

BARMETAL



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

Romania Policy Report

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Introduction

The BARMETAL ("*Digitalization, Automatization and Decarbonization: Opportunity for Strengthening Collective Bargaining in the Metal Sector*") project aims to understand the key challenges deriving from trends of digitalization, automatization and decarbonization (DAD) that influence working conditions in the metalworking sector and its companies across the EU Member States and Candidate Countries.

The main research questions this report addresses are "*What are the main challenges/changes relevant for working conditions with respect to digitalization, automation, and decarbonization in the metalworking industry*", and "*How can new forms of work and training related to these changes be addressed via collective bargaining?*" in the case of Romania. To address these research questions, a qualitative methodology involving desk research (document research and content analysis) and in-depth personal interviews, guided by provided interview protocols, was employed.

1. National and sectoral labour market situation

The total number of workers in the Romanian economy is approximately 5 million (5,113,200 employees) (INS, 2023a). The majority of these workers (22.4%) are situated in the capital region (Bucharest – Ilfov), followed in terms of concentration by the North-West regions (13.9%) and the Central region (12.7%) of Romania.

Recently, the Romanian labor market experienced the lowest increase in total employment (+0.1% in 2022) among all EU countries, according to the European Commission (European Commission, 2023a, p. 23). In comparison to 2021, the unemployment rate remained stable. The youth unemployment rate in Romania saw one of the most significant rises across the EU at 1.8%, reaching a rate of 22.8%. Additionally, Romania currently holds the highest NEET rate ("neither in employment nor in education and training") among Member States, at 19.8% (European Commission, 2023a, p. 27). The job vacancy rate of 0.9% is the lowest among EU countries (European Commission, 2023a, p. 28). The disparity between individuals with lower levels of education and those with higher levels is particularly pronounced in Romania, exceeding 30% (European Commission, 2023a, p. 36).

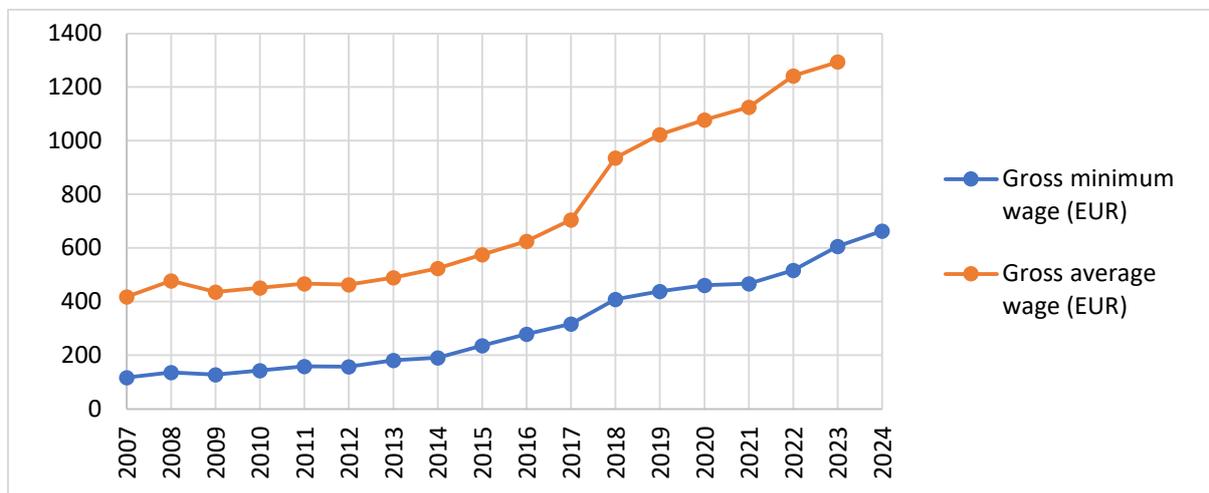
Key characteristics. The Romanian labor market has undergone significant transformations in response to macroeconomic trends and specific challenges.

- *Persistent Labor and Skills Deficit:* A significant labor and skills deficit has persisted for several years, posing a potential threat to the country's long-term growth. This shortage is exacerbated by adverse demographic trends and emigration.
- *Skills Mismatch and Education Underperformance:* A notable mismatch exists between the supply and demand for skills, a situation further compounded by the underperformance of the education system. Romania ranks poorly in the European Skills Index, particularly in the domains of skills development and activation.
- *Rise in Flexible Work:* There is an increase in flexible work. Market indicators suggest a shift towards greater work flexibility, encompassing hybrid work models, flexible working hours, and varied contractual arrangements between workers and companies.
- *Slow Digitalization Pace:* Despite some advancements, Romania lags behind in digitalization, ranking 27th among the 27 EU Member States in terms of progress in digital

competitiveness, as measured by the Digital Economy and Society Index (DESI) (European Commission, 2023b). Areas of concern include e-governance, the integration of digital technologies by businesses, digital public services, human capital, and broadband connectivity.

- **Rapid Wage Growth:** Romania has experienced notable wage growth in recent years (see **Figure 1**). Factors contributing to this growth include economic development, increased foreign investment, and a tightening labor market. The technology sector, in particular, has seen significant wage increases due to rising demand for skilled workers in IT and related fields. The government is updating the minimum wage to keep up with inflation, with an estimated 1,867,000 employees (36.5% of the workforce) being paid the minimum wage in the economy (Barbuta, 2023).
- **Low Labor Productivity:** Despite efforts to enhance labor productivity, it still stands at approximately two-thirds of the OECD average, indicating room for improvement in this aspect.

Figure 1. Evolution of gross minimum and average wages since joining the EU



Sources: INS (2023b); CED (2022); BNR (2023)

Labor costs in the Industry and Construction sectors have experienced significant annual increases over the last decade, thereby undermining price competitiveness and the overall sector competitiveness in both industry and construction. The average monthly gross salary in 2022 amounted to 1,225 euros, while the average monthly net salary saw an 11.3% increase (+77 euros) compared to the previous year, reaching 760 euros.

In 2023, the metal sector (NACE categories C24, C25, and C29) accounted for approximately 5% of the total labor force in Romania (refer to **Table 1**), with 61.05% of these individuals employed in automotive manufacturing. To be more precise, the Manufacture of motor vehicles, trailers, and semi-trailers employed 3.19% of the total labor force, equivalent to 163,000 workers. However, it is estimated that over 230,000 employees are directly engaged in the automotive sector (including trade), making it the most crucial sector in 23 out of 41 counties in Romania. The automotive industry (manufacturing and trade) contributes 28% to Romania's GDP (Spătaru, 2022), and 26% to Romania's exports (Sandu, 2022, as cited by Neagu, 2022).

Table 1. Evolution of the number of employees in the metal sector

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Employees (number)	299,280	322,488	334,901	351,508	343,919	329,198	311,821	303,043	303,302	295,800
C24 - Manufacture of basic metals	30,184	29,825	30,107	30,702	31,235	31,122	28,912	29,131	29,655	29,700
C25 - Manufacture of fabricated metal products, except machinery and equipment	76,195	79,830	81,829	87,645	86,355	86,729	81,956	83,412	83,013	74,300
C29 - Manufacture of motor vehicles, trailers and semi-trailers	159,908	182,174	192,479	202,414	194,126	179,319	169,806	160,760	161,402	163,000
C30 – Manufacture of other transport vehicles	32,993	30,659	30,486	30,747	32,203	32,028	31,147	29,740	29,232	28,800
% of total workforce of the country	6.1%	6.4%	6.4%	6.6%	6.3%	6.0%	5.8%	5.5%	5.4%	5.8%

Source: INS (2023a)

2. Insight into industrial relations

After the fall of the communist regime in 1989, Romanian industrial relations were marked by fragmentation, tensions between employers' organizations, and discrepancies between public and private sector unions. The latter, with limited exceptions in sectors such as automotive and banking, exerted considerably less intense activity and influence on the labor market (Guga & Trif, 2023).

Before 2008, Romania boasted one of the largest collective bargaining coverages in Europe (98%) and a legislative framework supporting central and cross-industry bargaining. In 2011, this legal framework underwent modifications at the initiative of the center-right government, with the main change being the adoption of the Social Dialogue Act (#62/2011). This act severely restricted sectorial collective agreements, with negotiations now conducted based on "multi-employer" agreements exclusively signed by companies affiliated with a particular employer organization. These measures effectively prohibited social partners from engaging in subsequent cross-industry negotiations. Importantly, these policy adjustments were implemented without parliamentary deliberation (Trif, 2013).

Consequently, collective bargaining coverage experienced a significant decline, particularly between 2008 and 2011, plummeting from 98% to 35% (Waddington et al., 2019, p.10) (refer to **Table 2**). The dismantling of national collective bargaining agreements (NCBA) in 2011 resulted in a sharp decline in the wage share as bargaining coverage decreased (Volonciu, 2021; De Spiegelaere, 2023). The challenging state of social dialogue was further exacerbated by the effects of the financial crisis of 2007/2008 and the subsequent austerity measures imposed at the national level. Overall, the changes introduced by the Social Dialogue Act (#62/2011) were associated with deteriorating working conditions and lowered wage levels

(De Spiegelaere, 2023). These external challenges compounded the internal, long-lasting problems of unions, such as the aging of their members, leaders' legitimacy, and limited resources.

Romania exhibits a low rate of trade union membership, with only 21.4% of the workforce being members of trade unions (Statista, 2021). **Table 2** presents the evolution of the main indicators relevant to social dialogue in Romania on a comparative basis, highlighting a severely deteriorating situation of social dialogue over a twenty-year period.

Table 2. Evolution of main indicators relevant to social dialogue in Romania

Indicators	2000	2021
Trade union density (% of employees)	35	21.4
Employer organizations' density (% of employees)	80	60
Bargaining coverage (% of employees with the right to bargain)	100	15
Predominant level of bargaining	Sectoral level & Company level	

Source: OECD & AIAS (2021); Statista (2021).

As of December 25, 2022, the New Act on Social Dialogue came into effect (Act #367/2022 on Social Dialogue), amended by Government Emergency Ordinance no. 42/2023. Act #367/2022 was adopted in a specific context, primarily driven by the EU directive on minimum wages and the vigorous promotion of collective bargaining at the sectorial level within the EU. This European policy orientation was incorporated into Romania's National Recovery and Resilience Plan (RRP), where improving social dialogue and ensuring the legal framework for establishing minimum wages became formal conditions for funding. Generally, Act #367/2022 was well-received by EU institutions, as well as research and think-tank organizations, due to its objective of reestablishing the tradition of social dialogue in Romania. This is achieved by facilitating unionization, extending the right to strike, and enabling sectorial and cross-sectorial collective agreements (De Spiegelaere, 2023). The New Act on Social Dialogue (#367/2022) replaced the previous Act on Social Dialogue (#62/2011) that was enacted after two years of economic and financial crisis.

The main changes introduced by The New Act on Social Dialogue (#367/2022) were aimed at stimulating social dialogue in Romania, and they included the following amendments:

- The minimum number of workers required to establish a union was set at 10 workers from the same unit or 20 workers from different units within the same Collective Bargaining Sector (CBS).
- Election of employee representatives became mandatory for companies with at least 10 employees. In cases where there is no union in employers with at least 10 employees, the rights and interests of the employees can be defended and promoted by their representatives. These representatives are elected by the vote of at least half plus one of the total number of workers in the respective unit.
- The introduction of the notion of an 'independent worker' (self-employed), who is now recognized the right to form and join a union. It is becoming increasingly evident that

the independent worker is acquiring the status of an employee, with rights and obligations specific to an employment relationship.

- The reintroduction of the collective labor contract concluded at the national level, which increases the social and economic importance of trade union confederations and strengthens the stability of workers' rights in the national economy. This arrangement existed in the civil circuit before 2011. However, it is noted that employees will not benefit from the rights provided by the collective labor agreement concluded at the national level unless their employing units are part of the signatory employers' organizations or if they are included in the units of the employers' organizations and employers who subsequently joined the collective labor agreement at the national level (Balabuti & Nicolau, 2023).
- Broadening the framework regarding the situations in which a collective labor conflict can be triggered and the situations in which a strike can be declared.
- The reduction of the percentage established for the acquisition of representativeness at the unit level of the trade union organization. The new social dialogue law establishes the rule of representativeness at the unit level for trade union organizations as follows: (a) a trade union organization with a membership of at least 35% of the total number of employees / workers in a legal relationship is representative of work or a service relationship with the unit, or (b) component unions of the trade union federation with a total membership representing at least 35% of the total number of employees / workers in a legal employment relationship are representative together in a service relationship with the unit.

In March 2023, 58 sectors of collective bargaining were established by Governmental Decision (#171/1.03.2023). The sectors of collective bargaining (CBS) of interest to this research are:

- Sector 16 (Metallurgical industry),
- Sector 17 (Metal construction and machine building industry), and
- Sector 18 (Automotive and metal construction industry).

To date (December 2023), no employer, trade union, or con/federation has registered with the Social Dialogue Commission of the Labour Ministry to conduct collective bargaining in these sectors.

In Romania, the following nationally representative trade union confederations exist (**Table 3**):

Table 3. Nationally Representative Trade Union Confederations in Romania

Confederations	Representativeness
<ul style="list-style-type: none"> • National Trade Union Bloc (Bloc Național Sindical, BNS) 	<p>It has 30 member federations and trade unions.</p> <p>The member federations have a number of 935 trade unions.</p> <p>Represents 280,387 workers (2023), 5.5 % of Romanian workers</p> <p>Covers geographically all 42 counties of Romania</p>

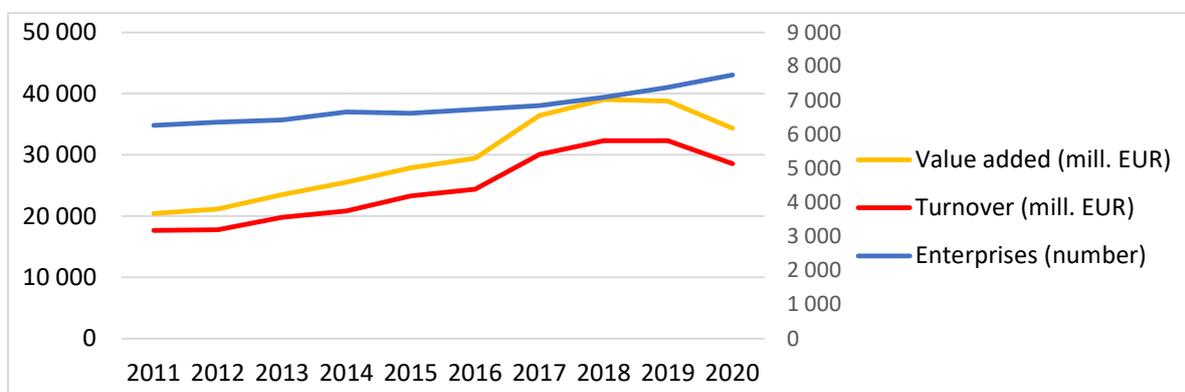
<ul style="list-style-type: none"> • National Confederation of Trade Unions (CNS Cartel Alfa) 	<p>It has 39 member federations and trade unions.</p> <p>Covers geographically all 42 counties of Romania.</p> <p>Represents 258,099 workers (2019).</p>
<ul style="list-style-type: none"> • National Confederation of Free Trade Unions from Romania (CNSLR Fratia) 	<p>It has 14 member federations and trade unions.</p> <p>Covers geographically all 42 counties of Romania.</p> <p>Represents 304,842 workers (2020).</p>
<ul style="list-style-type: none"> • Confederation of Democratic Trade Unions in Romania (CSDR) 	<p>It has 20 member federations and trade unions.</p> <p>Represents 262,663 workers (2020).</p>
<ul style="list-style-type: none"> • Meridian National Trade Union Confederation (CNS Meridian) 	<p>It has 29 member federations and trade unions.</p> <p>Covers geographically 33 counties of Romania.</p> <p>Represents 254,280 workers (2020).</p>

Sources: BNS (2023); CNS Cartel Alfa (2019); CNSLR Frăția (2020); CSD (2020); CSN Meridian (2020)

In a decentralized labor market where social dialogue is reduced, employers are less inclined to affiliate with federations and confederations. This poses a problem, as social dialogue typically occurs between partners at similar levels within a specific sector. A representative from a trade union in the automotive sector remarked, "We have no one to negotiate with at the federation level in the automotive sector. Employers are not interested in collaborating with each other to form employers' associations" (Interview #10). Currently, there are only two representative multi-sector employer unions in Romania: the Concordia Employers' Confederation and The National Council of Small and Medium Private Enterprises in Romania (CNIPMMR).

Advancing to the sector under investigation, the metal industry has a longstanding tradition in Romania, having played a significant role in the national economy until the demise of the communist regime in 1989. Currently, the majority of enterprises in the metal sector are concentrated within the 'Manufacture of fabricated metal products, except machinery and equipment' category. It is noteworthy that the highest turnover and value added come from the subsector encompassing the 'Manufacture of motor vehicles, trailers, and semi-trailers,' as illustrated in **Figure 2** and detailed in **Table 4**.

Figure 2. Evolution of main enterprise statistics in the metal sector



Source: Eurostat (2023)

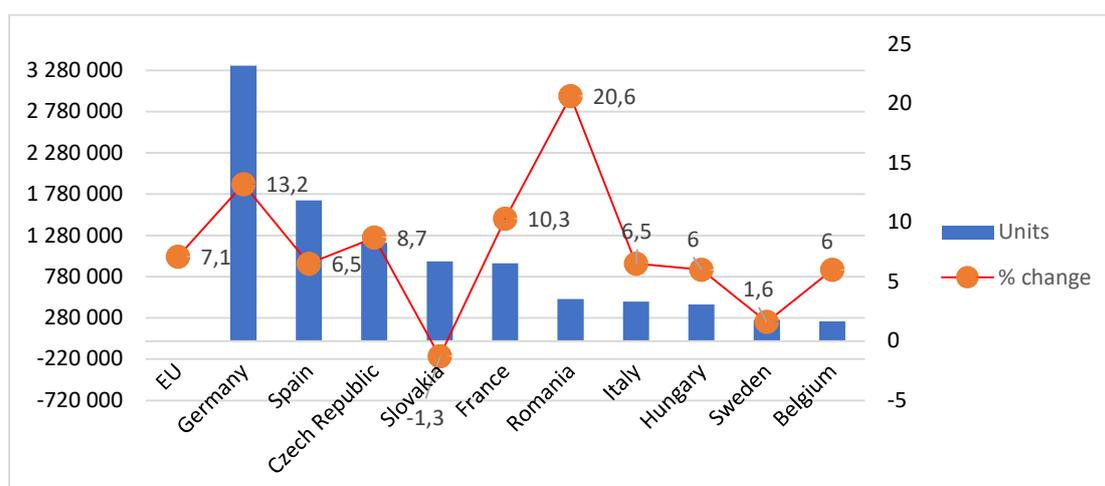
Table 4. Evolution of main enterprise statistics for relevant metal sectors (C24,C25, C29)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Enterprises (number)	6,265	6,361	6,423	6,658	6,622	6,733	6,849	7,087	7,381	7,748
C24	426	443	417	431	407	370	364	357	363	364
C25	5,414	5,494	5,576	5,777	5,759	5,898	6,014	6,249	6,517	6,871
C29	425	424	430	450	456	465	471	481	501	513
Turnover (mill. EUR)	17,686	17,783	19,813	20,837	23,309	24,358	30,087	32,348	32,311	28,560
C24	4,926.5	4,546.3	3,768.2	3,925.5	3,893.7	3,450.8	4,362.6	4,577.8	4,534.4	3,748.9
C25	3,531.7	3,574.1	3,559.9	3,727.4	4,004.9	4,201.7	4,929.6	5,005.9	5,117.8	4,907.8
C29	9,227.3	9,662.5	12,485.3	13,184.0	15,410.8	16,705.3	20,795.0	22,764.0	22,658.4	19,903.3
Value added (mill. EUR)	2,781	3,376	3,701	4,686	4,565	5,075	6,335	6,678	6,480	5,763
C24	607.6	652.2	496.8	861.3	596.4	531.3	734.2	816.3	585.3	402.5
C25	853.7	819.0	957.2	1,278.7	1,095.4	1,096.9	1,331.8	1,381.4	1,511.0	1,492.0
C29	1,320.1	1,905.2	2,247.4	2,546.4	2,873.2	3,447.0	4,268.5	4,480.5	4,383.8	3,868.2

Source: Eurostat (2023)

In 2022, Romania witnessed the most significant surge in automobile production within the European Union, recording an increase of +20.6%. Positioned as the 6th largest producer of vehicles in the European Union, Romania followed Germany, Spain, Czechia, Slovakia, and France. The country produced 507,269 cars in 2022, surpassing its pre-pandemic levels (ACEA, 2023, p.9) (see **Figure 3**).

Figure 3. Top 10 passenger car producers in the EU in 2022 (units & % change from previous year)



Source: ACEA (2023)

Industrial relations have been characterized by governments' strong orientation towards attracting foreign capital, and their inability to create jobs has resulted in a shift in the balance

of power in favor of private employers, to the detriment of employees and social dialogue. A primary consequence is the exodus of labor across the border, as indicated by the high number of Romanian workers employed abroad. The quality of industrial relations has been adversely affected by a series of issues, among which we mention:

- Inadequate protection for workers (insufficient safeguarding of workers' rights, unfavorable working conditions, lack of job security, and challenges in addressing workplace grievances).
- Insufficient adaptation to changing work environments (failure to address new forms of employment, technological advancements, or changing industry dynamics).
- Legislative voids (absence of legislation/methodological notes for the enforcement of legislation).
- Limited collective bargaining opportunities. Until recently, the legislation restricted or inadequately supported collective bargaining between employers and trade unions.
- Inconsistent enforcement (weak and inconsistent enforcement mechanisms, authorities lacking the resources or commitment to consistently enforce industrial relations laws).
- Complex and bureaucratic procedures. This bureaucracy may discourage both employers and employees from engaging in constructive dialogue.
- Inadequate consideration of Social Dialogue input (resulting in laws that do not adequately address the needs of all parties involved).

3. DAD and its effects

[National discourses, policies and measures on DAD, also the role of social dialogue at national level for shaping DAD policies and measures](#)

Digitalization. Digitalization is a key focus for Romania, with a robust national commitment to its advancement. The pace of digitalization significantly accelerated during the pandemic, with investments directed toward developing digital infrastructure, high-speed internet connectivity, and digital services. Romania is increasingly recognized as an emerging IT outsourcing destination, boasting a growing IT industry with numerous international companies establishing offices and outsourcing services within the country. A strong emphasis on IT education contributes to producing a skilled workforce in software development, programming, and various IT-related fields. Romania has also fostered a budding startup ecosystem, particularly in cities such as Cluj-Napoca and Bucharest, with a keen focus on innovation and supporting the growth of technology startups.

Notable achievements in digitalization include a high internet penetration rate of 88.9% (2023) (Statista, 2023), a robust mobile phone penetration rate of 145.4% (2023) (Datareportal, 2023), and recognition as one of the top 20 countries in terms of software development (Business Review, 2022). With over 200,000 software developers and a strong IT education system (Lesniak, 2023), Romania has made significant strides. However, progress in aspects like e-governance and digital skills among the population has been relatively slow. According to The Digital Economy and Society Index (DESI) for 2022 by the European

Commission, Romania has the lowest score among all European countries in the EU27 in terms of digitalization, lagging behind in the majority of the index components. The convergence process with other EU members in terms of the digital economy is also slow in Romania (European Commission, 2023b).

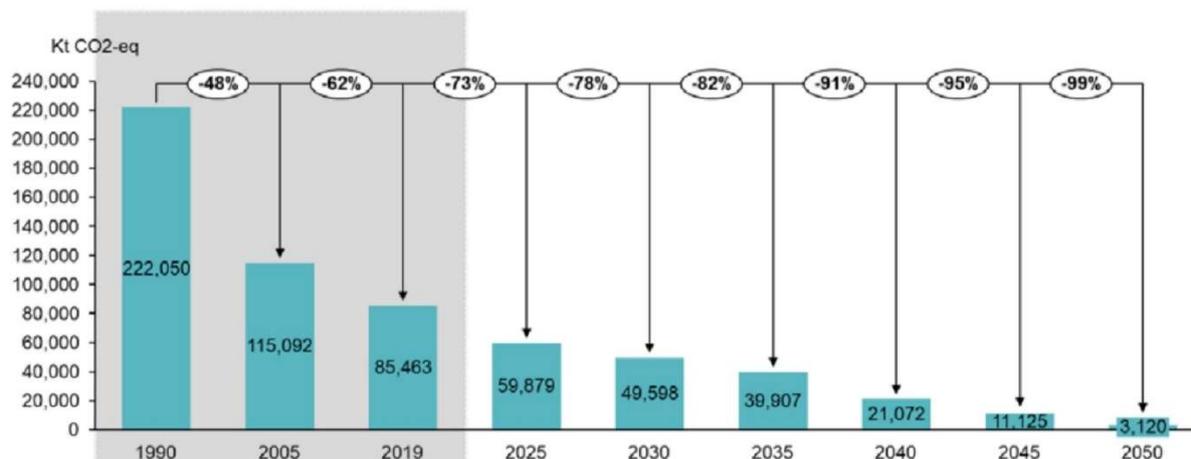
Current official public policies are aimed at addressing the sluggish pace of digitalization. Efforts have been accelerated by the coronavirus pandemic, prompting central and local public administration to implement policy measures. These measures include the *e-commerce policy* (2019), implementation of the *electronic signature* (2020), development of the *Digital Identity System* (2020), establishment of the *Authority for the Digitization of Romania* (2020), creation of the *Ministry of Research, Innovation and Digitalization* (2020), implementation of the *National Interoperability Platform* (2022), and the establishment, management, and development of *infrastructures and cloud IT services* used by public authorities and institutions (2022).

The Romanian Recovery and Resilience Plan (RRP) allocates EUR 5.97 billion (20.5%) to digital transformation, with EUR 4.98 billion expected to contribute to the Digital Decade targets (European Commission, 2021).

Automation. The degree of industrial production automation in Romania is relatively low. The country has an industrial robot density of 21 robots per 10,000 employees, which is five times lower than the European average. In 2018, the most recent year for which detailed data is available, Romania had 3,555 industrial robots in operation. The majority of these robots (2,155) were integrated into machine tool operations, handling tasks such as picking and placing, palletizing, bolting, and performing quality inspection and testing applications. Approximately 630 industrial robots were involved in welding and soldering, with the remaining engaged in assembly, processing, and distribution processes (Puiu, 2021).

Decarbonization. Romania's "*Long-Term Strategy for Reducing Greenhouse Gas Emissions – Neutral Romania*" in 2050 was unveiled in December 2023 (Government Ordinance #1215/2023). This strategy outlines policy options and measures for decarbonizing all economic sectors, with a specific focus on six key sectors: Energy, Transport, Buildings and Heating & Cooling, Agriculture and Forestry, and Waste. According to the "*Neutral Romania*" scenario, which has been selected, Romania aspires to achieve climate neutrality by 2050, with a target of a 99% reduction in net emissions in 2050 compared to the 1990 level. Notably, Romania has already initiated the decarbonization process by reducing emissions by 62% in 2019 compared to 1990 levels. However, additional efforts are essential to reach climate neutrality by 2050. The first significant milestone is set for 2030, requiring a 78% reduction in net emissions compared to 1990 levels (see **Figure 4**).

Figure 4. National targets for reducing net emissions until 2050 according to the Neutral Romania scenario



Source: Government of Romania (2023, p. 15)

In the industrial sector, net emissions decreased by 73% between 1990 and 2019. Industry stands as the most significant consumer of energy in Romania. The process of decarbonizing the energy sector has already commenced, with 69% of the emissions reduction target for 2050 achieved by 2019. The social protection of workers affected by the measures taken to decarbonize the energy sector was ensured through a series of social protection measures, as well as initiatives for professional reconversion and retraining, as outlined in Government Ordinance #108/2022 (Government of Romania, 2022). Active measures are in place to address unemployment in accordance with the law and the provisions of applicable collective or individual labor contracts. Professional retraining and courses are provided under the National Professional Training Plan, addressing the identified professional training needs in the Territorial Plans for a Just Transition and dual education.

Sectoral relevance of DAD – what challenges does it pose to the sector (production, employment, skill levels, etc.)

Digitalization. The pandemic accelerated the digitization process of local companies, constrained by the context of the health crisis. However, micro-enterprises, small, and medium-sized companies in Romania are much less digitized compared to the rest of Europe. Only 53% of SMEs have at least a basic level of digital intensity, compared to the EU average of 69%, while the gap with the EU average is even greater for indicators showing the adoption of advanced digital technologies (European Commission, 2023c).

According to a national study, the main challenges digital technologies raise for local businesses include organizational resistance to change (35%), digitalization costs (33%), lack of digital skills among employees (23%), high complexity (22%), and security concerns (20%). The main advantages of digitalization for businesses, according to the same study, are process simplification (61%), cost reduction (52%), operational efficiency (49%), income increase (28%), better performance measurement (26%), improved decision-making (23%), brand reputation (22%), and competitive advantage (20%) (Valoria, 2020).

The digital transformation in the automotive industry enables companies to reduce the cost of production and time in the manufacturing process. The use of digital tools simplifies the monitoring of the quality of the manufacturing process. Real-time data collection enables manufacturers to promptly detect errors and make essential adjustments. The use of digital simulation and virtual data facilitates the identification of manufacturing quality issues, providing suggestions as needed.

Furthermore, digital traceability technologies maintain accurate records of the parts and components that make up a new car. Digital traceability ensures quality, optimizes the manufacturing process with direct identification of parts using RFID tags, minimizes the incorporation of counterfeit items, and is useful in factory recalls. Real-time traceability systems transmit process information to all levels of the manufacturing process, enabling supply chain optimization and reducing lead times.

Automation. The automotive industry boasts the highest degree of automation in Romania. Referred to as "cobots" or "collaborative robotic arms," these robots are integrated into picking and placing, testing, machine tool operation, quality inspection, screwing, and grinding applications in the Romanian automotive industry. Companies in the local metal industry have also integrated cobots for welding, grinding, or sandblasting applications. Ford Craiova, for instance, has implemented UR10 cobots on the engine production line, where they perform oiling operations, fill the engine with oil, and conduct quality inspections. Alseca Engineering, a manufacturer of automotive components, uses the UR5 cobot to automate ultrasonic welding and milling applications, switching between applications in just 15 minutes (Puiu, 2021).

In the automotive sector, automation primarily compensates for the increase in labor costs, the relative shortage of qualified personnel, and the need to assimilate products with high added value into production. An overview of the main benefits and challenges of digitalization and automation implementation in the automotive industry is shown in **Table 5**.

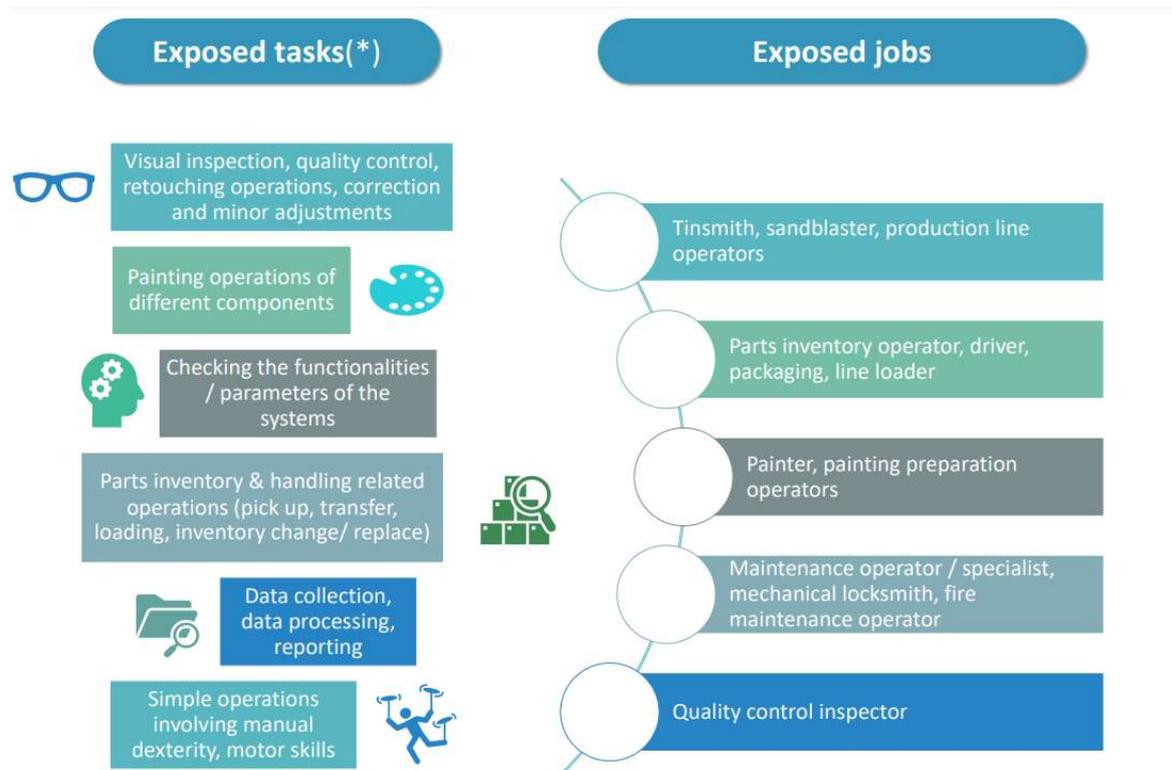
Table 5. Main benefits & challenges of digitalization & automation in the automotive sector

	Main benefits	Main challenges
Companies' Perspective	<ul style="list-style-type: none"> • Cost & time optimization • Access to data • Supply chain disruptions • Shortening the decision time • Increased productivity • Production diversification • Access to a wider talent pool 	<ul style="list-style-type: none"> • Lack of competent work force • Retaining trained staff, highly attractive on the labour market • Managing increasing complexity • High dependency on technology and cybersecurity
Workers' Perspective	<ul style="list-style-type: none"> • Higher productivity • Lower physical effort • Improved operating time • Lower exposure to heavy or dangerous tasks • Contribution to more technologically advanced products and services 	<ul style="list-style-type: none"> • Training / Upskilling / Re-skilling • Developing digital dexterity and mindset • Concerns regarding the possibility of job loss due to production relocalization abroad • Overcontrol • Increased complexity of work • Private life & Right to disconnect

Sources: Own research (2023); Concordia Employers Confederation (2022)

Digitalization and automation exert a significant influence on professional education and training, demanding increased expertise and technological skills in manufacturing, assembly, and car repair. For example, tasks related to fixing and replacing components are now complemented by digital activities that necessitate installation and reprogramming.

Figure 5. Most exposed tasks and jobs due to digitalization & automation in the automotive sector



(*) The degree of exposure has been calculated based on the direct jobs supervisors' assessment of a set of criteria for tasks propensity to automation and digitalization

Source: Concordia Employers Confederation (2022)

Research indicates that the metal sector will experience a decline in manual skills, including those related to manipulation, data processing, reporting, and tasks involving repetitive activities. The most vulnerable jobs include manual workers engaged in assembly line operations, inventory and line supplying operators, painters, and maintenance operators. Tasks at highest risk of digitalization and automation are repetitive and simple operations. Key skills expected to be less important in the future in the automotive industry include visual acuity, communication, precision control, selective attention, manual dexterity, endurance, and monitoring. The departments of Logistics, Maintenance, and Quality Control are expected to be most affected (Concordia Employers Confederation, 2022) (refer to **Figure 5**) (Concordia Employers Confederation, 2022).

Decarbonization raises significant concerns within the metal sector, particularly regarding energy sources. As a substantial consumer of energy, the industrial sector's share in total energy consumption remained nearly constant from 2010 to 2020, decreasing slightly from 29.4% in 2010 to 27.4% in 2020. Fossil fuels constitute the primary energy source for the industrial sector, with their share decreasing slightly from 81.7% in 2010 to 79.1% in 2020.

Biomass accounted for only 3.5% in 2020. Over the past decade, Steelmaking represented the second-largest share in total industrial energy consumption, averaging 23.1%, but with a notable downward trend (24.3% in 2010 to 16.5% in 2020), mainly due to reduced production. In 2020, automotive manufacturing accounted for 5.3% of the total industrial energy consumption in Romania (INS, 2023a).

Policies and measures required to achieve decarbonization objectives also target the transport sector, given its substantial contribution to total emissions (more than 10% of total greenhouse gas emissions at the national level currently originate from this sector) (MM, 2020). Consequently, measures for the decarbonization of the transport sector include:

- Promoting electromobility in road transport for both light vehicles and urban public transport.
- Promoting the use of biofuels in transport, including the continued use of traditional fuels and the introduction of advanced biofuels in road transport.
- Restricting the movement of vehicles with conventional fuel in city centers to improve air quality.
- Promoting the development of production and infrastructure necessary for the penetration of alternative fuels.
- Implementing CO₂ emission standards in both light passenger transport and heavy transport.

The automotive industry needs to keep pace with the transition to hybrid and fully electric cars to comply with legislation and remain competitive. The transition toward green economies will lead to substantial changes in the way companies conduct their operations, consequently impacting labor markets.

Electromobility poses major challenges to the automotive sector. A significant challenge for the automotive industry is its ability to maintain a continuous supply of critical raw materials from various parts of the world, competing with major powers such as China, Russia, and the United States of America. The shift from fossil fuel engines creates new global value chains. Electric cars require different raw materials and materials, including lighter composite materials that replace metal. Batteries for electric cars require rare earths, with 97% currently sourced from China. Rare earth metals, a group of 17 essential elements, are considered critical for a quarter of today's technology, including mobile phones, computer components, electric motors, and technologies like electric batteries, sophisticated weaponry, and wind turbines.

The renewal program of the Romanian car fleet, officially known as the "Program Regarding the Reduction of Greenhouse Gas Emissions in Transport by Promoting Non-Polluting and Energy-Efficient Road Transport Vehicles 2020-2024" ("Rabla Plus"), registered very high demand from both individuals and legal entities. During the first financing call that was open throughout 2020, the eco-voucher for an electric car was worth approximately EUR 9,300, while the eco-voucher for plug-in hybrid cars was EUR 4,100. In the second call opened in March 2023, the eco-voucher for a full electric car was worth approximately EUR 10,300, but this time the price of the newly acquired car was capped at EUR 75,000. Public institutions

and territorial authorities could have applied for eco-vouchers worth EUR 24,200 for public transportation vehicles (AFM, 2023).

Additionally, the government employs various strategies to change consumer behavior and stimulate electric mobility, including infrastructure development, public fleet electrification programs, zoning, and free parking for EVs, and discussions for environmental taxation.

4. Sectoral relevance of DAD – responses via collective bargaining

Social dialogue agenda of Romanian trade unions mainly includes workers' rights regarding *remuneration* (e.g. determination of salary, allowances to the base salary, bonuses, payment date, payment method, financial assistance in case of work accidents, financial assistance in case of special occasions, other compensations), *organization of work* (e.g. work duration, working program, work norms, records of work, reduced working hours and overtime), *free time* (e.g. work breaks, annual leave, legal and religious holidays, paid days off, additional leaves), *professional training*, and *execution of the labour contract* (e.g. duration, conclusion, suspension, termination, transfer, secondment, delegation, promotion and demoting, resignation, dismissal, protection of the workforce).

DAD has not been acknowledged so far as a significant concern in social dialogue in Romania. The decision to invest in DAD is perceived by trade union leaders as a strictly business decision. However, professional training is a major point on the social dialogue agenda. DAD transformative processes have been acknowledged to require professional training and skill upgrading. In this respect, the Labour Code (Act #53/2003 updated) ensures the right of employees to professional training. Employers have the obligation to periodically ensure participation in professional training programs for all employees. The costs of participating in these professional training programs are borne by the employers. An employer with more than 20 employees is obliged to draw up and apply professional training plans annually, with the consultation of the trade union or, as the case may be, the representatives of the employees. The elaborated professional training plan becomes an annex to the collective labour agreement concluded at the unit level.

Unfortunately, the new Social Dialogue Act (#367/2022) remains silent from the perspective of labor relations increasingly oriented towards digitalization and from that of temporary employees (Balabuti & Nicolau, 2023). The positive possible effects of digitalization are telework and improved communication, meanwhile the negative aspects refer, among others, to precarious work, diminishing social protection, worker alienation, over-control, risks of sharing personal and sensitive information, harassment, and global competition (Volonciu, 2021).

5. Case studies

Case studies were prepared employing qualitative exploratory research. Data were collected through conducting 21 interviews with workers, managers, and trade union representatives from two car manufacturers, one component manufacturer, and one national confederation in Romania. The discussion was guided by the BARMETAL interview protocols provided for the following categories: worker, technology specialist/manager, and trade union representative. Fifteen interviews were conducted on-site, and six interviews were conducted

online. Interviews were recorded and transcribed. The profile of the two company cases is shown in **Table 6**.

Table 6. Profile of company cases

Case	Profile	Size	Ownership	Type of product	Trade unions (TU) (yes/no)
1.	Car manufacturer	Large	Foreign owned subsidiary	Combustion-engine and hybrid vehicles	Yes, two TUs
2.	Supplier	SME	Foreign owned subsidiary	Precision moulds for die-casting	No

The investigated companies show large differences in terms of the degree of implementation of digitization, automation, and decarbonization.

Case study #1. Impact of DAD at vehicle manufacturing plant

The car manufacturer is a large enterprise, whose final product range includes combustion-engine and hybrid vehicles at the date of this research. It has invested more than EUR 1.7 billion in transforming the assembly plant located in Romania into one of its most modern production facilities worldwide. Investments in automation and digitization are expected to continue to increase.

The manufacturing lines in the Pressing & Bodywork, Paintwork, and Engines divisions have been highly automated in the last 10 years. Robots ('collaborative robotic arms' or 'cobots') were introduced for welding and painting the body of the car. The most automated division is Stamping & Pressing, where the number of robots is over 600. On the engine production line, robots perform spigot lubrication, engine oil filling, and quality inspections.

The re-technologization of the plant through automation and digitalization was accompanied by thorough professional training. Employees are continuously trained according to their individual annual training plans, either internally (e.g., at the workplace or abroad at headquarters) or externally (e.g., courses provided by specialized firms and the regional university). Training aims at providing both professional and non-professional skills, including soft skills.

The introduction of robots into manufacturing and assembly was done gradually, starting in 2011. The gradual introduction of 'cobots' over time allowed the displaced personnel to be relocated to other divisions of the plant. According to the collective bargaining agreement, displaced employees (because of the automation of productive processes) were offered to choose between three alternative positions within the factory or, opt to leave voluntarily cashing a departure compensation equal to their monthly salary for a period of 9 to 15 months, depending on seniority in the company. Additionally, professional training or re-qualification was provided to employees relocated to other positions.

The change in the workforce occurred as a result of the change in production volume, and not as a result of DAD. There is a percentage of the total workforce that represents flexible workers, employed on temporary contracts. Employees with this type of contract, and who

have a satisfactory annual evaluation, can have their contract extended. The union negotiated that when hiring would resume at the factory, former employees whose fixed-term contracts had expired would have priority in hiring.

Digitalization increased human interdependence. Completing a work task in the system requires the completion of previous tasks in the system by co-workers. Digitalization makes it easy to check performance in a digital way. Also, digitalization makes it easy to formulate suggestions for improving the manufacturing process for people who are more reserved about facing superiors. Online communication reduces the idle time of traveling through the factory between divisions/workplaces.

Automation increased human-machine interdependence. Workers and robots work in parallel on the assembly line. Workers must keep up with robots, which work faster by nature. *"When the production cycle stops, everything stops (both people and robots). It's a mixed work cycle, there are also people working on the conveyor, there are also robots. The moment I stopped the conveyor, I automatically stop both robots and people."* (Interview #7). *"Robots weld, move parts, but still need an operator to control them, that's why the impact hasn't been that big on our employees yet."* (Interview #13).

The transformative processes of digitalization and automation (D & A) are perceived to be accompanied by both advantages and disadvantages. However, the perceived advantages are much more numerous than the disadvantages. There were no massive and sudden changes in production and assembly technologies. A high degree of employee receptivity is noted, especially from young workers and especially from women. *"There are no massive changes, studies are being done depending on what changes they want to make. Mostly people are happy with these changes, of course with few exceptions. But when they all get used to using them, they are delighted."* (Interview #14)

At the moment of fieldwork, only hybrid versions of car models are being produced at the plant, but there are plans to start the production of full-electric cars in 2024. However, there is a certain uncertainty in relation to electric vehicle legislation and demand. The production of hybrid and full-electric car models requires workers' re-training & re-qualification and additional investment in the production line. The complexity of the final product (i.e., electric car) is expected to increase, due to the incorporation of a higher number of sensors and more digital technology. Decarbonization is changing the production process and workloads. It is expected that the complexity of work will increase, but the number of assembly tasks will decrease, as a result of the absence of the engine assembly, with a possible impact on jobs. Technology has reached a point where the production process is simplified quite a lot. Human effort is expected to be reduced since the components of electric cars are lighter than those of cars with internal combustion engines.

Transformative processes (DAD) have not been the subject of collective bargaining so far and have not had an impact on the contractual dimension. They are seen as strictly business decisions, which so far have not negatively affected employment. Moreover, DAD triggered training that increased workers' competences and qualifications. When transformative processes and new technologies are implemented, company management informs the union, and the union notifies workers affected by workplace upgrades. To date, the automation of production processes has not been accompanied by negative effects on current employees.

Moreover, those affected by automation received more favorable working conditions (permanent contracts, better working conditions).

Case study #2. Impact of DAD at tier 1 supplier

The supplier is a wholly owned subsidiary of a Western European company, specializing in the production of large, precision molds for die-casting and plastic injection molding, particularly for the automotive industry. It focuses on aluminum and magnesium molds for complex automotive parts such as powertrain systems, block engines, and gearboxes. The molds produced can be used for manufacturing components for both internal combustion engine cars and electric or hybrid cars.

In the manufacturing process, digitalization is primarily used for prototype design and sending specifications to heavy production machines. Over time, there has been a consistent commitment to investing in various new production equipment and software. The recent acquisition of a quality-check scanner and cloud-based data-saving software exemplifies this ongoing commitment.

The integration of new technologies has been facilitated through external providers, who not only supply the technology but also offer comprehensive training and maintenance services. The impetus for adopting these technologies stems from the imperative to align with market demands and address the shortage of manual labor. The latter issue is pervasive and systemic in the Romanian economy, closely tied to the suboptimal quality of vocational education schools. Furthermore, younger generations exhibit a preference for employment in the services sector, despite the manufacturing sector offering higher salaries for skilled workers.

However, the level of automation remains limited. The overall ratio of human to machine involvement in the production process is estimated at 50:50. The challenges in achieving higher levels of automation can be attributed to two principal factors. Firstly, the unique nature of the molds produced necessitates an individualized production approach, rendering them unsuitable for mass production systems. Consequently, each product type demands a distinctive design and adjustments to the standard production process. Secondly, certain stages of the production process, such as initial design and mold centering, defy automation. Even the numerical machines employed require human operators, and their programming involves digital design executed by specialized programmers and software designers.

Disruptive technological change has yet to manifest within the company, and several factors contribute to this circumstance. These include a prevailing familiarity with current technologies, the satisfactory quality and productivity achieved with existing technologies, limited financial resources for technological investments, client reluctance to embrace alternative production techniques like 3D printing, and the inherent difficulty or impossibility of automating specific production stages, as previously outlined.

Despite the absence of disruptive technological change, the workforce expresses a positive perception of the automation and digital technologies employed in the production process. Key insights from this perspective include the following. Firstly, employees concur that technology enhances their work, elevates both productivity and product quality, and minimizes the potential for human error. Secondly, human labor remains integral to the production of highly unique and customized products, echoing the sentiment that "*there is no machine without an operator*" guiding the company's production ethos. Notably,

discussions with employees revealed no evidence of fears regarding job displacement by machines, and no instances of layoffs have occurred as a result of technological innovations. On the contrary, employees exhibit a willingness to embrace technological changes, recognizing technology as a vital enabler of their work.

The company is actively involved in the production of molds for hybrid engines. Additionally, Romania has witnessed the production of several molds for electric engines, stemming from a larger project at the group level. Nevertheless, there exists no divergence in the production processes employed for molds designed for internal combustion engines compared to those intended for hybrid or electric counterparts. The company has undertaken marginal investments aimed at mitigating carbonization within the production processes. Noteworthy among these initiatives is the complete overhaul of the plant's lighting system in 2021, transitioning to LED lighting. This strategic move was undertaken to curtail lighting costs while simultaneously enhancing illumination quality within the plant.

In adherence to environmental stewardship, the plant has implemented a comprehensive filtering and cleaning system for residual water, complemented by an associated maintenance contract. It is essential to underscore that this investment, albeit contributing to environmental objectives, only tangentially aligns with the broader decarbonization process. However, in the realm of utilizing green energies, such options were deemed unfeasible for the plant due to the elevated energy intensity inherent in the production process.

Effective labor relations within the organization have been fostered through a combination of leadership style, organizational culture, and a flat organizational structure. The leadership's approach has led to an open dialogue between company management and employees, facilitated by an organizational culture that emphasizes management openness, accessibility, transparency, and direct communication with foreign owners. A familial organizational culture, with less emphasis on formal rules and complemented by a flat organizational structure, further contributes to the positive work environment.

However, the entrance into force of The New Act on Social Dialogue in December 2022 necessitated the formalization of employer-employee relations and the establishment of structures for social dialogue, even for companies with a reduced number of employees. In response to this legal requirement, the company informed its employees through an internal memo about their right to join a union and to elect their representatives for formal social dialogue. While employees were given the freedom to join different workers' unions in the sector, none opted to do so. Moreover, one employee expressed reservations about the effectiveness of formal workers' representation in a union, suggesting that management might find it easier to negotiate with individual employees rather than a collective. Although employees elected their representatives, discussions between the company's management and the employee representatives regarding the drafting of a collective bargaining agreement have not occurred up to this point.

The list of interviews presented in the Technical Appendix at the end of the Report.

6. Findings

In Romania, there is a regulated framework for social dialogue, involving the consultation of social partners at the national, sectoral, and territorial levels. There is a specific law dedicated to the regulation of social dialogue (Act #367/2022 on Social Dialogue, amended by

Government Emergency Ordinance no. 42/2023), complemented by other legislative acts (such as the Labour Code - Act #53/2003 updated, Act #467/2006 regarding the establishment of the general framework for the information and consultation of employees, and Government Decision #171/2023 on the establishment of collective bargaining sectors).

Several representatives of trade unions, when interviewed, indicated a significant discrepancy in bargaining power between unions in the public and private sectors. Unions representing public sector employees (e.g., in energy, health, education, and transport) possess greater bargaining power. They have the resources to mobilize employees for union actions, enabling them to influence government decisions. In contrast, the role of social dialogue in the private sector is limited in Romania, where unions tend to be fragmented and subject to the influence of small-scale patronage.

An imbalanced dynamic is observed between unions and employers at the confederation level. Unions are notably more united, stronger, vocal, and organized, while employers at the federative level are more fragmented, making it challenging for them to adopt a unified stance. However, the situation differs at the individual unit level.

Research also indicates that both unions and employers often require specialized guidance to effectively manage social dialogue situations, and they may not always possess the necessary expertise in this domain. Continuous organization of communication channels with employees, consistent information dissemination, goodwill, and alignment of all pertinent factors, including public authorities and employees, is deemed essential.

The recently enacted Act on Social Dialogue (#367/2022) does not address the evolving landscape of labor relations in the context of increasing digitalization or the concerns of temporary employees. However, it is expected to enhance social dialogue in Romania.

The role of social partners in addressing DAD is limited due to a severely deteriorating situation in social dialogue since 2000. Given the low rate of unionization in Romania, the challenges faced by unions, and the imbalance in bargaining power in the labor market, workers may be vulnerable due to the implementation of digitization, automation, and decarbonization processes.

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1. Technical Appendix

1.1. List of Interviews

Interview	Interview place	Interview date	TU Membership	TU Position	Gender (M=male F=female)	Age (years)	Level of education	Tenure in the organization (years)
#1	On site	10.02.2023	No	-	M	55	Tertiary education	14
#2	On site	10.02.2023	No	-	M	36	Tertiary education	7
#3	On site	10.02.2023	No	-	M	37	Secondary education	7
#4	On site	10.02.2023	No	-	M	30	Tertiary education	7
#5	On site	21.06.2023	Yes	Vice-president	M	40	Secondary education	11
#6	On site	21.06.2023	Yes	President of the Youth Division	M	28	Secondary education	6
#7	On site	21.06.2023	Yes	Group Leader	M	42	Tertiary education	13
#8	On site	21.06.2023	Yes	Group Leader	F	36	Tertiary education	6
#9	On site	21.06.2023	Yes	Group Leader	F	57	Tertiary education	38
#10	On site	21.06.2023	Yes	President	F	60	Tertiary education	41
#11	On-line	21.06.2023	Yes	President of Council	F	58	Secondary education	39
#12	On-line	21.06.2023	Yes	President of the Women Organization	F	30	Secondary Education	30

#13	On-line	21.06.2023	Yes	Vice-president	M	42	Secondary Education	11
#14	On-line	21.06.2023	Yes	Group Leader	M	46	Secondary Education	12
#15	On-line	21.06.2023	Yes	President of the Foundation	M	39	Tertiary education	13
#16	On site	30.05.2023	Yes	President	M	52	Tertiary education	32
#17	On site	28.07.2023	Yes	Group Leader	M	40	Secondary education	16
#18	On site	28.07.2023	Yes	Group Leader	M	38	Tertiary education	19
#19	On site	28.07.2023	Yes	Group Leader	M	49	Secondary education	29
#20	On site	28.07.2023	Yes	Group Leader	M	52	Secondary education	32
#21	On-line	31.10.2023	Yes	General Secretary of TU Confederation	M	46	Tertiary education	20

Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Commission. The European Commission cannot be held responsible for them.