

BARMETAL



Digitalization, Automatization and Decarbonization: Opportunity for Strengthening Collective Bargaining in the Metal Sector

CZECHIA country report

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Introduction

The BARMETAL project is aimed at understanding the impacts of the dual transformation involving digitization, automation and decarbonization (DAD), in working conditions and social dialogue within the metal sector. In the report, we describe how social partners responded to DAD challenges and evaluate the role of social dialogue in mitigating the adverse effects of the transformation on working conditions in Czechia. Within the metal industry, specifically understood as the sector processing metal goods, our focus centred on the automotive industry, the largest industrial production sector contributing to 9% of GDP (in the broader sense of supplier-buyer chains), constituting 26% of industrial production, and accounting for 24% of exports.

In the first section, we outline current developments in the automotive industry, emphasizing the national and sector-level labour market situations and recent changes. We then provide insights into industrial relations in the country, followed by a description of DAD discourses, policies, and impacts on employment, drawing on stakeholder interviews and available policy documents. The fourth section zooms in on responses to DAD challenges through collective bargaining at the sector level, subsequently delving into the company-level experiences and practices of collective bargaining examined through three case studies in automotive companies. The final section analyses findings from interviews and secondary sources.

This report is based on 15 interviews conducted between June and November 2023, with interview durations ranging from 45 to 90 minutes, conducted in person or via online calls (see the list of interviewees stakeholders in Annex 1). In addition to interviews, Charles University along with CELSI and EUROPEUM² co-organized a roundtable of 13 regional stakeholders in the Moravian-Silesian region hosted by Hyundai Nošovice in Czechia in November 2023. The purpose of the event was to get insights into the regional transformations and actors involved. Knowledge gathered during the roundtable is also used as a source of evidence in the report. Secondary sources, including academic literature, reports, background documents, and media reports, complement the evidence gathered during fieldwork activities.

1. National and sectoral labour market situation

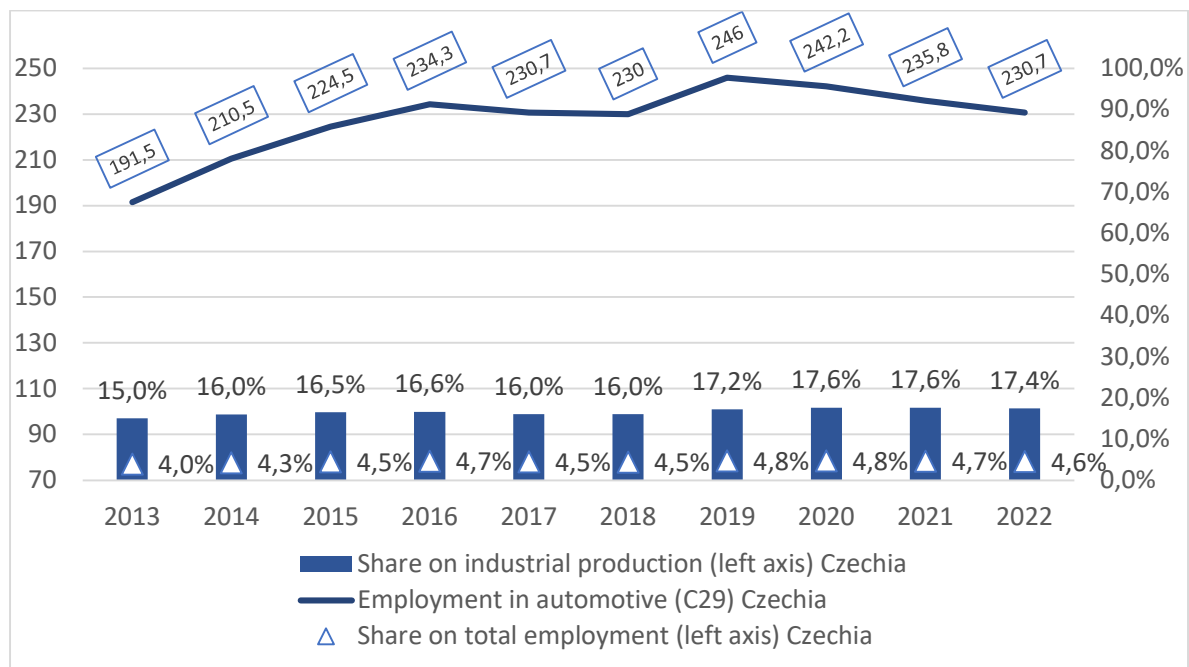
In this section, we provide general characteristics and sectoral developments in the metal sector, covering the past ten years, and we briefly introduce contextual information about the industry. In this report, we focus on Czechia and its automotive industry as a dominant and important sector within industrial production. Czechia is integrated into the automotive global production networks via mostly production functions, classifying its position as an integrated periphery (Pavlínek, 2022). Based on the extensive work of Pavlínek (2020, 2023), integrated periphery is characterised by substantially lower labour costs, geographic proximity to large and lucrative markets in core regions of western Europe, a high degree of foreign ownership and control, export-oriented high-volume production focusing on standardised cars and generic automotive components, along with low-volume production of niche-market vehicles, a weak presence of high value-added and strategic functions, FDI and business-friendly state policies, weak labour unions, more liberal labour codes and more

² <https://www.europeum.org/articles/detail/5909/report-kulaty-stul-elektromobilita-a-pracovni-prilezitosti-jake-zmeny-nas-cekaji>

flexible labour practices, and poorly developed domestic automotive industry compared to the foreign-controlled automotive sector.

Employment in automotive production has been decreasing in the last four years in Czechia (Figure 1). This is attributed to the COVID-19 pandemic and the related disruptions in supply chains. The evidence suggests that this was not caused by the substitute effect of automatisisation and digitalisation as labour demand has increased along with the installation of robots in production (Luptáček et al., 2021; Pisková et al., 2023). However, the empirical evidence suggests that the ongoing automatisisation and digitalization are also aimed to decrease the labour demand, as labour shortages have been severe in the industry since the mid-2010s (Drahokoupil, 2018).

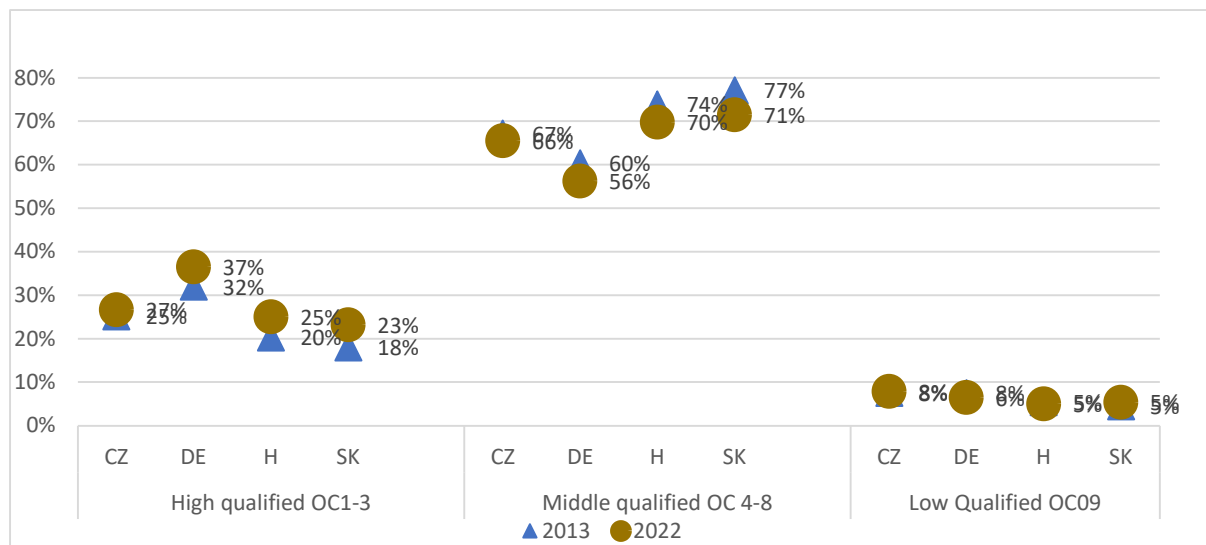
Figure 1. Employment in automotive



Source: own compilation based on Eurostat data [lfsa_egan2]

Except for the decline in workplaces, we also observe internal restructuring of the labour force. The dynamics for the last 10 years suggest a shift from middle to high-skilled positions in Czechia, although to some smaller extent than in other neighbouring countries (see Figure 2). Middle-qualified ISCO categories from 4 to 8 consisted of 67 per cent of employees in manufacturing (NACE C) in 2013, compared to 66% in 2022, while high-qualified (ISCO 1-3) consisted of 25% in 2013 and 27% in 2022. The share of low qualified in manufacturing remained unchanged at 8%. In the graph below, we can also see that the share of middle-skilled workers is lower in Germany than in the countries of the integrated periphery, which mirrors the dominant production function of the regions.

Figure 2. Changes in workforce composition between 2013 and 2022



Source: own compilation based on Eurostat (lfsa_eisn2)

Flexible work practices are spread in the sector, especially for agency work. In 2020, there were 274 thousand agency workers working predominantly in industrial production, construction and services. At the same time, agency work is connected with foreign employment, as 34% of all agency employees are foreigners. The largest share constitutes workers from Poland (34%), Slovakia (23%), Bulgaria (11%) and Ukraine (10%) (Trexima, 2020).

Currently, employers have embarked on the employment of workers from more distanced regions, such as the Philippines or Mongolia. This was allowed through special programs that the government approved in 2023³. An analysis of MoL from August 2023 suggested that most employers aim to employ foreigners in low-qualified positions with no qualification requirements (MPSV, 2023a). According to the survey among employers, only 5% of unoccupied workplaces are possible to automatise. At the same time, positions suitable for automatization are those where low-qualified foreigners are required (ibid). Foreigners are mostly employed by larger companies (60% of large companies with more than 100 employees employ foreigners vs. 28% of mid-sized companies which employ between 10-100 employees). The majority of employer requests consist of lifting the administration burden and easing of the nostrification processes (MPSV, 2023b).

The automotive sector also suffers from labour shortages, which was the main driver of wage increases in 2020. Labour shortages also contributed to larger wage increases of low-wage workers, resulting in slightly diminishing inequalities in the sector (Martišková et al., 2021). The average wage in the automotive sector is 1.3 times higher than the national average at final producers, but the average wage at suppliers is only at the level of the average national wage. Wages are highly dependent on the company's position in the value chain and there is also a gap between blue and white collar workers. The estimated wage inequality for the manufacturing industry is however, lower than the national average (Martišková et al., 2021).

³ <https://www.expats.cz/czech-news/article/higher-quotas-czechia-announces-plan-to-attract-more-filipinos-to-labor-market>

To get a decent wage, workers in automotive industries undertake overtime work, night shifts, and weekend shifts.

Future skill needs of the automotive industry are assessed by the stakeholders in the automotive industry via projects targeting skills ecosystems discussed at the EU level (e.g. Flamenco, or AllBatts). These projects provide insights into the expected skill requirements from the employer's side. Many skills are perceived as transferable, for instance in battery manufacturing, they are similar to the plant manufacturing jobs at car factories. Another similar case is the maintenance staff within the battery cell production facility composed of engineers and workers which aligns with cars production.

The most required qualification is the combination of knowledge from electricians, engineers, and programmers. This is addressed by the Czech car producer Škoda Auto, by developing their own model of cooperation with secondary school and introducing required skills for working with electric cars. The specialization of high-voltage electricians is regulated by law and thus requires specialized qualification. Only those who surpass this qualification is permitted to work with electric car components. Nevertheless, the employer distinguishes between manipulation of switch on and switch off mode, which is why light requalification is needed if manipulation is done under the switch off mode (see details in (Allbatts project, 2021b, p. 7).

On the other hand, some qualifications may experience difficulties in undertaking new jobs. Especially, engine engineers, despite their solid qualifications, are difficult to reskill for the automotive industry that is slowly moving away from Internal Combustion Engines (ICE) (Allbatts project, 2021).

2. Insight into industrial relations

The AutoSAP organisation represents employers in the automotive sector, associating with the biggest companies in the industry, research centres, and universities, totalling 141 members. Employees are represented by the trade union KOVO (OS KOVO) organisation, which operates within the metal sector and is the largest sector union in Czechia. The Škoda Auto trade union, the second largest in the automotive industry, is independent of OS KOVO.

There is no collective bargaining in the automotive industry at the sector level as employers are reluctant to engage in sector-level collective bargaining as trade unions have been attempting to conclude a collective agreement since 2016⁴. DAD challenges are perceived by trade unions as an impulse for negotiations (CZ04_TU), while employers neglect it and prefer less binding forms of cooperation (CZ06_E). Trade unions and employers report joint activities such as a common memorandum concerning measures related to the COVID-19 pandemic from 2021 which, however, lacks binding provisions on working conditions. Trade unions have access to the AutoSAP database mapping wages in the industry. AutoSAP representatives informally enter company-level collective bargaining if the problem in bargaining is reported,

⁴ In 2016, OS KOVO filed a case to enforce its rights regarding social dialogue and collective bargaining, which was unsuccessful in 2021 as the court supported AutoSAP's interpretation as an interest organization due to its association not only with employers but also research centers and other interest groups. Consequently, prospects for sector-level collective bargaining have significantly diminished.

but this does not mean any active support for collective bargaining at the company level on the employers' side.

AutoSAP does not identify as an employers' association as defined in the Collective Bargaining Act and refrains from bargaining due to differing wage levels and production programs among its member organisations (CZ06_E). The absence of sector-level bargaining implies the dominance of company-level negotiations in the automotive industry, leading to a diversity of outcomes. Only 20 per cent of employees in the automotive sector benefit from a collective agreement, and 34 per cent of companies report coverage (Table 1), leaving most workers in the industry without collective bargaining coverage.

Table 1. Trade union density and collective bargaining coverage in the automotive sector

	Number of employees	Number of companies	Number of companies with trade unions	Percentage of employees covered by a collective agreement (estimate)	Percentage of companies with a collective agreement
OEM	38 000	3	3	100	100
Tier 1	60 564	85	33	57	39
Tier 2	42 109	75	19	37	25
Tier 3	49 734	134	6	5	4
TOTAL	190 407	297	61	20	34

Source: own calculations based on data from OS KOVO and register of companies (2019)

The automotive industry's trade union density is higher than the national average. While the OECD database indicates a trade union density of approximately 11 per cent, it is estimated at 20 per cent in the automotive sector, primarily attributed to high unionisation rates among final producers. Notably, the final producers in the automotive sector exhibit complete (100 percent) collective bargaining coverage, approximately 57 percent of employees in tier 1 suppliers benefit from a collective agreement contrasting with 37 percent in tier 2 and a mere 5 percent in tier 3 (refer to Table 1). The national average for collective bargaining coverage is 33 percent.

The reported estimates, based on data from OS KOVO, might slightly underestimate the trade union presence in the sector, as a few trade union organizations are affiliated with the second largest confederation, the Association of Independent Trade Unions (Asociace samostatných odborů, ASO).

Within the OS KOVO organizations, 10% of companies report having more than one trade union organization, whereas the national average is 20%. When multiple organizations operate within an employer, these distinct trade unions must reach an agreement on the collective agreement. Conflict between trade unions can hinder the conclusion of a collective agreement at the company level.

Trade union organizations at the company level are considered independent entities operating autonomously. Company-level trade unions are typically affiliated with sector-level organizations, although this isn't mandatory. Sector-level organizations can offer legal

guidance and support to trade unions during collective bargaining, especially when the organization is new to the employer and no collective bargaining has yet been established. The high level of decentralization of collective bargaining causes trade unions to mostly negotiate immediate issues at the company level, especially wage increases and better working conditions. It is difficult for them to open topics related to DAD transformation (CZ 03).

Conflicts between employers and trade unions arise mostly at the company level and remain rare (Martíšková & Šumichrast, 2023). In recent years, conflicts recorded occurred due to working conditions and stagnant collective bargaining over the wage increase. The recent example includes the recent strike in Nexen Tire, owned by South Korean MNC, where workers protested against low wages and the unwillingness to conclude collective agreement (ČMKOS, 2022).

3. D-A-D and its effects

In this section we first present the main challenges of digitalization, automatization and decarbonization for the sector in terms of production, employment and skills based on the respondents' answers supported by the secondary evidence. Then we dive into the discourses, policies and the role of the social dialogue in the automotive industry.

Automation and digitalization technologies are emerging from business interest to increase productivity and competitiveness on the market. However, they are also intensified by the current decarbonization goals introduced by the EU affecting both the metal and automotive industries across EU Member States (BROWN et al., 2023). Such dual change brings broad implications for labour, namely for employment and labour market, work organisation, working conditions and job quality.

Challenges of digitalization, automatization and decarbonization

Out of 864 registered suppliers in the automotive industry, 165 are producing components to combustion engines (19%), having 17% in overall industry turnover. These companies usually do not only focus on components for combustion engines, and since their diversified portfolio, it may not be difficult to reorientate to EVs component production or change the sector (Novák, 2019). On the other hand, employees in companies which are expected to undergo transformation suffer from lack of information when decisions are made abroad in headquarters (CZ11_SUPPLIER_TU2).

Because of the transformation of the industry, the most prominent issue related to the automotive industry is employee requalification. The predictions for Czechia suggest that 75 thousand jobs in automotive will disappear and another 80 thousand will be created (BCG, 2022). Another prediction suggests that by 2030, 15 ths. of new highly skilled workplaces will be needed and 22 ths. middle skilled and 8 ths. low skilled will disappear. By 2050 the number of highly skilled workers will increase by 56 ths. employees (see Table 2). Newly created workplaces will require a different set of skills and mostly highly qualified workers will be needed.

Table 2. Skills prediction for the automotive industry in 2030 and 2050

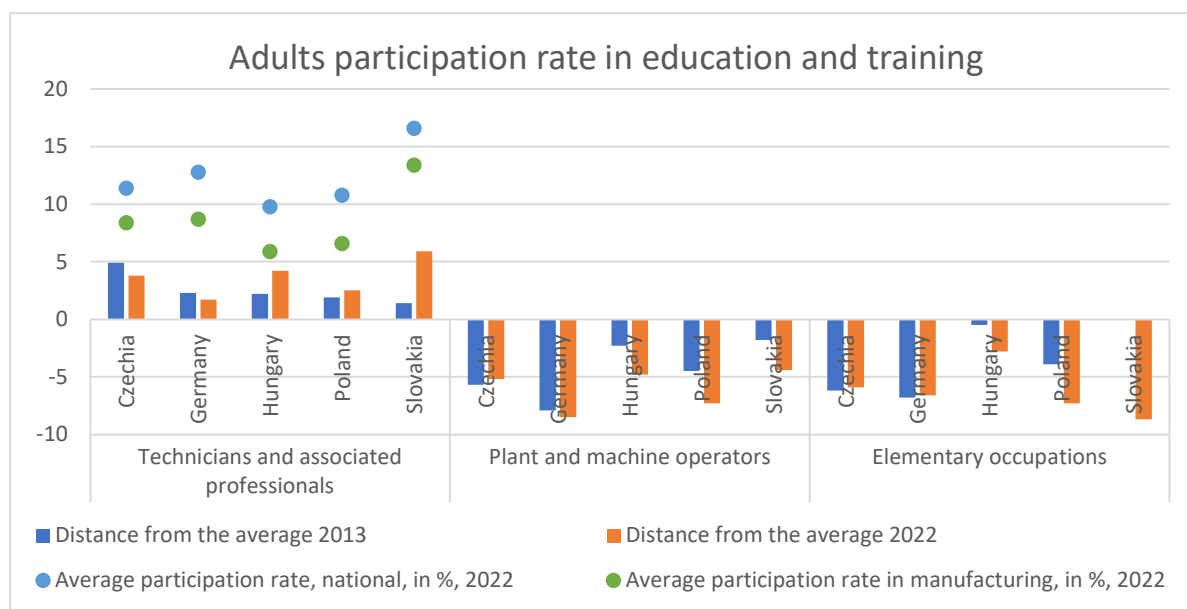
year	Number of workers			Difference		Change		Composition of the workforce		
	2015	2030	2050	2030	2050	in % 2030	2050%	2015	2030	2050
High skilled	178,91	193,88	234,9	14,97	55,99	8%	31%	31%	34%	39%
Medium skilled	354,38	331,95	335,01	-22,43	-19,37	-6%	-5%	61%	59%	55%
Low skilled	44,04	36,15	37,79	-7,89	-6,25	-18%	-14%	8%	6%	6%
SUM	577,33	561,98	607,7							

Source: CELSI 2022

Transformation of the automotive industry will thus require changes in employee qualifications despite the high number of jobs may remain preserved.

Another challenge is the low participation rates of adults in education and retraining. When we look at the current participation rate on retraining in different ISCO categories, we see that high-qualified technicians and associated professionals participate more often than plant and machine operators. The average adult participation rate is 8.4 % in industrial production and 11.4% overall (see Figure 3). This suggests that the retraining is still less spread in manufacturing production.

Figure 3. Participation rate in education and training, in %, ISCO



Source: own compilation based on the Eurostat data, trng_ifs_04

National discourses, policies and measures on DAD, also the role of social dialogue at national level for shaping DAD policies and measures

In the interviews we aimed at understanding the impacts of digitalization, automatization and decarbonization on social dialogue and how these processes are reflected in collective bargaining. During the interviews, respondents in several cases distinguished between

digitalization and automatization (DA) and decarbonization as two separate phenomena, although both are visible at the company level and have an impact on employees. In the following part, we present stakeholders discourses, policies and social dialogue responses at the national as well as sector levels on the two examined processes.

Digitalization and automatization were understood by respondents as an embedded process of lean production principles, driven by cost reduction efforts by companies. *“When it comes to digitalisation and automation, I think it's often a bit of an overstatement that it's some kind of revolutionary change. It's just a natural, sort of technological evolution that's just been going on in these companies for the last I don't know 20 or 30 years. So it's not something that those companies weren't doing before. Maybe, those processes are accelerating a little bit more in connection with, for example, the labour market, where those companies are already struggling with some shortage of qualified people or employees at all levels”.* (CZ06_E)

At the same time, at the national level, digitalization was perceived as the most important challenge when it comes to worker reskilling, due to the acceleration of the processes. As representatives of Ministry of Labour (MoL) stated in their written answers, they expect by 2030 that most employees will require basic or advanced digital skills, while currently such skills are only present in half of the workers. The timeline of 2030 it means requiring the reskilling of 2.2 million workers according to MoL estimates (CZ01_STATE).

Stakeholders perceived decarbonization as something “ordered from above” (CZ06_E), or something companies are forced to undergo because of the EU: *“The main problem is that the EU forces us to transform the industry”* (CZ04_TU). Decarbonization of the industry is understood as the change of the production program and changes in the production processes to some extent. The energy crisis further legitimized and sped up the production transformation and savings. Changes to the production program is the main source of fears about the job places. *“We have a lot of concern about employment here, because the technology of transforming from internal combustion engines to electric cars will simply need fewer employees.”* (CZ04_TU).

Discussing **policies related to the challenges of digitalization and automatization is mostly related to reskilling of employees and adaptation of education programs.** Here, it is important to distinguish between the national and company level. At the national level, efforts are to support innovations and reskilling via cohesion funds of the European Union (further referred to as the “EU funds”). At the company level, this represents a challenge as the project-based financing is unstable, while more systemic measures are missing. At the national level, digital learning is supported by the National recovery and resilience plan (NRRP) where, 22.8% of its total allocation supports digital transformation, including education, up-skilling and re-skilling. Transformation of education policies is discussed, but reskilling programmes targeted specifically to automotive are not present, digitalization of the industry is reflected in the programmes targeting Industry 4.0 needs (CZ01_STATE).

In 2021, the Ministry of Labour created the Committee for Retraining and Further Education which aimed to coordinate labour market needs and an education system between employers, trade unions and the state (represented by Ministry of Labour and Ministry of Commerce). Currently, MoLSA aims to follow up with the tripartite coordination model by discussing the partnership cooperation model in the field of continuing vocational education and training (CVET) with employers and trade unions (CZ01_STATE). Financial resources are,

however, missing for its establishment and functioning: *“Under this sectoral approach, a network of sectoral councils would be used, but the elaborated material also states that for its effective functioning, it would be necessary to ensure a fundamental restructuring and realignment of the staffing of the network of sectoral councils, as the previous cooperation with sectoral councils has proved to be insufficiently flexible and financially demanding in several respects. In addition, a major issue with this second option is the financial feasibility of its operation.”* (CZ01_STATE)

Participation of workers with low qualifications in reskilling programmes is specifically difficult to ensure. *“From the point of view of MoL, the participation of employees with low qualification is important as we expect that by 2030, the majority of workers will need basic or advanced digital skills.”* In the case of low-qualified workers, they have limited access to reskilling as they are needed in production processes, which prevents them from participating in education above the work-related duties during their working time. Another problem is the low willingness of employees to participate in retraining activities which might be associated with a lack of incentives for employees (CZ03_TU, CZ07_SUPPLIER1_TU, CZ10_OEM1_TU).

National policies targeting decarbonisation of the automotive industry are poorly developed according to employers. Employer’s representative criticised that the foreign direct investments related to the new production programs were stagnating and suggested that Czechia may already lag behind other countries in the region (CZ06_E). CzechInvest, the Agency for Enterprise and Investment Promotion, focuses on different industries with an aim of boosting their innovative potential through investments and further upgrading. The support for automotive industry falls under the broader category of mobility. In 2021, The Mobility Innovation Hub (MIH) was established in line with the objectives of its innovation strategy, with the support of the Government and the AutoSAP. The Mobility Innovation Hub focuses on connecting key sectors and their participants and building the overall ecosystem in mobility. In addition to startups, this includes established companies, scientific and research institutes, innovation centres, secondary and higher education institutions, industry associations and clusters, investors, and Czech state and local government organisations⁵.

In the broader context of mobility transformation, Czechia is lagging behind, having one of the oldest car fleets in Europe. Transformative purchases programme which would encourage people to get rid of the oldest cars are targeting businesses only and is of limited scale. The main argument is that companies purchase three-quarters of new cars in Czechia and 90 per cent of EVs are purchased by companies. Policymakers thus rely on the EVs secondary market to spread EVs among individual users. However, this journey seems to be slow and uncertain, the share of EVs in Czech car fleets was below one percent in 2023, while the share of EVs on new purchases was at 2,6% in 2023, which represented a 50% increase, but from a very low base (AutoSAP, 2024). The average age of cars in Czechia is 16 years while the median is ten years.

5.1.3.1. Role of social dialogue at the national level in shaping DAD

At the national level, social partners meet at the Tripartite committee alongside government representatives. Legislation concerning economic and social matters necessitates consultation with the Tripartite body. However, government acceptance of amendments

⁵ <https://www.mobility-hub.cz/#!/up>

remains voluntary. Apart from the Tripartite body, social partners engage in various project-based collaborations funded by the state budget or EU funds as there isn't a national-level collective bargaining framework or agreement in place. Consequently, our subsequent discussion revolves around social partners' interactions and involvement in policies concerning DAD, with a specific focus on retraining policies as a prominent example.

Both trade unions and employers discuss the reskilling programme implementation at the national level with the government. *“These are the most important trends, which are the main priority for us, and we are dealing with them, let's say, from a legal lobby perspective but also stated incentives provided for the industry” (CZ06_E).* Social partners are targeting the Ministry of Labour and the Ministry of Education to launch requalification programmes needed for the sector level. *“For some time, we have been trying to communicate to the Ministry of Labour and Social Affairs that there should be simply sector-oriented, targeted retraining programmes, systemically set retraining, which would respond to the changes in the individual key industries that are here ..., so that there would be systemic retraining, and a system of lifelong learning so that some ad hoc retraining programmes would not be announced, but systemic approach will be favoured.” (CZ06_E).* Initiatives are also taken by employers together with NGOs. Employers' association AutoSAP run their project funded by the European Climate Fund to specify qualifications for the automotive industry together with the Automotive skills Alliance (ASA). In this project, trade unions are not involved.

In 2021, the trade union confederation ČMKOS, in cooperation with the main employers' association the Confederation of Industry of the Czech Republic (Svaz průmyslu a dopravy - SP ČR), prepared a conceptual document where they suggested their proposal for a lifelong learning policy and demanded the government implement it. The document contains a series of recommendations for further education in Czechia, which are proposed to be adopted by the Tripartite body and implemented by the government in enhancing the system of governance of the life-long learning (LLL) and more intensive involvement of social partners via the Tripartite body. It also demands an audit of the current LLL system. It emphasises the need to address the LLL in collective bargaining and increase the resources for active labour market policies. Although it has not yet been implemented, this initiative suggests that social partners are finding a common interest in addressing employee reskilling and upskilling policies. Until now, trade unions rarely participated in discussions on adult learning, while now their representatives are systematically invited into working groups and boards to discuss this topic (Eurofound, 2022).

As reflected by the respondent from ČMKOS in 2021, the project was important for trade unions because it involved them in the debates on future policies. Thanks to this project, experts from ministries and employer organizations participated in the discussion, and informal connections emerged between trade unions and experts from employer associations. This was considered a good starting point for social dialogue at the tripartite level because employee requalification is a non-controversial topic for social dialogue, and there is a will to build on this at the level of confederations of employees and employers. However, this view is not shared with the sector-level employer organisation AutoSAP, who did not find employee education to be a new impulse for social dialogue with OS KOVO (CZ06_E).

Despite political efforts and efforts of social partners in the last three years, there is no concrete proposal for LLL. Various proposals and committees established provide a space for

political dialogue between social partners and the government but do not lead to tangible results. As pointed out by an employer representative: *“No government would tell you that education or requalification is not important. Everyone will say it is important, but when it comes to concrete steps, such as the comprehensive program of life-long learning, we have not reached tangible results with any government yet”* (CZ06_E). At the same time, social partners at the sector level do not undertake initiatives or prepare their own LLL programmes, nor do they aim to discuss it bilaterally.

The support for LLL was challenged by the trade union representative OS KOVO, who emphasized, that investments being planned for company restructuring funded by EU funds or by public money should bind multinational companies, which dominate the industry, to reinvest their profits in the country (CZ04_TU).

Decarbonisation is mostly political, and social partners are mostly cooperating to influence legislation related to decarbonisation efforts at the EU and national levels. The flagship example was the resistance against the EURO 7 norm. It was led by employers in the automotive industry, claiming that requirements for EURO 7 would double the investment costs currently mostly allocated to the transformation to electromobility. At the same time, increased investment costs were expected to increase the price of the small cars, which would eventually cause a decrease in demand. As a return effect, it would decrease production and thus cause unemployment⁶. This was the main mobilisation argument of the employers. They lobbied politicians at the national but also at the EU level to stop the EURO7 (CZ06_E). Concerns about emissions and dust particles from tires were not part of the public debate in the country. Trade unions also opposed the EURO7 and allied with employers in their effort to block it; this was the case of the trade union in Škoda Auto⁷.

From the above, we can conclude observations on the role of social dialogue in shaping the digitalisation and automatisisation agenda:

- The agenda of social partners related to transformation mostly focuses on the life-long learning policies at the national level and financing the transition at companies.
- The lack of stability in the financing the CVET and LLL causes a lack of systemic involvement of the social partners in reskilling. The internal capacities of the social partners are insufficient to compensate for the lack of public sources in this agenda.
- Employers are dominant in the discussion about future labour market needs, adult education at the national, sectoral and company level. The high autonomy of employers provides little space for involvement for trade unions.
- Trade unions recognise the threats related to the restructuring of industrial production and the labour market, but lack the capacity to be more vocal and present in several ongoing discussions.
- Social partners play a shadow role in the governance of decarbonisation. Actors perceive industry decarbonisation as something necessary and unavoidable, imposed by the EU.

⁶ <https://www.novinky.cz/clanek/auto-petzl-kvuli-norme-euro-7-hrozi-propad-vyroby-az-o-tretinu-a-nezamestnanost-40423427>

⁷ <https://www.seznamzpravy.cz/clanek/ekonomika-byznys-doprava-odbory-euro-7-zastavi-vyrobun-malych-aut-v-bruselu-musime-zapojit-emoce-226291>

- At the same time, employers have a tendency to overvalue the benefits, highlighting the role of investments and opportunities for upgrading the industry, vaguely recognizing the impacts on employees.
- This combination of silent reluctance and overestimation of positive effects may be one of the reasons why we observe the lack of specific transformative policies for the automotive industry.

4. Responses via collective bargaining

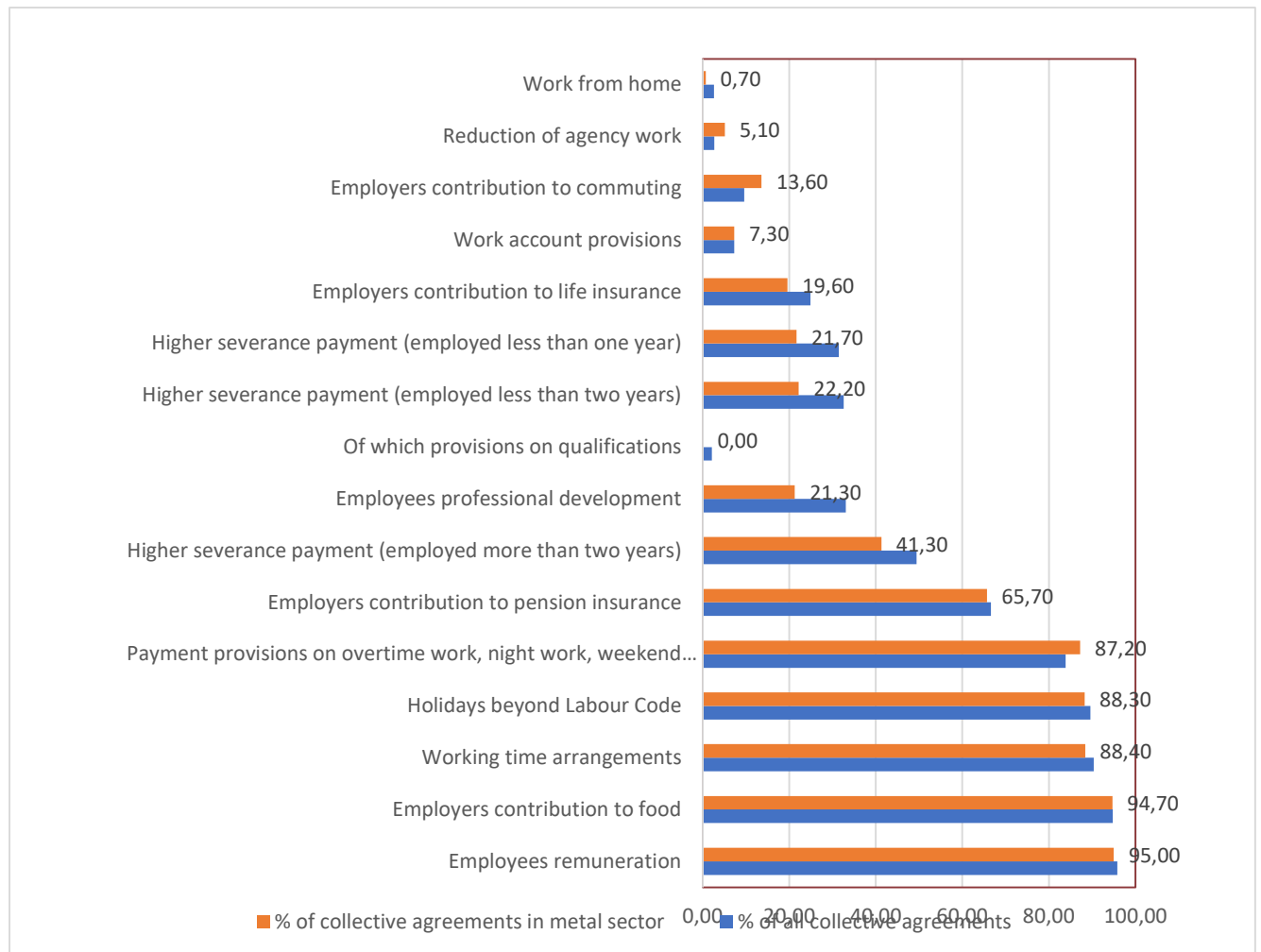
In the automotive industry, sector-level social dialogues is missing, and its emergence was once again denied in our interview (CZ06_E). Therefore, in this part, we introduce the methods of coordinating beyond collective bargaining at the sector level and the most frequent topics of collective bargaining in the companies in the sector.

The relatively low density of automotive trade unions and uncoordinated sector-level social dialogue allow mostly for ad hoc solutions tailored to the company level, while a comprehensive strategy for the sector is missing. Within OS KOVO, there is an automotive section where 54 members are associated and coordinate on issues related to employment and working conditions and collective bargaining.

New topics are, however, rarely introduced in collective bargaining at the company level. At the level of OS KOVO, there is an effort to emphasize reskilling programmes for employees. However, despite the recommendations, the number of provisions related to employee education is not increasing. Around 33% of collective agreements at the company level stipulate that conditions for employees' personal development should be created, but only 2.1% of collective agreements guarantee some concrete programmes for personal development (Figure 4). As an example of a specific provision, one of the collective agreements defines the employee's entitlement to the requalification programme provided by the employer in the employee's working time if the employee is threatened by the layoff. Another CA provides even more detailed regulations on who is entitled to requalification. It also states that requalification is at the expense of the employers and is to be provided during the working time of the worker and thus paid.

Moreover, company-level collective agreements rarely stipulate retraining policies as employers consider this agenda to be at their discretion. In most cases, trade unions do not aim to intervene in this agenda directly. However, they would like to improve the co-determination in the managerial decisions about who at the company level will participate in retraining and under what conditions. The need for huge investments in the transformation further decreases employee prospects for higher concessions gained via collective bargaining when investments related to decarbonisation negatively impact wage increases (CZ03_TU).

Figure 4. Collective agreements provision in the metal industry



Source: Kolektivnismouvy.cz (2023)

5. Case studies

This part presents the case studies collected during our fieldwork in Czechia. The case selection was driven by the need to understand ongoing DAD processes in the sector. During the selection process, we focused on decarbonization because it is fewer studies and more diversified changes than digitalisation and automatization. At the same time, digitalisation and automatization are ongoing processes, while production changes related to car electrification are more sudden. Two OEMs and one supplier are covered in this part to better capture the DAD processes. When selecting suppliers, we searched for companies producing components for combustion engines. All three companies are foreign-owned, employing more than 2000 employees each. In all three, social dialogue is present, and a collective agreement is signed regularly. In two of the companies, more than one trade union organisation operates.

The structure of the case presentation is as follows: introductory information about the company, the state of the production changes related to digitalisation, automatization and decarbonisation processes, retraining policies adopted in response to technological changes, topics of the collective bargaining in response to technological change, assessing the role of

the social dialogue at the company level in response to DAD challenges. All cases are at the request of respondents anonymised.

5.2. Final producer 1

Company OEM1 launched the production of a hybrid model two years ago and does not produce any solely electric vehicles. This is a conscious strategy. The hybrid model satisfies current limits on the emissions of cars produced, and thus, the company avoids rapid shifts and cost-intensive transformation of production, waiting for the results of regulation and EV uptake in Europe. Nevertheless, in Dec 2023, shifts to EV production, especially of small cars, were announced by its global management. In Czechia, the company employs 3500 employees and produces around 200 ths cars yearly.

To seek efficiency and cost savings in the production processes, the company employs specialists dealing with energy or cost savings, such as the Energy Saving Collaboration teams who organise the “quality rounds” intensive discussions with involved employees on quality improvement suggestions. The company aims to be carbon-neutral by 2030 and plans to spread this target to suppliers. By 2050, the whole supplier chain is expected to be carbon-neutral (CZ09_OEM1_E).

According to a company trade union representative, working conditions are mostly impacted by the changes in production because each new generation of cars includes a higher number of components. This is demanding for internal logistics, where new digital tools and robots are implemented (CZ10_OEM1_TU). Kaizens, constant small improvements of production processes, are expected to be proposed by each employee at least once every 3 months or four times per year. It is not compulsory, but financial reward is tied to submit kaizen. Thus, employees keep suggesting incremental changes in production (CZ10_OEM1_TU).

Retraining policies

Employee requalification is provided in different ways. The first is access to the online learning platform Seduo, which targets companies and their employees. It offers courses related to leadership, communication, marketing, personal development, productivity, digital skills or languages. The company tries to encourage workers to participate, but there are few incentives beyond encouragement. Employees are expected to undertake the tasks outside their working hours, especially those in production.

Second, retraining is offered based on defined production needs. For instance, when introducing a new model, there was an increased demand for electricians in maintenance; the company offered employees the possibility of undertaking specialised courses to attain a licence for electricians, which is a 300-hour-long course provided in a specialized education facility. The employer paid for the course.

Third, the company launched the senior program, which encourages participants to undertake courses in digital skills.

The uptake of these possibilities is unknown; high internal labour segmentation suggests that uptake is higher among white collars. In production, around 50% of all workers are Ukrainians or foreigners. All production workers have work time organized in three shifts, leading to irregular free time and further discouraging participation in reskilling courses. In the collective agreement, there is a provision that vacancies are firstly offered to company employees,

giving them a chance to change their specialisation in some cases and undertake internal reskilling. However, English is another selection criterion for upgrading. Even the supervisor position in production requires basic English language skills, which can be a distinguishing criterion for blue-collar workers.

Role of the Social Dialogue

Social dialogue at the company level is organised via regular monthly and weekly meetings between the three trade union organisations and employer representatives, where mostly immediate issues, changes and problems are discussed. Collective agreement is bargained regularly; all three trade union organisations are involved and must agree to sign it with employers. Collective agreements mostly focus on wages and social support to employees, including allocation of company-owned flats, lunch breaks, wage bonuses, etc. It is important to mention that collective agreement is applied only to production workers and their team leaders. Above the team leaders, there are group leaders, and despite being still involved in production, the wage is not regulated by the collective agreement but negotiated with the employer individually. This can lead to a situation when a team leader has a higher wage than a group leader (CZ10_OEM1_TU).

Information provided by the employers about changes is satisfactory, according to the TU representatives (CZ10_OEM1_TU and CZ11_SUPPLIER_TU2), thanks to the regular meetings with management. It is, however, not at the level of codetermination, but only information. Important sources of information for the trade unions include European Work Council meetings and international trade union networks (CZ11_SUPPLIER_TU2).

The role of the social dialogue in the reskilling process is uncodified and informal. There is no specific provision in the collective agreement on retraining. Informally, trade union leaders described that employees need encouragement and that the observation is that employees are not willing to participate, especially those above 50, but also younger ones too (CZ10_OEM1_TU). On the other hand, the trade union leader of the second organisation did not perceive employee education as important and regarded it as unnecessary given the current production program (CZ11_SUPPLIER_TU2).

5.3. Final producer 2

Company OEM 2 employs and produces more than 300 ths. vehicles yearly in three models. In its production strategy, the company is “standing on both legs”, producing EVs (and BEVs) and ICE vehicles. 15% of production is in EVs (BEV or PHEV), of which almost all are exported to Germany, France, Netherlands and Nordic countries. The share of EVs is expected to rise, which has consequences on production capacities and changes. In 2021, the company announced that part of manual gearbox production will be shifted to China, while battery production will be introduced there. In 2023, the second part of the production of gearboxes was announced to be replaced with the production of batteries. Interestingly, despite being on the company premises, batteries will be produced by a supplier company. Battery cells will be imported from a neighbouring country, and here, the assembly of batteries will occur.

This transfer from gearboxes to batteries represents a case of production changes related to gradually increasing EV production. Most employees suitable for other positions in the company are expected to find a place elsewhere in production in the same company. However, some specific cases of dismissals do arise from this change. It was announced that

around 30 workers out of 200 will be dismissed who won't be needed and workers with disabilities unable to work night shifts because of medical conditions (e.g. diabetes, high blood pressure, etc). The reason is that the transmission hall was the only one organised in two shifts, while all other production parts are organised in three shifts, thus also including the night shift.

As the trade union representative suggested, for those who won't leave the company, jobs in assembly will be available. *“It was a calm workplace, with a low level of fluctuation, while assembly is much more demanding. People in transmission halls were mostly working on CNC machines, thus doing some middle-qualified job, while working in assembly is downgrading from their point of view”* (CZ15). It is likely that those who want to remain at the same occupation level will leave the company (CZ15). Given the specialisation of CNC machines, finding a job elsewhere will not be a problem as these qualifications are still in high demand. Nevertheless, this suggests the internal restructuring of skills composition at OEMs following the ‘hollowing the middle’ pattern, decreasing the number of middle-skilled while increasing the low-skilled and high-skilled workers.

Role of the Social Dialogue

There is a collective agreement signed for four years, while wages are negotiated for one or two years. For dismissals, severance payment is agreed upon, above the level of the Labour Code. Upcoming changes are shared with trade union representatives to a minimal extent. According to a trade union representative, the employer follows the legislation, which, however, is poorly defined and allows the employer to provide only limited information about upcoming changes. There is limited co-determination in the law, e.g. for mass dismissals, but trade unions have limited possibilities to influence employer decisions. Trade union density is above 50% among production positions and very limited among white-collar workers.

For instance, reskilling was proposed by trade unions, calling for programmes designed for those employees who want to change their positions or attain new qualifications (CZ15). This was, however, not considered relevant by the employer. Employer representatives considered changes gradual without any sudden impact on employees and thus not requiring workers to undertake reskilling courses (CZ14). For instance, when launching EV production, the need for electricians seemed to be high, and trade unions proposed reskilling programs. However, employers were able to recruit enough workers from the labour market. Similar to OEM1, vacancies are first offered to current employees.

[5.4. Supplier 1](#)

The supplier company is a TIER 1 supplier in the automotive industry, owned by a big multinational company and employs 4,500 employees and produces components for diesel motors in Czechia. Since this technology is expected to decline, the company will undergo a transformation of its production program when one of its six halls is expected to be transformed to produce electromotors, electro-axles, stators and rotors. It is expected that the company will produce both diesel motor components and electromotors for a longer time as both technologies are expected to remain relevant.

The transformation of production towards electromotors was decided upon by the headquarters through internal competition. The high flexibility, experience with transformation and low labour costs were decisive factors to introduce a new production

program in the company (CZ13_SUPPLIER1_E). Trade unions consider this a strategic and important decision, which translates to the preservation of most of the workplaces (CZ07_SUPPLIER1_TU).

Reskilling

The company is amid a transformation that addresses both production workers and indirect technical roles (white-collar positions). As part of this initiative, current blue-collar workers are being prepared with new skills. Participation in the reskilling program is open to everyone, regardless of age, although the employer notes that interest predominantly comes from younger cohorts (CZ13_SUPPLIER1_E). As individuals retrain for new production roles, vacancies in the existing diesel components production will be filled by new employees recruited externally. These positions in diesel component production do not necessitate specific educational qualifications, making it easier to onboard new staff for the current production roles. At the same time, technical workers are also continuously learning by visiting other multi-national company sites. The new production of electromotors will be increasingly robotised and automatized; thus also, more middle and high qualified people will be required.

Along with the reskilling related to transformation, the company runs its education centre where continuous learning is provided to those who require certification or would like to upgrade their position within the company. Further, the company offers access to the online learning platform SEDUO, similar to OEM1. Workers with access to computers in their jobs can undertake some courses at work (e.g. the platform offers coffee seminars – a short education training). In contrast, blue collars, despite having the same access, can undertake it only outside their working hours. This is the reason why uptake among blue collar workers is very low.

Employer representatives observed that blue-collar workers need encouragement to voluntarily enter reskilling (CZ13_SUPPLIER1_E). For these purposes, trade unions seem to have an important informal role as they informally encourage people to undertake offered reskilling courses and, at the same time, inform employers about the barriers for blue-collar workers to participate. Trade unions thus provide suggestions for improvements, which the employer praises (CZ13_SUPPLIER1_E). At the same time, trade union representatives mentioned that it should not be taken for granted that trade unions undertake the role of “cheerleaders” for reskilling among blue collars. *“Those people do not see the necessity [to participate in education], and we try to encourage them and explain its importance, but at the same time, given the massive needs for reskilling, this can't be our role.”*(CZ07_SUPPLIER1_TU). According to the respondent, the state and employer should undertake more active roles (CZ07_SUPPLIER1_TU).

Social dialogue

In the company, there are four active trade union organisations. The employer perceives this as a disadvantage due to increased coordination costs. A single collective agreement, covering all employees within the company, is negotiated regularly. However, aspects concerning the transformation and reskilling efforts are only partially addressed within this collective agreement. Certain provisions, such as severance payments and case management for redundant workers, providing them with job-seeking support, are regulated and funded by the employer.

Moreover, numerous discussions take place outside collective bargaining in the form of regular weekly and monthly meetings between the management and trade unions. These discussions encompass various topics, including training policies, facilitating and advocating retraining opportunities, and investments in digitalisation and automation. The trade unions have positively evaluated the company's efforts in gradually introducing new technologies (CZ07_SUPPLIER1_TU, CZ08_EWC)

Table 3. Comparison of the case studies

	OEM1	OEM2	Supplier 1
Year of establishment	2002	2006	1993
Number of employees in 2022	3525	3278	3889
Products	Two models in ICE, HEVs	Three models in ICE and EV version	Components for diesel motors
Ongoing transformation processes	No EVs are produced, and 50% of produced cars are hybrids	Transmission production phase out in 2022 and continuing in 2023 and 2024	Introducing new production of electromotors from 2024
Change in the number of employees between 2018 and 2022	62.0%	-1.0%	-3.0%
Trade union density	30%*	50% among blue collars	40%*
Number of trade union organisations	3	1	4
Collective bargaining coverage	Only for blue collars	Only for blue collars	100%

Source: Companies annual reports and interviews, *estimation

6. Findings

DAD processes are underway in the Czech automotive industry, which is evident in the ongoing changes observed among all companies in our case studies. While digitalisation and automation are perceived as ongoing and inevitable transitions for companies mostly to attain costs saving and compensate for labour shortages as a part of the competition, decarbonisation is perceived as an inevitable yet unwelcome change. At the national level, the absence of sector-specific policies poses a challenge. These policies would facilitate sectoral transformation and ensure a just transition for all involved. Decarbonization-related changes serve as the primary catalysts for company-level transformations. With shifts in production, the adoption of new technologies, digitalisation, and automation are concurrently implemented.

In our interviews, we've noted a reluctance towards decarbonisation policies and the Green Deal, particularly from the trade union side, juxtaposed with employer overestimation of the positive impacts on employment. This discordance in perspectives may be one of the reasons why relevant policy responses are missing. For example, retraining policies, specifically for vocational education and reskilling programs within the automotive sector, suffer due to inconsistent financing and a lack of coordination. Regionally, in the Moravian-Silesian region, positive efforts have been witnessed as various actors collaborate to align employer needs with education providers, aiming for better coordination.

Social partners engage in national-level discussions, occasionally forming partnerships with employers calling the government to undertake the action. At the sector level, OS KOVO advocates for collective bargaining, while the employer association AutoSAP deems it unnecessary for the sector. Retraining policies have not yet penetrated the collective bargaining at the company level or only to a limited extent. The dominant issues in collective bargaining remains related to wages and working conditions. Nonetheless, trade unions at the company level play a role in mitigating the impacts on workers, albeit in a less codified and implicit manner, by encouraging workers to undertake reskilling and providing information about participation barriers to employers. The absence of coordination at the sector/national level means that topics related to industrial policy, or targeting boarder improvements of working conditions (e.g. working time reduction) are not discussed. These debates are thus absent from talks at the national policy level, nor are addressed at the company level.

The dominant role of the multinational companies in the automotive industry prevents a better coordinated response to DAD challenges. At the company level, any decisions about new technological implementation are made without employee representatives. Trade unions are mostly informed about upcoming changes, but even the practice of informing is uneven and dependent on relations between management and trade union. At the sector level, automotive companies do not perceive it necessary to cooperate with trade unions and social dialogue is not regarded as an arena for changes. Both social partners, however, call the government to undertake the action and provide comprehensive education policies for employees.

Policy observations and inspiration for action:

- Decentralized collective bargaining allows mostly for ad hoc solutions and immediate responses. Nevertheless, the response to current challenges needs to be more coordinated, given the size of the sector and similar processes which several firms and companies may undergo.
- If social dialogue is not a viable option for the coordinated transformation for the stakeholders, regional coordination between employers, trade unions, regional authorities and education facilities may be an efficient way of mitigating negative impacts on companies and workers.
- Coordination bodies should be supported financially and institutionally by the government institutions. It can have different forms such as sectoral councils, sectoral tripartite committees, or regional coordination institutions.

5.5. Annex 1. List of respondents

CODE	Institution	Type of stakeholder	Date of the interview (form)
CZ01_STATE	Ministry of Labour of Czech Republic	State administration representative	December 4, 2023 (written answers)
CZ02_EXPERT	Škoda Auto University	Expert	July 24, 2023 (interview recorded, transcribed)
CZ03_TU	Trade union in the metal sector (OS KOVO)	Expert, trade unions	July 25, 2023 (interview recorded, transcribed)
CZ04_TU	OS KOVO	Elected representative	August 16, 2023 (interview recorded, transcribed)
CZ05_TU	OS KOVO	Automotive section representative	August 2, 2023 (interview recorded, transcribed)
CZ06_E	Employers association in the automotive industry (AutoSAP)	Expert	July 27, 2023 (interview recorded, transcribed)
CZ07_SUPPLIER1_TU	Trade union at supplier 1	President	September 9, 2023 (interview recorded, transcribed)
CZ08_EWC	Trade union supplier 1	EWC member	September 9, 2023 (interview recorded, transcribed)
CZ09_OEM1_E	Employer representative OEM 1	Head of the communication department	October 12, 2023 (interview recorded, transcribed)
CZ10_OEM1_TU	Trade union representative OEM1, trade union 1	President	October 12, 2023 (interview recorded, transcribed)
CZ11_SUPPLIER_TU2	Trade union representative supplier 2	President	October 16, 2023 (interview recorded, transcribed)
CZ12_OEM1_TU	Trade union representative OEM1, trade union 2	President	October 30, 2023 (notes from the interview)
CZ13_Supplier1_E	Employer representative supplier 1	Head of HR department	November 3, 2023 (notes from the interview)
CZ14_OEM2_E	Employer representative OEM 2	Head of communication	November 9, 2023 (interview recorded, transcribed)
CZ15_OEM2_TU	Trade union representative OEM2	President	November 9, 2023 (interview recorded, transcribed)

Source: own compilation, 2024

Literature

- Allbatts project. (2021a). *Analysis of Future Needs*. https://www.project-allbatts.eu/Media/Publications/20/Publications_20_20210601_8945.pdf
- Allbatts project. (2021b). *Electric vehicle manufacturing & Battery integration—Future qualifications needed (Workshop Evaluation)*. https://www.project-allbatts.eu/Media/Publications/14/Publications_14_20210226_144623.pdf
- AutoSAP. (2024). *Měsíční přehledy výroby a odbytu vozidel*. SAP – Sdružení automobilového průmyslu. <https://autosap.cz/zakladni-prehledy-automotive/mesicni-prehledy-vyroby-a-odbytu-vozidel/>
- BCG. (2022). *Czech Automotive Industry in Transition*. <https://www.europeum.org/data/articles/20220523-e-mobility-report-czech-rep-full-results-vupdated.pdf>
- BROWN, D., GASPAROTTI, A., BRATZEL, S., FLICKENSCHILD, M., PANAGIOTIDOU, Z., DINGEMANSE, J., & MAZZI, C. (2023). *The Future of the EU automotive sector*. Policy Department for Economic, Scientific and Quality of Life Policies Directorate-General for Internal Policies. [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695457/IPOL_STU\(2021\)695457_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695457/IPOL_STU(2021)695457_EN.pdf)
- ČMKOS. (2022). *Odbory v korejské firmě NEXEN TIRE půjdou do stávků*. Českomoravská konfederace odborových svazů. <https://www.cmkos.cz/cs/obsah/219/odbory-v-korejske-firme-nexen-tire-pujdou-do-stavky/332918>
- Drahokoupil, J. (2018). *Jobs, upgrading and the prospects for development—*. European Trade Union Institute. <https://www.etui.org/sites/default/files/2020-09/The%20challenge%20of%20digital%20transformation%20in%20the%20automotive%20industry-2020.pdf>
- Eurofound. (2022). *Moving with the times: Emerging practices and provisions in collective bargaining*. European Foundation for the Improvement of Living and Working Conditions. <https://data.europa.eu/doi/10.2806/279880>
- Kolektivnismouvy.cz. (2023). *INFORMACE O PRACOVNÍCH PODMÍNKÁCH [Information on working conditions]*. <https://kolektivnismouvy.cz/publikace2022.html>
- Luptáčík, M., Lábaj, M., Jankovič, P., Majzlíková, E., Martišková, M., Ondrejčíková, K., Švardová, V., & Vitáloš, M. (2021). *Hospodárske a sociálne dopady Priemyslu 4.0 [Economic and social impacts of Industry 4.0]*. VEDA. <https://www.databazeknih.cz/knihy/hospodarske-a-socialne-dopady-priemyslu-4-0-483070>
- Martišková, M., Kahancova, M., & Kostolný, J. (2021). *Negotiating wage (in)equality: Changing union strategies in high-wage and low-wage sectors in Czechia and Slovakia*. 27(1). <https://journals.sagepub.com/doi/full/10.1177/1024258921995363>
- Martišková, M., & Šumichrast, A. (2023). Chapter 7 Czechia: Trade unions escaping marginalization. In *Trade unions in the European Union*. Peter Lang. https://www.etui.org/sites/default/files/2023-06/Chapter7_Czechia_Trade%20unions%20escaping%20marginalization_2023.pdf
- MPSV. (2023a). *Analýza volných pracovních míst a zaměstnávání cizinců*. Ministry of Labour and Social Affairs in Czechia. <https://www.mpsv.cz/documents/20142/848077/Anal%C3%BDza+voln%C3%BDch+p>

- racovn%C3%ADch+m%C3%ADst+s+akcentem+na+cizince.pdf/98e14f5b-7991-8127-5589-fad01268158e
- MPSV. (2023b). *Zaměstnávání cizích státních příslušníků* [Databáze]. Ministerstvo Práce a Sociálních Věcí ČR. <https://data.mpsv.cz/web/data/zamestnavani-cizich-statnich-prislusniku>
- Novák, R. (2019). *Výhled elektromobility v ČR 2019*. https://www.csas.cz/content/dam/cz/csas/www_csas_cz/Dokumenty-korporat/Dokumenty/Analytici/vyhled_elektromobility_v_CR_2019_03.pdf
- Pavlínek, P. (2020). *Restructuring and internationalization of the European automotive industry*. 20(2), 509–541. <https://academic.oup.com/joeg/article/20/2/509/5303643>
- Pavlínek, P. (2022). Relative positions of countries in the core-periphery structure of the European automotive industry. *European Urban and Regional Studies*, 29(1), 59–84. <https://doi.org/10.1177/09697764211021882>
- Pavlínek, P. (2023). Transition of the automotive industry towards electric vehicle production in the east European integrated periphery. *Empirica*, 50(1), 35–73. <https://doi.org/10.1007/s10663-022-09554-9>
- Pisková, L., Dobranschi, M., Semerád, P., & Otavová, M. (2023). The Impact of Robot Installations on Employment and Labour Productivity in the Automotive Industry. *Central European Business Review*. <https://doi.org/10.18267/j.cebr.342>
- Trexima. (2020). *Agentury prace*. Svaz Průmyslu. https://www.spcr.cz/images/Studie_Agentury_prace_fin.pdf

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