Czechia, given the higher levels of routine manual production tasks concentrated there, and the proportion of the industry dependent on producing specific parts for ICE cars. Our union interviewee noted: "Employees will move to other segments of production or to services… We are convinced of job losses in the automotive industry. Digitization is progressing. Digitization in companies – companies do this either on the instinct of self-preservation to cope with production costs, or they will gradually disappear. Many employees will need to be retrained for the position of electrician."

Tempering any images of a rapid transformation of the industry, however, some interviewees questioned the realism of a quick transition towards BEVs given the large stock of ICEs already on the roads and the lack of infrastructural preparedness (as introduced in Section 2.2). Furthermore, basic questions around where and how people will be able to charge their cars (or whether swappable batteries – as pioneered by the Chinese company Nio – or hydrogen, or some other technology are required) remain to be solved.

It is unlikely that this development would be linear, however. Observers have noted, for instance, a possibility for shorter-term gains in employment through core countries moving ICE

and PHEV production to CEE,[14] while higher-value R&D and the production of higher-end EVs would be concentrated by parent companies in the core. To an extent, this seems an accurate portrayal of current trends. VW, for instance, plans to move the production of their ICE Passat model to Czechia from 2023, while it upgrades German production sites for EVs (Drahokoupil *et al*. 2019). Where BEVs are produced in CEE countries, they tend to be more price-sensitive and smaller models. The production of BEVs in Czechia already sees the country continue on its trajectory of producing for export.

While there are some Czech members of the European Battery Alliance, these tend to be smaller or more experimental battery producers (e.g. EV Battery in Přemyslovice or CES BatteryBox), with the Alliance primarily concentrated in Western and Northern Europe. Volkswagen, for instance, plans to cover most of its output with in-house battery production by 2030[15] and is planning six battery factories in Europe by 2030. These, however, will be concentrated in Western Europe with CEE countries competing with each other for any further plants. The lack of involvement in this value chain was noted in the interviews: “I think that we lack battery production here in the Czech Republic today. We know that such capacity is being created all over Europe and not in the Czech Republic, not that the batteries cannot be exported to us, just like a lot of things are exported or imported in Europe. But I think that in terms of how we have the production chain complex, it's something we just miss.” (CZ03)

In part to counteract ICE-based path dependencies, in 2021, the Czech government announced €2bn in support for the construction of at least one state-subsidised lithium battery ‘gigafactory’, in a process led by the state-owned power company *ČEZ (in potential partnership with VW or the South Korean firm, LG).* A further attempt to dislodge China’s domination in this supply chain, the factory is planned to be completed by 2024, creating up to 2,300 jobs and situated on the site of former coal power station in Prunéřov, North Bohemia (Czechia’s largest coal plant, until it was decommissioned). The state’s memorandum of support cited it as ‘a strategic project that could accelerate the transformation of both energy and automotive industries…transforming structurally affected regions in the Czech Republic.’

With the growing importance of batteries, mining and resource supply are set to become a more direct part of the Czech supply chain. In a development specific to the Czech case, the Czech government’s gigafactory announcement came on top of news that commercial mining would commence in *Krušné hory (the Ore Mountains)* in the north of the country, on the border with Germany. Czechia is home to 3-5% of the world’s lithium ore and, with rising demand and prices, it now appears commercially viable to exploit these reserves. This mining project – also involving *ČEZ, who envision supplying lithium to the factory* – would be the EU’s first internal source of battery-grade lithium. Such projects are a sign that policymakers are repositioning Czechia to take advantage of a desire to locate the EV value chain within Europe.

3.2 Expected changes in employment

Automotive employment in Czechia has been expanding rapidly since the 1990s as a result of expansion and offshoring of production from ‘core’ states. As job numbers have stagnated or declined in ‘core’ nations, they have increased in CEE. Throughout this expansion, the Czech auto industry has had longstanding labour and skills shortages, with employers consistently complaining of a chronic skills shortage. Labour is therefore often imported in the form of agency employees (from Ukraine, Poland and elsewhere) and wages have risen steadily, especially for those working in OEMs.

[14] PHEVs are particularly complex – and thus labour-intensive – to produce.

[15] https://www.ft.com/content/cf53d51f-bcb2-46e1-a0e3-e86e9eeba13c

Employment figures show that most Czech automotive workers are manual workers, and most of them work in automotive supplier organisations. It may therefore be relevant to reflect on the fact that in the wake of the 2008 crisis, employees in suppliers of parts were more likely to be laid off than employees in final producers (13% vs 3% layoff rates in the immediate aftermath of the crisis) (Drahokoupil *et al*. 2019). As can be seen in Figure 5, however, the composition of the labour market has been changing and the number of (higher-paid) employees in R&D and other automotive service enterprises has been rising in recent years.

While advocates of the so-called 'green new deal' propose that green investments and industrial transitions can produce increases in quality employment, there are no doubts that uncertainties lie ahead for industries currently dependent on fossil fuels, such as the automotive sector. While the quantitative change in jobs is unclear – depending on political decisions and market demand – it is obvious that the quality of work will shift also. For instance, skilled labour is likely to become more important and the new profile of workers will require more specialised qualifications (e.g. high-voltage applications and programming). If so, older and lower-skilled employees – as well as agency employees – may be the ones to lose out. As our union interviewee noted, "Agency employees are probably even worse off than core ones, agencies have little interest in their education. Businesses are hesitant to invest in staff due to increasing pressure from the EU institutions on greening at all costs. They are considering whether to continue production, or whether to look for a territory where we would not have such strict legislation. Priority for companies is given to investments in technology, machines, people are in the last place – in case of problems, employees are trained or new ones are hired from the labor market (foreign employees are better for companies – they use various practices to reduce labor costs in order to save costs)." Czech unions, however, do not appear to be preparing for any widespread redundancies, and generally focus on less strategic, long-term matters.

Overall, OEMs too appeared confident in succeeding in the transition, with employment potentially even growing in the short term as firms focus on greater output of ICEs, PHEVs and BEVs, often side-by-side on production lines. Over 16,000 Škoda employees have already undergone basic in-house training on electromobility, signalling how central this will be to the company moving forward. While automation is growing and BEVs require less direct labour, projected growth in sales and demand is deemed to outweigh reductions in labour intensity of production. Profit margins of ICEs, however, are predicted to drop, bringing with it renewed pressure on wages in Czech production (Drahokoupil *et al.* 2019).

While CEE countries generally focus on ICE production, with state-of-the-art BEV manufacturing concentrated in core countries, smaller, price-sensitive EV models are increasingly concentrated in CEE countries. Looking beyond the short-term, many of the largest car manufacturers have pledged to completely discontinue ICE production. Disruptions, therefore, may be pushed further up the supply chain – towards those more specialised Tier 2 and Tier 3 supply companies who produce ICE-specific components. It should be noted that these more vulnerable firms are also the ones less likely to have a strong union presence.

While new jobs will be created in the automotive industry, these will not necessarily coincide at the same time and location as the jobs lost. The German automotive sector already produces most of its premium lines at home, while manufacturing smaller, cheaper cars abroad (Pavlínek 2021). Given that such decisions are taken abroad, in company headquarters, uneven impacts can be expected across countries and sectors. Škoda has, however, announced a €500m investment in retraining and job safeguarding to 2030, as part of their 'Next Level – Škoda Strategy 2030' plan, pivoting the company to electric components and vehicles. This may signal, however, increased control and surveillance of workers in digitised factory processes, and a quicker pace of work under advancing Industry 4.0 methods.

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

Political strategies and the Czech state cannot be thought of outside of its relationship to the EU – for instance, with the influence of the EU's 'Fit for 55' policy speeding up charging infrastructure roll out in member states. However, as noted above, domestic public policy in Czechia has relied on providing an attractive business environment for automotive FDI, often in competition with neighbouring states. Given the challenges facing the industry, political decisions will have to be made as to whether a more balanced approach can be struck between autonomy, local control and quality jobs with this growth-at-all-costs approach. Fostering more local value chains or product diversification,[16] for instance, could protect employment and industry, and is certainly more prominent on the political agenda, post-Covid. The state appears to be taking an active role in its support for the industry, focusing on new potential sources of employment in economically depressed regions, such as battery production and lithium mining. The actual sustainability credentials of such projects, however, are open to debate. The state has also in recent years backed a Mobility Innovation Hub, with Škoda and various universities as key partners. This is envisioned to facilitate collaboration between industry, research and the public sector on questions such as e-mobility, alternative drive systems and digitalisation.

As Eder (2021) points out, the state is not a neutral party in transformation processes. Rather, as currently structured it 'might also be used to make the working class pay for the major transformations, while the future profits remain in the hands of the few.' As a result, conflict as much as social partnership may be required moving forward, where appropriate. The Czech state has long provided a benign context for transnational automotive capital. A progressive industrial policy from various organs of the Czech state, however, could equitably soften the blow of the decline of ICE, taking into consideration the challenges outlined above. Apart from transformation funds for retraining, working-time adjustments or early retirement, regional and national government could facilitate a timely (proactive, rather than reactive) reduction in the over-dependence of particular regions on single large employers, acknowledging the cyclical and unstable nature of the industry. One interviewee highlighted that this would be in the longer-term interest of the state: "*And eminently, it should also be of interest to the state, which should support it at least financially, because it will pay off for them in the sense that these people will not end up in the employment office, they will not have to pay them unemployment benefits. This money can be effectively invested in getting those people paid for courses, which will be run, for example, by a private entity or a university, and the employer will actually organise it, i.e., it is necessary to have it as a cooperation of these three entities."* (CZ03)

In spite of these possibilities, our interviews underlined a sense that the 'state' – broadly understood – is not taking the role it could or should, whether in terms of softening the blow for employees, readying any necessary infrastructure: "*[Employers] care about the business, and unions care about people. Well, the third player in the tripartite dialogue is missing because he is asleep. This is neither the fault of trade unions nor employers. The legislators have other worries now.*" (CZ01) A climate activist highlighted that the Czech state is lagging on climate transitions in general: "*And these are normal tools that politics has, and they could regulate, to intervene in that market. But so far, they are not used here in Czechia. But at the same time, it is consistent, that is why we are climate sceptical here, as in this country.*" (CZ06)

[16] We would note, for example, that Czechia is one of the world's leading producers of buses and trams, so the focus on providing incentives for the car industry could be pivoted elsewhere.

"*The problem is that it requires quite a large financial investment and, most importantly, it must be grasped conceptually. So, I think it also takes time to come up with it and somehow compile the strategy of how to proceed so that it is as advantageous and meaningful for the given city*" (CZ05).

Furthermore, interviewees highlighted the greater role the state could play in intervening in cultural trends which valorise individualised automobility:

"*I don't think we're mentally prepared for that. In our country, the car still has status, in the sense that in which car people see you, they will judge you accordingly and so on. But I think the state could do a lot about this without having to spend a single crown on subsidies, they should explain why it is harmful. It's a stupid example, but once upon a time the state played a big role in this, for example, in* [discouraging] *smoking.*" (CZ08)

In the Czech context, politicians have long spoken about Škoda's survival as a matter of 'national interest' and attempted to influence it accordingly. However, the state is currently limited in the oversight and direction given to OEMs. Given such interests, Eder (2021: 45) suggests that 'the state acquires shares in those companies that need to be restructured in order to actively influence their corporate strategies to make them congruent with the social-ecological transformation.' Without such radical thinking, interviewees expressed dismay at current political commitments for just transitions towards greener mobility of any kind:

- *"Market forces will finally lead to conversion, but this might be too late. We need incentives to make it (conversion) the cheapest and the most comfortable solution"* (CZ06).
- "*I don't think there is a financial advantage, or a higher tax deduction, or anything like that. Compared to some other countries, for example, we are missing a bit because the support is simply not so significant*." (CZ05)

The state could build on existing expertise by developing a structure similar to its Coal Commission and RE:START initiatives which bring together governing bodies with local stakeholders impacted by the decline of coal jobs (see Section 3). This should be a long-term, community-led process where possible, reflecting the depth of issues arising over many years and ensuring that regions do not become over-reliant on fleeting employment by shallow-rooted overseas entities searching for profit margins.

Given that governing transport is not about the production of individual cars, but the establishment of a mobility system and infrastructure, different levels of the state, from municipalities to the national government, will need to systematically promote appropriate infrastructure for the transition. A new balance will need to be struck between mass public transport, alternative mobility (e.g. bicycles and scooters) and regulating for (ideally smaller and more cost-effective) EVs. While more marginal and less strategic, Eder (2021) highlights state procurement policies as another lever for change in this – perhaps ensuring that Czech industry is supported in purchasing policies (a tool already used under the 2015 National Action Plan) or supporting particular types of vehicles and infrastructures (whether EVs, cycling or public transport). This could facilitate and smooth the transition.

Czechia has one of the oldest car fleets in the EU – relying on second-hand imports – and therefore one interviewee noted an inconsistency in how EU rules impact different member states:

"*There are various models of how to motivate zero-emission mobility. Currently, CO2 taxation is being considered based on the mileage using a CO2 registration tax, or it is possible to support zero taxation in territories such as Czechia. And it is there where we see a discrepancy between the fact that the European Union, on the one hand, regulates manufacturers in order that they should produce those vehicles. On the other hand, customers are not motivated to buy and operate those vehicles in many countries. It's just that ecology plays no role from a*

human or fiscal perspective. So, of course, the situation is tough, while the direction of Europe to some reasonable economic path can be controlled." (CZ03)

Political initiatives will face the reality of skepticism about who is driving transformations and who stands to benefit. On numerous occasions, as seen in Section 2.1, this took the form of anti-EU sentiment. Public support for just transitions could be built through education, retraining and sustainable welfare policies. One union interviewee, however, expressed skepticism about state-led educational reforms: "implementation is important, and I'm a little skeptical here. Public education does not catch up at all, it follows the old curriculum and there is a slow response to development trends."

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

Producers portrayed an assumption that a smooth replacement of ICE cars would be possible, with few negative repercussions for the industry or Czech production facilities: *"I would say that a final outcome for automotive will remain the same in terms of production. We should produce no matter what power will be used"* (CZ03). *"For workers, there won't be a huge change, but sure they will need to requalify. These requalification courses should be short and focused, lasting several months only. We need to define curriculums, and places where it will be taught – [such as] high schools and universities."* (CZ03). This vision of smooth transition, however, contradicts that of some other interviewees.

There is also a path dependency being created, with all resources being put into EV production: "*In terms of those production programs, the carmakers today in many cases simply bet everything on electromobility, and now they will have to stick to it, tooth and nail, because they invested a lot of money into it.*" (CZ08) Some feel that even if this is the wrong direction, there is not much that can be done to change course: "*Electromobility is just beginning. We all know in the industry that this will be the case for 20 years. It is a dead-end and a fashion into which the European Union is simply forcing us now. There is no choice, so we will simply have to look into that dead-end for 20 years, and we will have to endure it. And then they find out it doesn't work.*" (CZ01).

While Czechia had robust R&D activities before privatisation of the sector in the 1990s, this has since declined. It may be necessary for this tradition to be recovered – for instance, looking at alternative products and strategies. However, Pavlínek (2021: 20) notes that "The rapid growth of the automotive industry in the stable periphery has been slowing down and is unlikely to continue in the future because of the increasingly exhausted sources of labor surplus and, consequently, rising wages. Since the ECE automotive industry is overwhelmingly under foreign ownership and control, the only remaining ways to improve its relative position is through the strengthening of innovation activities and shifting to a higher-value-added production, which takes time." It should be noted in the Czech case that Škoda still has more autonomy in this than the more recent greenfield developments, which are entirely controlled by head offices (Drahokoupil *et al*. 2019). The existence of the Škoda University is also notable in this respect.

All of the OEMs present in Czechia have a stated interest in developing BEVs or hybrid vehicles, which together comprised 9.6% of production in the first half of 2021, according to industry data. Also, as noted above, firms like LG (Korea) and VW (Germany) are considering Czechia for battery production, while the state and private industry are collaborating on future-facing mobility initiatives. Due to ongoing uncertainties about the form of infrastructure which would be required to support a full conversion to BEVs, firms such as Škoda have also developed collaborations related to charging infrastructure, to be installed and used in Czech homes or businesses. It also is recycling batteries from cars into power packs/energy storage systems. Growth in non-car services (such as more software-based services, as outlined in Section 2.2) may further offset reductions in employment elsewhere.

Given this picture, it seems that suppliers who are specialised in ICE components could be the most vulnerable, and the most in need of support for a just transition. Czechia already has robust production of buses (of which it is one of the world's largest per-capita producers, producing 5,070 units in 2020), trams, bicycles and other modes of transport, with certain suppliers producing for diverse final producers, across transport modes. This gives some leeway for adaptation to coming transformations among suppliers. Smaller suppliers need to avoid the 'captive' value chains of the automotive sector (Eder 2021: 14), perhaps diversifying into other products where possible to reduce their reliance on individual OEMs. It is notable that while Czech car production fell by 20% due to covid, bus production fell by only 2%, perhaps signalling the latter as a related more resilient sector for expansion, and one which is less vulnerable to individual consumer demand.

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

In general, the automotive industry has a relatively strong union tradition, and Czechia is no exception to this. However, the focus of unions has been on short-term protection of jobs and internal working conditions, rather than any strategic analysis of the future of the industry itself (as, for instance, seen in Germany) or broader international solidarity activities. Furthermore, researchers have noted variations across workplaces which will need to be factored in. For instance, there are tangibly worse labour relations in Czech factories owned by Asian employers, who are less versed in union consultation and engagement (Drahokoupil *et al*. 2015). Similarly, unions have a relatively strong presence in Czech OEMs, but are less organised in SMEs and Tier 2 and Tier 3 suppliers.

As Eder (2021: 5) notes, 'deepened trade integration through cross-border production chains has…changed the power relations among companies and between capital and workers.' Trade union strategies in Czechia are certainly constrained by the constant threat of jobs moving abroad, with workers in different countries played off against each other. Eder notes the possibility for more supra-national – perhaps pan-European – co-ordination of employment relations, while emphasising the need to not further weaken national unions.

The Czech automotive sector very rarely sees strikes or the full flexing of potential union power. Given ongoing radical technological transformations in the sector, this may be set to change. While issues are generally portrayed by Czech unions and employers alike as 'jobs versus the environment', there is a long history of such collaboration and working-class environmentalism which could be drawn from. Our interviewees signalled such a shift:

"If trade unions want to survive, they need to start to say: *´Hey, we do not want now this percentage increase now, but rather we want you to invest in ecological heating or solar energy in our company´* (CZ02). *"Trade unions should force employers to give more money for on education to those areas that are expected to be needed in near future"* (CZ01)

If the Czech automotive sector is to take a 'high-road' model, then the stance of unions will need to shift and more international solidarity will be required. Unions in neighbouring Germany have called for a four-day working week, shortening working hours instead of reducing employment – something which is yet to make its way onto the agenda in Czechia. There are signs of change however – our union interviewee noted that their communication and member database system is being modernised and centralised and that they desired to increasingly "involve members in European educational projects." The database mentioned is further used to gather data points from regional workplaces, which is then used in collective bargaining in given regions.

Pardi (2021) points out that the EU's single market and increased internal competition has seen an increase in Gross Value Added and the average price of cars, while average personnel costs have risen at a much slower rate. Employees are getting the worst deal out

of the growth of the automotive sector, compared to shareholders. He notes that IG Metall and other trade unions should realise that the current approach (producing premium cars) is problematic and find a better path, fostering understanding that change is inevitable.

Given the lack of preparedness expressed by our union respondents, there is space for unions to include workers more in the redefinition of their industry. Eder suggests that unions become 'learning organisations', engaging workers[17] and creating solidarity and new thinking in the face of radical shifts, both at home and in dialogue with overseas colleagues. Unlike in Germany, there have been no comprehensive proposals for transformation of the automotive industry put forward by unions. This perhaps speaks to the peripheral, subordinate position of the industry in international value chains. A sense was conveyed that trade unions need to act before it is too late: "*The unions should not start dealing with this when it happens because then we are in the role of, as they called it, firefighters, trying to put out what we can at the last minute. We need to proactively try to inspire the management in some way right now, so that the employees are already starting to educate, requalify and so on.*" (CZ01)

More immediate industry transitions signal increased technological and knowledge demands for workers (e.g. working with high-voltage equipment): "*We need workers who will change the know-how in the areas of batteries, replacement, battery management, all of which undoubtedly lead to an increase in the number of at least medium-skilled workers in our industry, at the expense of the less qualified.*" (CZ03) While this process has started in a relatively weak form ("*So far, the only thing that's going on is that they're trying to retrain a certain group of employees and, to put it mildly, turn them into light electricians. These are the people who do repairs to those cars in terms of electrical wiring, fuses and the like. And now they're doing some kind of training for them so they can work with that electric car.*" (CZ01)), in our interviews, one trade unionist claimed that employers are not showing sufficient interest in these implications for workers: '*They can't imagine it, and then one day they* [employers] *come and say, "You, look, we already have the law here, we have to have people with such and such a stamp".'* (CZ01). Unions will have to not only pre-empt such changes, but also learn to organise the growing body of employees working in programming, R&D and other non-assembly line jobs.

There was a sense then that changes are being driven from the top down, for instance by the EU, at a pace which employees can't adapt to. This was expressed by one trade unionist, in the context of requalification processes: "*The EU will give the deadline: "Then and then it will be ready." And they will launch it quickly, and it will not be sufficiently prepared at all.*" (CZ01)

Related to this, trade unions in Czechia have not formed any notable alliances with other social actors to frame social conversations around the future of low-carbon mobility in Czechia. In the neighbouring countries of Slovakia and Germany, there has at least been some contact between unions and groups like Fridays for Future. In such alliances, unions could work to ensure the government creates the necessary social supports (such as retraining allowances, adult education, working-time reductions and early retirement schemes)

Finally, if union work in the sector is to be effective, Czech unions must extend their reach beyond the OEMs, into SMEs and suppliers who make up a large proportion of employment and who will lack the resources to re-orient production.

[17] Eder (2021: 54) notes IG Metall's Transformation Map as an example which could be followed, albeit re-oriented towards socio-ecological questions such as 'opportunities for conversion and diversification towards the production of ecologically less harmful goods'.

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