

Chapter 9

Managing the transformation of the German automotive industry

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Introduction

The automotive industry is undergoing radical change. Various processes are driving the transformation of this key industry, which has been a symbol of social progress for the last 120 years. In addition to the ongoing processes of automation and globalisation, which have been changing industrial production for decades, climate regulation is now having a direct impact on the core value chain of automobile production and this may lead to disruptive change. The enormous challenges posed by the necessary, and properly ambitious, protection of the climate exacerbate the urgency with which conflicts between different goals must be resolved.

This chapter outlines the transformation process of a key industry in Germany and addresses the role played by the German metalworking union (IG Metall) in managing it. In the first section, it makes the attempt to clarify what is meant by ‘transformation’. Its object – the automotive industry – is described in terms of its economic significance, followed by the process of change in terms both of its dimensions and its drivers. Here, we focus in particular on one driver: climate regulation, which is currently the most prominent factor influencing the development of the automotive industry. The second section deals with the nature of the transformation in terms of its technological, economic and political dimensions. Section 3 describes the transformation perspective of IG Metall corresponding to the concept of a ‘just transition’, with Section 4 introducing the leading actors in the transformation and their positions and strategies. The fifth section considers the different hierarchical levels with which IG Metall is engaged in raising its demands. Finally, the results are summarised and the relevant conflicts identified between the objectives and the conditions which lie behind a successful transformation.

1. The transformation - which transformation?

1.1 The object of transformation: the German automotive industry

Regarding the impact of the global financial, economic and sovereign debt crisis in 2008/09, it has probably been the automotive industry which has contributed most to the rapid recovery of the German economy. Despite structural overcapacities, the automotive industry has continued to grow both qualitatively and quantitatively. On the production side, this means that registrations of new cars increased from 4.5 million units in 1990 to 5.75 million in 2016 (VDA 2018) while the stock increased in the same

period from 30 million passenger cars to 46.5 million (KBA 2018). From a consumption perspective, the volume of traffic increased from approximately 600 billion passenger kilometres in 1990 to approximately 980 billion in 2016 (BMVI 2017: 219). In addition, new passenger car types were established, especially from 2000, including the 4-door coupé/crossover coupé, sports utility vehicles (SUV), compact SUVs, etc.

With more than 840,000 employees and an annual turnover of more than €426bn in 2017 (over six per cent more than in the previous year), and thus 14 per cent of total German value added, automobile production undoubtedly represents a key sector of the German economy. After the onset of the crisis in 2007, employment in the sector has continued to grow while earnings before interest and taxes (EBIT) margins of 6-8 per cent are very high compared to other industrial sectors. Additionally, despite the relocation of large areas of production to central eastern Europe (CEE), it has been possible to keep all elements of the value chain in Germany. Two factors are responsible for maintaining employment despite this relocation initiative: booming demand from China and other emerging markets has resulted in massive increases in the volume of exports of German-made cars; while the value of cars has also increased.

The sector also plays a key role for IG Metall: one-third of the union's members and one-third of its new members work here. The more advanced collective agreements often appear first in this sector while, in the large companies, co-determination is practised as a matter of course.

The unprecedented boom in the automotive industry in the last twenty years, from which employees have benefited with high wage increases, could now be abruptly ended by a 'new old' technology: first the electrification of powertrains; and, more recently, completely new mobility concepts. However, the concept of motorised mass mobility in Germany remains unchallenged not only in economic but also in cultural terms: despite repeated crises, structural breaks and regional differences, a united Germany remains firmly on four wheels. Even so, industrial production and employment has been in a constant state of flux as a result of the interaction of various factors (for example including, among others, increases in productivity, technology/innovation, competition and assorted crises). Decline has also featured in these changes as the prior examples of the textile and mining industries, and the current case of the steel industry, also illustrate.

In the case of current developments in the automotive industry, a number of peculiarities have come together. First of all, there is no economic crisis in the automobile industry sufficient to drive a transformation process: the order books are full. Business is going particularly well even in those areas that would be severely affected by future transformation. Small and medium-sized suppliers manufacturing highly-specialised components for combustion technology are currently benefiting from the worldwide boom in private transport. Of course, this phenomenon is very fragile but, in practical terms, it has great effects on possible 'change management' practices and change awareness on both the capital and the labour sides of a company. This also has an effect on IG Metall: the importance of the industry lies in rising turnover and good collective bargaining agreements which, in turn, lead to more members but also an increased

focus on the industry. In terms of organisational theory, therefore, one cannot speak today of a crisis-induced transformation of the automobile industry.

Nevertheless, the forthcoming change is radical: the switch to electrified powertrains affects over thirty per cent of the value added in a car, and in which products and activities could be completely eliminated precisely in those fields where German industry has a particularly strong competence. Unlike in other incremental innovation processes, long transition phases are not expected under which different technologies may run in parallel (as was the case previously with, for example, automatic transmissions). IG Metall assumes that this development will be disruptive. An electrification rate of only thirty per cent in 10-12 years would force accelerated change in some segments. As we know, making running repairs is fine as long as the tear is minor – but a major tear requires a different level of intervention.

Primarily, the transformation of the automotive industry is a transformation of the drive, with a corresponding change in skills requirements. However, the technology is so new (at least in terms of mass production) that particular advantages between producers (such as Tesla or some of the Chinese brands), or among technologies (battery electric or fuel cell), could not have been established so far. In contrast, the incumbent positions of leading manufacturers in combustion technology could quickly be eroded. Even if the product strategy of the leading manufacturers is currently aimed at battery electric propulsion, the issues of raw material procurement, grid stability and additional energy requirements are factors that can slow down progress. This creates uncertainty among decision-makers: companies keep a low profile on investment issues and politicians cannot draw up regulatory strategies from this. In contrast to the turnaround in energy policy, for example, it is not yet clear which direction this transformation will take, which technologies and products will prevail and what this means for the skills of the labour force.

Finally, one has to bear in mind that transformation means very different things for the companies, operations and employees concerned. Hence, from IG Metall's point of view, when it comes to the organisation and mobilisation of the workforce behind fair change (i.e. a just transition), it is important to remember that interpretations of the scope of this change range from 'promising' to 'threatening'. The dominant concern of the workforce is not just the question of whether the technology in their plants is viable for the future but also how they might be prepared for the coming changes. The contours of these changes in automobile production can already be foreseen but, in their essential dimensions, they are still very much unknown. We can rely only partially on past experience in this new, uncharted territory.

Before we explore the various options available to IG Metall in managing this change, it is necessary to take a closer look at the nature of the transformation itself including, firstly, its main drivers and dimensions as well as the related positions and strategies of the leading political actors.

1.2 The main driver of transformation: environmental regulation

There have been two developments that have shaped the automotive industry over the past two to three decades. Following the collapse of the eastern bloc, the globalisation of value chains has increased enormously. Due to the growing importance of the so-called BRICS countries,¹ world market shares in automobile production have, since the 2000s, shifted more and more away from the automotive centres of the triad – North America, EU and Japan (Blöcker 2015). On the one hand, the export of vehicles manufactured in Germany has increased massively (1990: 55.8 per cent; 2016: 76.5 per cent); on the other, the production of German companies has become strongly internationalised. Suppliers, in particular, have built production plants in central eastern Europe, where lower labour costs combined with lower energy and property costs, along with subsidies, have offered cost benefits. Manufacturers are also increasingly deciding to produce where they sell. It was initially predicted that only control units, R&D and group management would remain in the country of origin, but this has not materialised. With the increase in production for export, especially in the value-added premium segment, manufacturers have increased employment in particular in Germany despite the relocations.

The digitalisation of production and product is the other development which has shaped the industry in the most recent period. This has had major effects in terms of change in the working environment and therefore has become subject to increasing attention from trade unions. Intelligent production systems start at the interface between production machines and employees, digitalising their communications and networking these with the communications of other devices, employees, products and even other production sites. In addition to the new automation potential opened up by this, it also enables comprehensive control of the production process.

This production-side digitalisation and automation runs in parallel to the digitalisation of the automobile as a product. The autonomous and connective (electric) car, as a product, corresponds to Industry 4.0 as a production system: in terms of its deployment after the production process, it applies the same mechanisms of software-based operation (measuring, processing, controlling and connecting) that it previously used in communications with employees and equipment during the production process. After home ownership, a car is probably the most expensive purchase in a person's life and, therefore, takes up not only financial resources but also time, i.e. in maintenance. Here, the potential for personal savings can be expected at various levels as social models of mobility change (a move from 'possessions' towards 'benefits'). This is where new business models come in, completely reorganising mobility and blurring the boundaries between private and public transport.

However, the most important driver of the changes in automobile production is environmental regulation. In November 2015, the international community agreed to limit global warming to 2°C (and possibly to 1.5°C) because, otherwise, a so-called 'tipping point' will be reached which will set in motion irreversible processes of climate

1. i.e. Brazil, Russia, India, China and South Africa.

change. More recently, the Intergovernmental Panel on Climate Change has stressed that a limit of 1.5 degrees is considered necessary and warned of the far-reaching consequences of a global temperature rise above that level (IPCC 2018). To this end, it is necessary to ensure that, by 2050, all processes across the globe produce no more CO₂ emissions (and other greenhouse gases weighted according to their harmfulness and converted into CO₂ equivalents) than can be absorbed by natural means (oceans, moors, forests, etc.). Reports contain various statements on the volume of greenhouse gases that can still be emitted until the target is exceeded. However, all serious studies, institutes and climate researchers agree that ‘climate-neutral’ world production must be achieved by 2050 at the latest. Transport now stands out as the sector that has, so far, contributed comparatively little to the reduction of greenhouse gases.² The pressure on manufacturers to cut emissions is, therefore, high.

In order to understand the context, it is worthwhile undertaking a short review of the European regulatory process in this area (see text box 1).

Box 1 **The European regulation process on CO₂ emissions by new cars**

In late 2018, debates were taking place on the post-2021 scenario of CO₂ emission limits for the average fleet produced by each manufacturer, i.e. the average of all the cars registered by a manufacturer in one year. Cars contribute over 60 per cent of emissions in the transport sector, so it constitutes a very important focus for reduction strategies. After the European Commission had set the scene in November 2017, with a proposal for a fifteen per cent reduction by 2025 and thirty per cent by 2030 (compared to the 2021 baseline), the Environment Committee of the European Parliament put forward a proposal to strengthen the target with a reduction of twenty per cent by 2025 and forty per cent by 2030. During this period, environmental organisations proposed a reduction of 70 per cent by 2030 (BUND *et al.* 2018). The European Council reached a compromise position of a 35 per cent reduction by 2030 (European Council 2018).

Germany first voted for a thirty per cent reduction following long disagreements between the federal environment and transport ministries (see further below), but finally agreed with the 35 per cent target. This tense situation within the German and European institutions highlights both the controversiality of the subject as well as Germany’s dwindling influence in this regulatory process.

Ultimately, the European institutions agreed on a reduction scenario of fifteen per cent by 2025 (for both cars and vans) and on a reduction of 31 per cent for vans and 37.5 per cent for cars by 2030 with the addition of an ‘impact assessment’ in 2023 under which the regulatory instruments should be monitored regarding their efficiency, progress and price.

2. In order to administer this target, the Federal Republic of Germany has defined interim targets for each emission source (industry sector) in its 2016 Climate Protection Plan. With 466 million tonnes of CO₂, the energy sector is the most emission-intensive sector in Germany but it has already reduced emissions by 23 per cent between 1990 and 2014. Furthermore, in agriculture, building construction and industry, reductions of 18-43 per cent are recorded; only transport has maintained its emission level during this period. Car traffic is responsible for about 70 per cent of CO₂ emissions in the transport sector.

In its climate protection law, expected to be introduced in Germany in the second half of 2019, further means of regulating mobility behaviour (city tolls, speed limits, etc.) are now being discussed. This is a second, very effective, lever necessary for achieving the reduction goals in the transport sector as the regulation of the emissions of cars and vans would not be sufficient by itself and neither would it solve other, space-related problems in this sector (such as traffic jams, parking management and air pollution). Acting additionally in these areas would also, however, put even more pressure on car production and factories related to the manufacture of combustion engines and drivetrains.

By 2021, phased in from 2020, the average fleet emission to be achieved by all new cars is 95 grams of CO₂ per kilometre. For European manufacturers as a whole, the latest average value (achieved in 2017) was 118.5g/km (for German fleets: 126g/km) which, in 2018, is likely to have risen for the first time since 2000 due also to declining registrations of diesel vehicles. Under this 95g/km target by 2021, EU manufacturers will have to pay a penalty of €95 per registered vehicle for each gram of CO₂ beyond the limit. PA Consulting calculates that Volkswagen would face fines of up to €1.2bn, BMW €600m and Daimler €200m per annum on the basis of a projection of the values they would reach in 2021 (PA Consulting 2017). These fines may seem sizable, but one should remember that these companies all have very successful consumption-intensive sports utility vehicles (SUVs) as a significant part of their businesses, highlighting one of the various dilemmas faced by the development units of car manufacturers.

The reduction target can ultimately be regulated (by the manufacturers themselves) via two levers: increased efficiency in classic combustion engines; and via a market ramping-up of electric cars. The potential offered by new technologies (downsizing, cylinder deactivation, automatic transmission, mild hybrid technology and lightweight construction) is estimated to have a reduction effect of between ten and eighteen per cent. The rest must therefore be achieved through registration quotas for electric cars.³ This is precisely where the pressure on manufacturers to act comes in: in the past, it was possible to point to the inhibiting factors of e-mobilisation and blame sceptical consumers or slow progress in infrastructure development, but a slow increase in the production of electric cars in the near future will have a direct impact on manufacturers' balance sheets.

2. The main dimensions of change: technological, economic and political

Just as the drivers of the transformation work on different levels, the concept of mass mobility in terms of individual transport is also the result of cultural forces reflected by corresponding norms and regulation. In addition to its central economic significance,

3. However, another unclear factor is the role played by plug-in hybrids. Depending on the user profile, such a car can make plentiful savings of CO₂ emissions from burning fuel if it is used in electric drive mode but, if it is operated in combustion mode, the higher weight due to the two drive systems also causes higher fuel consumption than in comparable combustion cars.

the car is also a symbol of the modern narrative of freedom, individuality, power and self-determination.⁴

Despite the continuing expansion of precarious employment through outsourcing, the expansion of service activities and temporary work, as well as fragmented workforces and the fracturing of trade unions (Dörre 2011), the system of regulated labour relations⁵ has nevertheless managed to regain some of its lost significance following the 2008/09 financial crisis.⁶ A major consumer good with a high level of added value, the motor car forms a nexus between its role as a guarantor of prosperity (jobs in the German auto industry are among the best regulated) and a central element in the fulfilment of the bourgeois promise of freedom. The transformation of the automotive industry also means the transformation of the mobility of mass society as it exists today.

An attempt to shape this discussion in purely economic or cultural terms would obstruct perspectives on the possibilities of worker representation. In the following, therefore, we would like to present the various dimensions of this transformation and, for a better understanding of the subject, briefly discuss the central technologies that materially represent the change that is underway (see text box 2).

Box 2 **Excursus on the most important technologies driving the transformation**

The *battery cell* is at the centre of the media attention that surrounds the discussion of the immediate future of automobiles. In a battery-powered vehicle, this will account for a large part of the added value (it is the electric car's equivalent of the connecting rod and crankshaft). The high relevance attributed to this technology results more from its strategic importance than from its potential to create employment. Currently, with Samsung and Panasonic leading the way, most of the production capacity is taken up by consumer electronics companies. Politicians have repeatedly emphasised the strategic relevance of production in Europe or Germany but, Bosch, the only German company involved in this technology, decided in the spring of 2019 not to proceed with investment projects in this area. The Chinese company CATL now wants to build a factory in Thuringia.

Fuel cell technology competes with (or complements) battery-powered electric propulsion. Here, water is split using electrical energy (electrolysis) into oxygen and hydrogen. The hydrogen obtained in this way can later be converted back into electrical energy, oxygen and water in a fuel cell. Various problems that arise in the production and use of battery electric drives are eliminated. However, the production, transport and storage of hydrogen on an industrial scale is enormously energy intensive and expensive. This also applies to the fuel cell itself, for which platinum is required. Moreover, the conversion of hydrogen

4. Reflecting an agreeably non-economic view of the automotive regime via Kuhm (1997).
5. The main elements to this system are: a trade-off between labour and capital (profit and wages), wide coverage of collective agreements and a strong welfare state.
6. It is easy to find numerous reasons why the current boom may not be sustained, but the current balance of power has been stabilised, for example, by the collective bargaining agreement signed in March 2018. This took up the issue of working time, which had been locked down since 2003, and successfully implemented it in new regulations.

and oxygen back into electricity consumes a lot of energy; in comparison, the battery is much more efficient. The German automotive industry began popularising this technology as early as the 1990s, but an inadequate infrastructure of hydrogen filling stations has always prevented a breakthrough. Now this technology is attracting attention afresh – but private and public investment in infrastructure development are clearly concentrating on charging stations for battery electric cars.

A convenient solution in the sense of classical technologies would be the spread of so-called e-fuels (also *synthetic fuels* or *PowerToX* technology). When they are burned, the same amount of carbon dioxide is released as was previously bound during the formation of the synthetic fuel, making it CO₂-neutral. An enormous advantage to this technology would be that prevailing production and research capacities in the field of combustion technology could continue to be used, while the same applies to the existing infrastructure. The disadvantage is the high energy consumption of the material conversion processes, which is far higher than even that of hydrogen production. This is probably the reason why it is not expected that this technology will become part of mass transit. However, it has interesting implications for both air traffic and shipping.

As a bridge technology, the *plug-in hybrid (PHEV)* is currently of major importance, making up over 75 per cent of all registered electric cars in Germany. These vehicles include both drive systems on board: an electric motor with a battery that enables a purely electric range of 30-50 km; and a conventional combustion engine. This means that 90 per cent of the average distances travelled during the day can be covered electrically and, if necessary, the advantages of the combustion engine (range, recharging/tank time, infrastructure) can still be exploited. The dual drive means that the vehicle has high added value, including a positive employment effect, but the result is that it is both more expensive and heavier.

In addition, the *classic hybrid (HEV)* must not go unmentioned. Here, the electric motor primarily has a supporting function for the combustion engine (e.g. when starting up) so purely electric ranges are barely possible. With the Prius, Toyota has had a model with this system on the market since 1997.

With the *Mild Hybrid*, we are entering the field of consumption-reducing technologies for classic combustion systems and thus the second lever in the automotive industry's strategies for reducing emissions. This technology consists of a second on-board network that operates in the high voltage range (48V) and supports the combustion engine in certain high-load situations (acceleration, warm-up phase parallel activity of energy-intensive components). Similar to the HEV, kinetic energy is converted into electrical energy by recuperation, which can later be re-used. However, the electric motor and battery are much smaller, so much so that they have no drive-related function whatsoever.

Consumption-reducing technologies also include, for example, cylinder deactivation (micro-hybrid), lightweight construction and downsizing. These technologies can be understood as additional to the compensatory technologies, which means that they start with the classic combustion engine and do not replace existing production facilities and skills but instead supplement them. The market penetration of these technologies

would thus have a rather limited effect on requirements for the further training of the workforce (e.g. in high voltage systems) and the restructuring of production processes. Their integration on the employment side can be organised via operational means of co-determination and collective bargaining (plant level works agreements). Operational and corporate strategies do not change fundamentally and the constellations of the leading suppliers on the world market are little influenced.

An essential prerequisite for achieving low-carbon mobility is the use of sensor technology and its associated connectivity, which enables *connected driving*. More and more sensors, radars and other measurement technologies are being installed in cars. The data is collected, processed and exchanged between the vehicle and the driver, the manufacturer and the vehicles themselves. This will result in the development of new business models generally related to mobility. Fields of application will be not only traffic and urban planning, but all of the data-based services that are already used in digital communications technology today.

The possibility of *autonomous driving*, also facilitated by sensors and other measurement technology, is politically regulated on a scale under which legislation in the EU and the USA differentiates between six steps of autonomy. Some studies already see full automation (Level 5) by 2030 with a market penetration of 35 per cent (Oliver Wyman 2018: 37).⁷ It is assumed that the use of vehicles will change considerably if there is no longer a need for a driver. In line with the trend away from the possession of goods towards cloud-based and the 'sharing economy' use of services (for example, music streaming, among others), it is conceivable that cars will become terminal devices for mobility requirements. This puts the entire cultural significance of the automobile at risk, while consumption patterns could change fundamentally along new forms of use in fresh mobility concepts. The creation of value shifts therefore from the production of individually-owned goods to the sale and trade by mobility providers of digital movement profiles and entertainment.

Studies assume that the added value in the production of cars as mobility terminals will remain high but that the development guidelines will be set by the end provider whose business is primarily the use of the product (McKinsey 2016). Development along two paths would be conceivable: robo-taxis for everyday mobility needs; and premium cars with comprehensive driving assistance systems for individuality needs. Business models would develop differently along these paths.

In addition to the shifts in the shares of the value chain between manufacturers and suppliers, there may also be shifts in competence and control. These new actor constellations are also posing a challenge to traditional patterns of compromise-finding in plant agreements. In order not to fall behind in the distribution of new added value, Daimler and BMW have recently set up a joint venture in which all mobility services (car sharing, parking, charging infrastructure, etc.) are supported by both manufacturers. This merger is still awaiting the verdict of the trade commission, but clearly shows the new lines of conflict and their potential influence on the established players.

7. PWC even assumes 40 per cent: PWC (2017: 19).

This technology also has considerable potential from an environmental perspective: new usage patterns open up the possibility of reducing the total number of vehicles. A privately-owned car is not in use in something like 90–95 per cent of its service life. However, reverse scenarios are also conceivable: for journeys that are now covered on foot or by bicycle for pragmatic reasons, these highly flexible and possibly inexpensive (for example in a flat-rate model) methods of individual transport could be used instead.

2.1 Technological dimension

From a technology perspective, development can be roughly divided into two dimensions: the electrification of the powertrain; and autonomous and connected driving. Empirically, these two technologies overlap and shape each other, but they unfold different modes of action which is why they should be separated analytically.⁸

The electrification of the powertrain brings about major savings because it is composed of considerably fewer and simpler components than other models – crankshafts, cylinder heads, connecting rods, valves and injection nozzles, but also transmissions, exhaust systems and others, are completely omitted. Instead, the powertrain is composed of a relatively simple structure of a coil, magnets and a rotor. A car with a combustion engine has seven times more components than an electric one. This also makes the maintenance of the engine much easier: the service of a Tesla is limited to the replacement of the key battery, the replacement of the coolant and checking the track.

On the other hand, the procurement and disposal of raw materials and the additional demand for electrical energy are problematic. The electric car is dependent on a completely different infrastructure, so these questions are an increasing concern. Cobalt, which is important for the cathodes of battery cells, is largely produced in the Congo in inhumane conditions and the degradation of silicon is enormously energy-intensive. In addition, it is still unclear what an environmentally-friendly disposal and recycling concept looks like. A particular problem, however, is the cross-sectoral shift of emissions. In the case of electric cars, the current energy mix in Germany means that such vehicles can only be described as locally emissions-free. Even more serious than the additional demand for electrical power, however, is the maximum load factor of today's consumption networks.

These points make it clear that a turnaround in mobility is closely linked to a turnaround in energy and the development of new infrastructures that can ensure a reliable supply of raw materials and energy. This task falls within the responsibility of the public sector and requires transparent, coordinated decision-making processes. In addition, there is a need for a planning framework for companies.

8. Political regulation is also at different stages of development in line with technological developments. Electrification is already an important element of industrial policy today (CO₂ limits and registration quotas for e-cars, state premiums, charging infrastructure, battery cells, etc.). This is not yet the case for autonomous driving.

2.2 Economic dimension

In economic terms, the transformation has the potential to produce much cheaper drives. The costs, which are still high today, are concentrated primarily on battery cells, with price developments in this technology⁹ having a direct impact on the costs of electric drives.

The employment effects will be discussed in the section on the transformation perspectives of IG Metall although, at this point, we should note that it is considered unrealistic that the loss of jobs in the powertrain segment will be compensated in full through new technologies, products and services. We estimate the effect of the job cuts to be greater than can be absorbed by new markets and the ‘benefit’ of a shrinking labour force in an ageing society.

In addition, the lower depth of added value implied by the new technology puts pressure on the trained, skilled labour which still characterises industrial production today. This will simply be less necessary, on top of the effects of more automated production, and the result will be a savings potential for companies which will weaken the negotiating position of employee representatives. The new growth markets of mobility services are, furthermore, characterised by a strongly polarised demand for labour: highly qualified IT specialists and engineers; as well as unskilled and semi-skilled service personnel for the maintenance and operation of terminal equipment. Skilled industrial work in the manufacturing sector, the core area of IG Metall’s organisational power, will decrease. Activity and skills profiles, and the corresponding remuneration framework, must first be redefined; in engaging with this, however, experience will be devalued.

Plant and inter-plant institutions of employee representation must re-define their role in an environment of industrial relations in which new production networks, the creation of value chains and market participants are developing all the time, and for which traditional patterns of co-determination and participation do not necessarily make up integrated components of economic development.

2.3 Political dimension

The transformation of this important industry also has a political dimension. Apart from the concrete regulatory effect of these requirements, the EU-level compromise within the Council of Ministers has shown that this situation has contributed to a readjustment of the balance of power within Europe.¹⁰ The stable constellation of German dominance of the car industry in Europe over the past few decades is now being called into question by the regulatory requirements applying to the automotive

9. The world market price for a kWh storage capacity in lithium-ion batteries has more than halved from €400 (2013) to €189 (2016) within 3 years (Statista 2018).

10. At the decisive meeting of the EU Environment Council, the German representation positioned itself at the bottom of EU member states’ proposals with an orientation towards the Commission’s level of ambition (i.e. a 30 per cent reduction) and was thus unable to assert itself. The Coalition Committee and the Chancellor’s Office have reacted differently – a clear sign of a rupture in the hegemony.

industry. It is now important at federal level in Germany that, from 2020, the first phase of the transformation will begin in which new CO₂ targets can no longer be achieved via increasing the efficiency of combustion engines. Changes in industrial relations will, of course, require appropriate regulation.

The current debate on diesel has superimposed questions about the turnaround in propulsion and mobility highlighted in recent election campaigns. In addition to dealing with driving bans in city centres, which initially addressed local air pollution problems, calls are also being made on the federal state with regard to the expansion of infrastructure for charging stations, the necessary network expansion and the establishment of battery cell production units and support for research programmes. A coherent concept for the framework of mobility (transport, environment, research and economy) would be desirable across all ministries in which reduction targets would be brought into a coherent relationship with considerations of the development of absolute transport performance, modal splits, etc. Unfortunately, the perspective of the Ministry of Transport leaves some open questions in this context.¹¹ The Mobility Commission ‘Platform for the Future of Mobility’ (NPM, formerly NPE) was established for this purpose. It has a very broad thematic and personnel base, but it is still too early to assess its work.

Now that the subject matter and the interrelationship of elements in the transformation have been introduced, we would like to present the actors on the political field as well as their positions and strategies.

3. The transformation perspective of IG Metall

What do these technological developments and the regulatory framework mean for trade unions? The first questions to be answered are whether a transformation process is technologically and economically feasible; and to what extent, under which conditions and in which areas is work going to be affected. At the heart of IG Metall’s perspective is that people have three roles:

- as employees in the automotive industry, they have an interest in safe and good jobs;
- as users of mobility services, they have interest in reliable and rapid transport;
- as citizens, they want to live in a clean and healthy environment.

This leads to the task of securing future-proof jobs via a collective bargaining policy which is forward-looking. In addition, unions should seek to secure investment in the company on behalf of innovation and technology even when faced with resistance from management. Likewise, there is a need to ensure environmental rationality in the design of new processes, products and services.

11. Compared to 2010, road traffic is to increase by a further ten per cent (cars) and 38.8 per cent (vans) by 2030, according to the transport infrastructure plan (cf. BMVI 2016: 55-56).

These interests give rise to numerous conflicting goals that must be dealt with honestly. For example, the increasing scale of commuter traffic in large cities causes tension with the residents of that city. Likewise, the production of large SUVs is a major ecological problem but, at the moment, it secures profits and employment. In order to address these different levels of interest correctly, the relationship between them needs to be properly defined. The purpose of the trade union is to represent employees as a collective actor by organising their demands and requests in order to assert their interests with the employer: the interests of employees in the production process are, initially, at the centre of strategy. Under the condition of capitalist production relations, the successful representation of interests (the labour policy dimension of trade union work) is akin to the condition for the successful representation of the interests of employees as citizens, i.e. for attractive mobility offers and a wholesome environment (the socio-political dimension of trade union work). The scope and location of changes in employment is therefore the starting point of IG Metall's strategic perspective.

The development that is currently at the centre of attention – the electrification of powertrains – indicates that less labour will be needed for their production. This is because the car will run with an electric motor that has a much lower depth of added value while even the production of the battery cell, the most cost-intensive component of electric drivetrains, is highly automated and hence will not require much human labour. In recent years, studies have published various figures on the question of how many jobs will be lost in the event of a market ramping-up of electric cars (Falck *et al.* 2017; ECF 2017; PA Consulting 2018; see also Cacilo and Haag 2018 and Diez 2017 with regard to the digitalisation of production). Most of these studies are based on models for the market development of certain products and services.

With the ELAB 2.0 study, however, commissioned by IG Metall, the Fraunhofer Institute for Labour Economics and Organisation (Bauer *et al.* 2018) has now provided a contribution to the discussion about the employment impact based on the real production figures of the members of the study consortium. These include all German manufacturers and major suppliers. In the most realistic scenario (25 per cent battery electric vehicle (BEV); 15 per cent PHEV), 70,000 jobs in the production of powertrains would be lost by 2030, according to these calculations. This figure already takes into account the compensatory effects of new technologies (some 30,000 employees).¹² With just over 200,000 direct employees in powertrains, about one in two is therefore likely to be affected by the electrification of the component.

For reasons of practicability, it was not possible for the research to take into account some of the effects that could have an influence on this figure. For example, complete battery cell production was left out of this review because there is still no plant in Germany or Europe that manufactures this component, which is strategically

12. After the finalised EU regulations on CO₂ emissions after 2021, the ELAB 2.0 model was fed with the new volume of electric vehicles necessary to reach that goal (on the basis of the estimate that 50 per cent of new cars in 2030 will be BEV/PHEV). In such a case, the numbers of job losses rise to 100,000 while the number of jobs affected rises to 150,000.

important for shaping the supply chain. Meanwhile, Panasonic, Samsung and also LG – Japanese and South Korean consumer electronics companies – are emerging as new suppliers who have previously played no role in production networks. Likewise, it was assumed that the entire value chain would remain in the country and, furthermore, that the 2016 production volume would be maintained (i.e. 5.75 million drive units) with several other prevailing conditions also being repeated, including the export volume of 75 per cent of production and the presence of stable world market conditions. It is also particularly relevant for employment that, finally, some key structural effects could not be taken into account: it is conceivable, for example, that combustion-specific components (from pistons and cranks up to exhausts) only account for a small part of the turnover of a particular operating unit. If these parts are no longer demanded, it may be that the plant becomes non-profitable, even if all its other components are produced as normal.

The transformation of the automotive industry, however, is not only a transformation of the electrified drivetrain (in terms of the technical dimension), but also a transformation of the regime of accumulation in a key automotive industry (economic dimension), as well as of state regulation (political dimension) and of the traditional concept of transport (which is to say, it is also a social change). The various dimensions overlap at many points: from 2025 at the latest, the continued reduction of CO₂ emissions can no longer be achieved by gradually increasing the efficiency of combustion technology but only by manufacturing electric cars as replacements. New technologies (autonomous cars) will further call into question traditional distribution patterns in the value chain and will also open up new regulatory spaces for politics. Last but not least, the fraud scandals in the industry (e.g. with diesel NO_x emissions) have eroded corporatist arrangements between industry, ministries and licensing authorities.

IG Metall can only move successfully in this political field if it recognises the various dimensions involved in the transformation and reflects on their effects at all levels of political regulation (plant, company, state and federal level, and the EU). Conversely, the mode of transformation (by design or disaster¹³) is sensitive to the participation of IG Metall: it is the organisation for which the democratic process of co-determination and participation is part of the original principle of operation. A top-down authoritative approach concerning environmental regulation in the transport sector would directly affect tens of thousands of people's livelihoods and the interests of employees therefore cannot be ignored. Such a move would dramatically aggravate the post-democratic to anti-democratic developments of recent times and, moreover, would ultimately close off the scope for the development of environmental policy.

It would therefore be wrong to equate IG Metall's transformation perspective with that of industry ('growth, employment and prosperity'). A just transition means not cutting

13. This reflects the word game of Sommer and Welzer (2016) who claim that the transformation of the current economic, social and cultural model will happen anyway and that the question is therefore one of how it will actually happen. This points to the importance of the social and political regulation of economic structures which, at the moment, dominate the mode of transformation.

off the actors in change from the regulation of the process. Conflicting interests that complicate or impede a coherent policy are not the result of a one-sided labour-oriented perspective but can only be overcome collectively and by a successive expansion of spheres of influence into operational and entrepreneurial processes. Socio-economic change with progressive objectives (from 'decent work' to *buen vivir*) can fall into its opposite if objectives are politically dictated and not elaborated by the participants themselves.

4. The main actors and their positions in the transformation

4.1 Industry

Industry (ACEA¹⁴) is of the opinion that a twenty per cent reduction in emissions by 2030 is feasible and in line with other industry sectors (ACEA 2017). In addition to exploiting the potential for efficiency in the combustion sector, a slew of battery electric models is being deployed throughout Germany. BMW has been on the market since 2013 with its newly-developed pure electric model (i3) but is now changing its strategy and offering electric derivatives of combustion engines for the time being (X3). The reason for this is the expensive production and lightweight construction of the body area; currently, seeking weight reduction in the battery is more cost-efficient. Daimler recently unveiled its EQC, the first model in its EQ brand; Audi will sell the e-tron from 2019; while VW will offer three models of its ID family by 2022. It is, therefore, noticeable that the strategy of premium manufacturers is based on e-SUVs.

In terms of mobility policy, such a decision is relevant insofar as the development of products is still highly independent of the business of the development of new concepts in mobility. The manufacturers are thus maintaining the traditional path of space- and resource-intensive individual mobility and supplementing it with a different drive. Hence, a clear path dependency in development is evident. Any socio-political rationalities of the responsibility for resource consumption, noise and clean air, as emphasised by new mobility providers, can only be found through the filter of the promise of the freedom of unlimited flexibility and comfort. The investment sums of the manufacturers for the two topics of electromobility and autonomous driving are impressive (VW alone wants to invest €34bn before 2022).

Furthermore, it seems that the plug-in hybrid will play the role of bridging technology because model policy is moving in the direction of initially offering all combustion models with dual drive. Consequently, it is stressed that, even with an ambitious market ramping-up of electric cars, the majority of new cars will still have a combustion engine in 2030.

14. European Automobile Manufacturers' Association.

4.2 Federal policy in Germany

In addition to the discussions about banning diesel cars from entering the EU, the lack of agreement at EU Council level between the federal Ministries of Transport and of the Environment as regards a common position for CO₂ reduction in Germany shows how acute the conflict is between stakeholder factions. With its 45 per cent reduction proposal, the federal Ministry of the Environment¹⁵ presented a much more ambitious position than the Commission's proposal, with which the Ministry of Transport¹⁶ did not agree. At the German Industry Day, the Chancellor's Office expressed the opinion that industry ought not to be overtaxed by over-ambitious limit values. The compromise finally reached in the Council (a 35 per cent reduction), which was higher than Germany's preferred position, was considered feasible. However, the Transport Minister rejected it and accused the Environment Minister of having only half-heartedly negotiated.

This disagreement shapes not only the handling of the emissions problem, but also the way of organising changes in transport policy. In this situation, the Mobility Commission (NPM) has the opportunity to play a central role in the development of medium- and long-term concepts for the future of transport and mobility via its different working groups and steering committee. A subsequent legislative initiative (the Climate Protection Act 2019) is in process, but the relationship between this and the work and output of the Commission remains unclear.

Since July 2016, a premium has been offered for e-cars (€3,000 for hybrid and €4,000 for all-electric vehicles). However, funding applications are being made to a much lower degree than expected. The corresponding target of one million registered electric cars by 2020 has now been dropped by the government. In company car regulation, electric cars are given a tax credit (according to the coalition agreement of January 2019, some 0.5 per cent of the list price instead of one per cent). All in all, however, these measures are comparatively unambitious.

The design of the charging infrastructure and preferential participation in road traffic (use of bus lanes, free parking spaces, etc.) is a matter for state and local politics. The German Association of Cities and Towns looks at the problem of individual transport primarily from the perspective of air pollution and much less from the perspective of carbon emissions. Above all, however, shortage of space on the roads is the focus of the interests of the municipalities for which the goal is, therefore, to shift the modes of transport composition in favour of public transport.

15. Led by the Social Democratic Party (SPD).

16. Led by the Christian Social Union (CSU).

4.3 Environmental associations

In a joint paper, prominent representatives of environmental associations have called for a reduction of 60-70 per cent in carbon dioxide emissions by 2030 (BUND *et al.* 2018).¹⁷ Furthermore, Greenpeace is even calling for completely decarbonised traffic by 2025 and, at the latest, by 2030, targets which are coupled with a call for a ban on the production of combustion engines within this period (DLR 2018). Meanwhile, limit values will continue to be included in the regulatory framework for emissions reduction across the entire transport sector. This makes it clear that, even though private transport is the strongest lever, the reductions required cannot be achieved simply by reducing emissions per vehicle.

The Brussels NGO Transport & Environment points out that even higher reduction levels must be seen against the background of the unrealistic test cycles that seek to measure emissions (T&E 2017). In their joint paper, BUND *et al.* (2018) point out that percentage reduction targets and an orientation towards the fleet average actually achieved in 2020 (and not towards the trigger level of 95g of CO₂ emissions per km) seem to offer loopholes. In addition to a higher reduction level, the paper argues that it is therefore necessary that test cycles be extended to include road tests; that a bonus and malus system be introduced for e-cars; and that the weight component be abolished. Further demands, such as company car privileges, new energy tax laws and toll regulations, are the subject of negotiations as regards 2019's planned Climate Protection Act).

4.4 IG Metall

IG Metall believes that there is potential to improve efficiency by between 12 and 18 per cent in the combustion sector. However, some of the technologies will only pay off in the high-price segments and less so in volume models (e.g. as a result of the lightweight construction). In line with the EU's forecasts, along with those of some consulting institutes on the market ramp-up of electric cars, an electric quota of fifty per cent in 2030 appears necessary to match the EU's new CO₂ reduction goals.¹⁸ Together, this results in a reduction potential of about 40 per cent, due to some European markets being where we expect no ramp up for BEVs at all (because there are no resources to build up an appropriate infrastructure).

IG Metall's aim is to exploit the potential for efficiency quickly and comprehensively, and to transfer it to production: abstract reduction figures are also not the main focus

17. The demands include not only emissions targets, but also traffic-reducing measures such as city tolls, abolition of the weight component, abolition of company car privileges, an increase in mineral oil tax and a general speed limit on motorways. These measures are considered all the more necessary where the reductions in CO₂ emissions are less ambitious.

18. Based on current registration figures, this corresponds to around one million electric cars per year. Depending on how hybrid and battery electric drives are distributed, and how plug-in hybrids are actually driven (in combustion or electric mode), the emissions reduction effect of one million electric cars may accordingly be lesser. On 1 January 2018, the fleet consisted of 56,861 purely electric cars (BEV) and 230,710 hybrid vehicles (HEV and PHEV) (KBA 2018).

for the union. The balancing of existing interests is more equitable on a set of measures if technology-based possibility analyses are used to determine where cost-efficient reduction potential can be exploited, and what this means for the innovation, location and workforce skills strategies of companies and businesses. Thus, political measures, as conditions for the different levels of ambition, come to the fore.

In this context, IG Metall is working on the concept of conditioned regulation. In relation to the processes before us, this means that the target corridor is defined for 2030, but the focus will initially be on the review assessments scheduled for 2023. It is here that the scope for further reductions and improvements will be discussed. In this way, the high degree of uncertainty about the economic and technological developments that will realise the scale of the reduction – of whatever magnitude – can be taken into account.

The purpose is the organisation of a co-determined transformation process and the avoidance of operational and regional structural breaks (see Sommer and Welzer 2016).

5. IG Metall's different fields of action

5.1 EU level

IG Metall, in representing workers' interests at EU level, advises members of the European Parliament in committee procedures and in Parliament itself, drawing on its technical knowledge of works councils, by submitting position papers and comments. In addition, the union has made demands for a coordinated industrial policy (for example in battery cell production in the context of electrification). The forthcoming transformation process comprises numerous technologies that are either completely new or which are too capital-intensive for the industrial sector in Europe to develop at national level. Lead markets and suppliers are not yet located in Europe. This is a completely new situation that cannot be compared with the technology that has ensured the prosperity of the most recent decades in Germany and Europe. However, the union also believes that it is important to design the supply chains in such a way that they enable safe and good working conditions at all levels within Europe.

The challenge IG Metall faces is to prevent the constant threat of competition between locations on the basis of low wages. If new technologies are developed by companies outside Europe, and supply chains become even more flexible, global value chains can only be countered with supranational trade union work. The international umbrella organisation, IndustriAll, was founded for this purpose, bringing together over 190 industrial unions in 2012. Together, they represent over seven million members and fifty million employees working in the metal and electrical industries, textiles, chemicals and energy. This union federation has both a global and a European structure so that supply chains can be better monitored with appropriate coordination by local trade unions. The increasing pressure to relocate suppliers to central and eastern Europe requires coordination rules on tariff deviations in the automotive industry – something which is vital for an internationally-synchronised course of transformation.

In addition, the federation facilitates networking opportunities at EU level as well as the exchange of information on forthcoming legislative processes with regard to the transformation, in order that common positions might be established on which policy advice can take place in Brussels.

5.2 Federal and regional level

Federal level

The main platform for the regulation of the transport sector, with the purpose of creating a sustainable mobility system, is the so-called NPM (Nationale Plattform Zukunft der Mobilität). No less than six ministries, representatives of municipal transport companies, environmental and social associations, scientists and of course the industry and trade unions constitute six working groups regarding the various dimensions of the change process across the entire mobility sector. IG Metall participates in two of these groups: in working group 1 ‘Transport and climate change’, which is working on possible measures of CO₂ reduction in the transport sector; and in working group 4 ‘Securing Germany as a place for mobility, production, battery cell production, primary materials and recycling, training and qualifications’ which focuses on broad questions of industrial production and mobility, the construction of battery cell plants (infrastructure, investment, networks/hubs) and the provision of workers equipped with appropriate skills and training.

Working group 1 has recently released its interim results: it argues that the CO₂ emissions reduction goals set by the Climate Protection Plan of the federal government (of 40-42 per cent in the transport sector) are feasible, but only with the mobilisation of enormous financial and organisational resources and the acquisition of vast social legitimacy. That could only be achieved by consequent and transparent regulation at each level of the administration. In addition to powertrain electrification, the working group’s report outlines the following areas of action: the promotion of synthetic fuels; the expansion of local public transport and rail for long-distance passenger and freight transport; and digitalisation. Right to the end, there were disagreements among the participants about the details of the reduction effect and the costs of single measures, such that it was unable to draw up a consensually-decided package of measures to address to the federal government. Nevertheless, the interim report has pulled together numerous facts that can serve as the basis for a transparent and effective regulation of the transport sector.

Coordinated investment and infrastructure programmes are also necessary at federal level. Regulation at EU level extends to the larger product, labour and service markets and attempts to coordinate these, whereas federal policy has the task of promoting local production, technologies and competences/qualifications and in developing their profile.

In the view of IG Metall, the challenges presented by the coming changes can only be mastered if the high innovation potential of German industry is also applied to the

new technologies. However, new products are often radical innovations rather than incremental ones so companies are caught in a dilemma from a business perspective: necessary investments that tie up enormous resources over long timetables are being held back pending the initiatives of competitors. With each individual company acting in this way, the delay to investment is becoming – from an economic point of view – rather dangerous. This dilemma can only be resolved by a decisive industrial policy (start-up financing, investment funds, infrastructure investments).

IG Metall believes its role is to draw stakeholders' attention to such problems. In addition, however, the union is clear that the role of the Federal Employment Agency must be reconsidered. Some companies will have no prospects following the transformation and it is beyond the remit of such companies to retrain employees consequently made redundant. This is where the political actors must take the initiative by creating new instruments that regulate the transition between old and new employment (i.e. during the re-training period). For several years, however, work on placing people into employment has been geared towards rapid outcomes and has frequently ignored existing knowledge and skills. This has led to a gradual destruction of accumulated skills potential where job losses have occurred.

These forthcoming changes in the automotive industry and the above-average level of skills required by the new technologies are developments which are becoming increasingly explosive. With the proviso that existing skills ought to be retained in a new job, IG Metall has therefore proposed the expansion of the existing 'short-time working allowance' (*Kurzarbeitergeld/KuG*) to a 'short-time transformation allowance' (*Transformation-KuG*).¹⁹ Under this scheme, the federal agency would support the further training and retraining of employees via supplementary payments, provided that continued employment in the plant is viable. This possibility would be set for the long-term in line with the course of a plant's transformation process and clearly requires forward-looking personnel planning. This *Transformation-KuG*²⁰ has been made as a demand to the parties involved in the elaboration of their coalition agreement.

IG Metall is also calling for a paradigm shift in education policy. For high-quality initial training for trainees and work-placement students, the investment backlog, which is estimated at €34bn, must be dealt with first (building stock, digital infrastructure, teaching aids). In addition, the education system must focus more on being able to provide employees with new content throughout their working lives. At the interface between companies and schools, it is vital that communications channels are open for new groups of employees (non-experts, experienced companies) going beyond the

19. With this legal instrument, companies facing financial problems can apply for state support during a period of restructuring, with the state then taking over a certain percentage of the wages to be paid. However, it is designed only for cases of restructuring. IG Metall is proposing that model be adapted for transformation processes at plant level (*Transformation-KuG*).

20. In detail, s. 111(3) of the *Betriebsverfassungsgesetz (BetrVG)* covers the definition of criteria with the summary of the individual measures involved in enterprise change (*Betriebsänderung*) from which interest reconciliation can take place between employers and employees (*Interessenausgleich und Sozialplan*). In addition, the extension of s. 111 exp. 1 SGB (III) for the authorisation of a short-time allowance is intended where a successful retraining measure does not flow durably into a new activity and further work takes place in the old enterprise.

framework of training courses and also including follow-on training. To this end, a legal framework must be created that largely overlaps with the requirements of the education system in terms of content.²¹

Regional level

Regional cooperation is important for a successful transition. In May 2017, a so-called ‘transformation advisory council’ (*Transformationsbeirat*) was set up in Baden-Württemberg as an initiative of IG Metall. Together with the Ministry of Economics and Labour, manufacturers and suppliers, employers’ associations, a municipal trade association and a state mobility agency, a forum was created out of which a specific work programme was intended to emerge. This led to a roadmap being drawn up and applying from September 2017.

In the meantime, this group has been merged into the so-called ‘Automotive Industry Strategy Dialogue’ (*Strategiedialog Automobilindustrie*) in which the stakeholders concerned discuss the problems and possible solutions for transformation sub-processes in continuing dialogue, translating these into specific measures and projects. This also includes events designed to make this process transparent. The specific projects include state investment in charging infrastructure; the support of investment partnerships between municipalities and companies with regard to digital infrastructure and new municipal mobility solutions; the establishment of an electromobility hub, especially for SMEs to support them in realigning their product profiles; and the establishment of a battery cell production unit in cooperation with Fraunhofer IPA. In addition, a European testing and competence centre for batteries and energy storage systems is to be established.

In the Bavarian ‘Pact for the Future’, the regional Prime Minister, the Association of the Bavarian Metal and Electrical Industry and IG Metall Bayern have agreed on target agreements as a means of actively tackling this process. With the vision of turning the state into a sustainable and environmentally friendly industrial location, based on secure and good employment through technological change, the necessary cornerstones have been defined which are then to be implemented in specific joint projects. In addition to the promotion of alternative drive technologies, the digitalisation of production plays a central role. The issue of education and skills is addressed particularly effectively at this level as it falls within the competences of the federal states. Accordingly, the Pact refers not only to continuing vocational training in enterprises but also to the state’s responsibility in vocational education and training. The already dense network of universities of applied sciences, state technical schools and research institutions is also set to be expanded.

21. For a start, the union has been calling in this context for the abolition of the ban on cooperation, the free use of learning materials, co-determination by works councils in the creation of course content and the integration of vocational training into the BBiG (‘Vocational Training Act’). A paradigm shift, however, would require further measures in the longer-term, including: the establishment of a right to further vocational training; the establishment of a public system of further training and counselling in a network of vocational schools, universities and the Federal Employment Agency; and the right to an advance for a follow-on training course (cf. IG Metall Fact Sheet 1.1 on the 2017 federal elections).

That southern Germany is taking on a pioneering role corresponds to the existing economic structure and thus the distribution of resources among the various regions of the Federal Republic of Germany. Unfortunately, these programmes and initiatives cannot simply be taken over by structurally weak regions, not only because of the issue of financial resources, but above all because the relevant personnel are frequently not in place. The business landscape is characterised by small and medium-sized enterprises which often maintain production-only sites, with the managing directors and owners usually located in structurally strong regions or else abroad where they assume the role of the ‘extended workbench’. Opportunities for co-determination within a plant are correspondingly limited. For this reason, state policy is a central addressee for employee interest representation, especially where relations based on collective bargaining have been eroded and the institutions of employee representation facing a transformation process have been left to their own devices.

5.3 Company level

Companies are the central actors in transformation: they determine product development, investment strategies and personnel planning for the future. They have the necessary economic and technical resources and are geared towards using them to achieve successful change. The perspective of employees is naturally not at the centre of these developments – on the contrary, such fundamental restructuring can result in job losses. The task of IG Metall is, therefore, to exert an influence on location, employment, innovation and investment strategies; conclude agreements to safeguard production locations; and find a development perspective for every plant. There are a number of positive examples of this in action which will be briefly outlined here as cases of good practice.

In the future, Daimler will be divided into three divisions. The General Works Council has reached an agreement with *Projekt Zukunft* (‘Project Future’) under which future job security was extended from 2020 to 2030. This job security applies to all Daimler employees, including those in logistics and branch offices. The second element of the agreement includes a say in the procurement of new products, electronic components and development and mobility services: within the work of the company’s innovation committees, the works council is advised on future product strategies by plant management and has the right to make proposals in response. And, finally, investment commitments of €35bn have been made in Germany over the next seven years. These investments are dedicated to the areas of e-mobility, mobility services, connectivity and autonomous driving, thus making a clear commitment to the role of the core location in the transformation.

The works council has used the restructuring to secure the core interests of employees with further agreements on collective bargaining in sectoral companies, on company pension schemes and on profit-sharing. In return, it supports the restructuring process.²²

22. Daimler General Works Council Handout.

Volkswagen is also facing major change. Group management is anticipating extensive job cuts as a result of the introduction of new technologies and products. As early as 2016, the works council was able to negotiate a job security plan up to 2025, with the reduction in employment therefore being achieved in a socially acceptable manner under the company's so-called 'Future Pact'. This includes part-time work for older employees, which is set to be significantly expanded. As part of the 'Future Pact', 25,000 jobs will be eliminated although 9,000 will also be created. At the same time, commitments have been made to locate new e-mobility products at German sites. In this way, each department has been given a development perspective over the next few years. Management's plans to outsource certain products and logistics, or to relocate all new e-components abroad under specific termination plans, could thus be fended off. To this end, the works council supports the strategy of productivity and profit maximisation.

There have also been strategic agreements in the supplier sector which relate specifically to the transformation process. At Schaeffler, an agreement on the future (*Zukunftsvereinbarung*) has been reached that goes beyond normal employment agreements. Suppliers' products are relatively independent of brand identity in the end product, so they can position themselves more flexibly within the new drive and mobility concepts than end manufacturers. In this way, business models beyond the private ownership of cars are also of great interest here. This places question marks over the traditional relationships between end manufacturers and suppliers. For suppliers, the transformation process potentially goes beyond the mere electrification of the drive and refers directly to new business models for product-related services. Accordingly, agreements must be conceptualised.

The Schaeffler agreement, therefore, provides for the following elements: works council committees must be involved in site development (new products, business models); the initial training programme (dual training) and the internal further training programme are to be expanded; work organisation should be designed in such a way that these training measures can also be deployed; and the existing agreements towards the security of sites are to be maintained and standardised, with redundancies for operational reasons being avoided. Furthermore, an innovation fund of €50m will be set up to take account of suggestions from employees and provide them with better support. Finally, the agreement formulates a clear commitment to collective bargaining – the declared goal is collective bargaining coverage across all locations. These elements will all be reviewed by a steering committee made up of equal numbers of representatives. This ensures that the employee side has a say in the entire process of transformation within the company and ensures its transparency for the workforce.

Of course, these examples can be adapted to Tier 2 or Tier 3 suppliers only to a very limited extent. The question of resources is decisive in management's room for manoeuvre and therefore also in the possibility of making concessions to the employee side. The instruments of co-determination in outsourcing, as well as the participation of works councils in innovation and investment committees (as at Daimler), can, however, also be applied in certain forms in smaller companies.

In discussions with works councils, it becomes clear that the decisive initiatives for the early theming of new products and qualifications tend to come from the employee side. In particular, the issue of training in plant change is also taken up from there. However, the interventions of employee representatives can also support the future viability of a company from a product perspective, for example by using producers' knowledge to draw up proposals for new products or processes in open participation programmes and then digitalising them, evaluating them and transforming them into new processes. Even if, ultimately, the company or plant management decides on the implementation of the proposals (it is also conceivable that committees with equal representation will be set up to take such decisions), employees gain from having exerted influence on the orientation of product development right up to the strategic positioning of the company, in addition to any codetermination committees and rights that may also be established. IG Metall sees this instrument as an opportunity to use the transformation of industry to expand co-determination.

5.4 Plant level

Primarily, the plant is the level at which the regulations agreed in collective agreements are implemented. The works council is an independent actor in interest representation and is obliged by the Works Constitution Act (*Betriebsverfassungsgesetz – BetrVG*) to strike a balance between company-related (economic) rationalities and employment-related rationalities (the reproduction of the workforce). The inter-company hierarchy deals with the issues of wage levels and wage composition, but elements are negotiated here that affect daily operations (shift divisions, occupational health and safety, holidays, overtime, skills and training, among others).

In transformation programmes, the plant level is important because it is here that change processes have a direct impact on employees. Strategic and conceptual considerations have the potential to be experienced in everyday working life and either generate legitimacy for a process – or otherwise de-legitimise it. For a membership-based democratic organisation such as IG Metall, this level is therefore decisive when it comes to success or failure. At the same time, the central power resource of the individual employee also lies at this level in the decision for or against union membership. Where the union exists, that structure of trust and the works council carry the positions, awareness and moods of the members into decision-making within the plant. It is here at which it is determined whether the union is acting with the members or not. A confident plant policy in transformation is therefore called a participation-oriented plant policy and refers both to the plant and to the union's organisational structures.

In addition to the political possibility of co-determination beyond the BetrVG (participation in decision-making bodies, agreements implementing overall company agreements), the focus is on motivating the workforce around new issues. For example, the initiative 'Work and Innovation' (*Arbeit und Innovation*) is a project in this area in which various employees, engineers, personnel managers, works councils and shop stewards have been trained in questions about the new world of work. Together with the trade union training centres, a work-oriented network of experts and Ruhr University

Bochum, a training programme has been developed (the so-called ‘Learning Factory’). Here, the education and skills approach can be applied at plant level, since problems arising there lie at the heart of this initiative which, with the expertise of scientists, seeks to develop and test solutions for technological or process-related problems. This makes it possible for workers to experience that the decision-making and problem-solving structures in a plant or company are not given by natural law, but have arisen as a result of deliberate interventions and can be changed through concerted action. This course has already been held thirteen times with a total of 80 companies and 250 participants.

In addition, IG Metall is trying – on a pilot basis – to obtain a comprehensive overview of the specific situation in particular locations by means of plant surveys. Full-time representatives at a plant, together with employees, collect information on the product and on the skills status of employees in order to find out whether and how the plant is likely to be affected by the transformation process. This should make it possible to influence strategic decision-making processes at an early stage and to develop future-proof development perspectives. In this way, and in cooperation with the local and regional representatives of IG Metall, a transparent, participatory and bottom-up plant map is thus being created which facilitates a broad and detailed view of the extent and content of the involvement of individual regions, plants or companies. An exchange of experiences and the co-ordination of development strategies is intended to follow, with the aim of outlining a plant-specific development perspective in each company and for each plant. This will broaden the scope of action and strengthen the strategic position of employees in the transformation process.

Some of the union’s districts are already well advanced on this work, with the project due to be implemented nationwide in 2020.

6. Conclusions – conditions for a successful transformation

In accordance with the transformation triangle of economic, environmental and political dimensions, a successful transformation for IG Metall means the striking of a balance between the development of sustainable and thus employment-securing products, their environmental sustainability and democratic access to their use. For the automotive industry, this means taking on a pioneering role in the competition for new drive technologies and mobility concepts in line with the enormous volume of employment and the innovative capacity of the sector.

These aspects are inter-connected. Of course, the problem of the qualitative and quantitative development of jobs is the starting point of any strategy for trade unions as this is the basis of their power to act. Without tighter climate regulation, the problems of air and space pollution in inner cities will soon have an impact on the industry and on the product. However, the development model of expansive automobile production has worked very successfully over the past decades according to the criterion of capital utilisation. With the precondition of the externalisation of the environmentally-consequential costs, which has always been a basic condition for capitalist development,

the automobile industry is prospering in the centre and in emerging countries, albeit at different levels. Alternative development models that focus on the strengthening of environmental sustainability in line with the sector's goals in the Climate Protection Plan must therefore be developed on the basis of the current model of production if structural breaches are to be avoided. Above all, the development of resource- and energy-efficient technologies must be at the centre of the strategies of reconciliation between the environmental and employment policy dimensions of transformation. At the same time, it is clear that development here has, so far, contributed insufficiently to the reduction of greenhouse gas emissions.

Just as economic prosperity, based on successful value-added production, was a necessary condition in the past for the expansion of trade union power and thus workers' participation and co-determination, so could an interruption in this growth endanger this democratic process. The jobs vs. environment dilemma (Rätzzel and Uzzell 2011) thus has a direct effect under current production conditions. The arguments of environmentally-motivated actors, who fear an even greater loss of jobs if industry is not committed to making products and production more natural and resource-conserving, only confirm this connection.²³ Resolving this dilemma implies the creation of other production conditions in which democratic control over the means of production is ensured. This possibility is certainly relevant as a strategic goal, but the effective power to act is anchored in the current conditions of production and ownership. As a result, this question cannot be resolved immediately, but compromises may be found with a view to addressing these conflicting goals. Striking such compromises that strengthen the power of employees and their representatives are, in turn, basic conditions for extending democratic control over production.

However, the necessary compromises in the regulation lead to numerous conflicts of objectives. For example:

Economic-environmental: The current discussion about nitrogen oxide emissions in diesel technology is leading to a collapse in the number of registrations of this type of engine. Since there are no alternative drives on the market in the relevant price classes, consumers are switching to the petrol engine, which is leading to an increase in the CO₂ balances on manufacturers' fleets. It is true that diesel technology has made certain vehicle classes possible in the first place (for example, the SUV), but it is also true that a one-for-one switch makes it more difficult to achieve fleet-based reduction limits.

Environmental-global: Even if the infrastructure, the procurement and recycling issues and the product portfolio of automobile manufacturers are designed in such

23. Nevertheless, these comparisons express some fairly speculative assertions. Popular comparisons, such as those with the lighting industry, the telecommunications industry or television screens are not possible because of several factors (the depth of value added and employment, the relevance of investment for households, innovation cycles, locations and supply chains). In this way, people may argue over the compensatory effects of higher household incomes when spending on fuel is invested in other consumer goods (ECF 2017 - Reference Study for Environmental Associations).

a way that electric cars become attractive for broad groups of buyers, apart from the aforementioned effects on jobs, the question of the environmental follow-on costs through battery cell production nevertheless remains. The electric car even offers the possibility of externalising these costs further than the traditional car, since the focus is often only on local CO₂ neutrality. There is, therefore, a conflict between locally-clean mobility and global responsibility for resource exploitation.

Environmental distribution policy: If one thinks ahead from the transformation of drives to the transformation of mobility, market-based regulation concepts to reduce emissions are likely to be particularly popular within a neoliberal paradigm. Although social differences are manifested and symbolically represented by the car, the right to individual mobility is democratically distributed over the presence of equal access to public infrastructure (road use, traffic rules, parking spaces). Whether this will be the same for private mobility service providers remains to be seen. On the consumer side, there is therefore a democratic problem with the reduction of individual means of transport by new mobility service providers.

Regional policy: This problem becomes all the more serious if one considers further social developments in the mobility of mass society. The result of progressive urbanisation and real estate speculation/rental price developments is that more and more people are being forced into the suburban belts of large cities and must travel ever-greater commuter routes.²⁴ In addition, the proportion of dual-earner households is increasing. These developments are challenging for a public transport system that is today already overloaded in urban centres and cannot increase in the short timeframe necessary to achieve the desired reduction in cars. At the same time, urban residents have an interest in clean air. There is, therefore, a conflict between interest in mobility for gainful employment and interest in the health of citizens.

Business management: Organisational theory is clear that successful processes and products from historically-evolved development strategies lead to path dependency. This means that, especially in large, hierarchically-structured organisations, various transformation processes are subject to numerous obstacles. The German automotive industry and combustion technology are good examples of this. Turning away from the combustion engine and individual mobility here means a devaluing of the networks of research and education institutions, development centres and production sites that have grown over the decades. Particularly successful actors in classical production see themselves in a conflict between having the highest amount of resources to achieve transformation on the one hand and having to generate these resources from classical technologies on the other. The transition to new drives and mobility is complicated by the asynchronicity of market ramp-ups of individual technologies

24. The average distance between home and work has increased from 8.7 km in 2000-2014 to 10.5 km in 2014 (statista.com 2014). In addition, the purposes of travel continue to diversify, i.e. there is a general trend in society to travel more and further.

in different segments. Thus, the uncoordinated transformation of social mobility, as a chaotic process, is affecting individual positions in the value chain and preventing path changes, the necessity for which has long been acknowledged individually. This conflict makes it particularly clear how important it is to have a consistent and transparent regulatory framework that takes into account the operational planning horizons of such far-reaching changes.

The democratic course of a just transition, on which the legitimacy of the actors and their strategies depends, is a two-sided one: on the one hand, it is a question of securing the perspective of tens of thousands of people on the future viability of their jobs; on the other, new exclusion mechanisms must be prevented. On this basis, political regulation measures to reduce CO₂ emissions from transport must be drawn up. This corresponds to the relationships between the dimensions of the crisis: the natural conditions created by transport are regulated by society. Nature reflects this regulation back into society along the lines of its own laws. The criteria of environmental sustainability are therefore reflected in the criteria of social sustainability. A climate policy regulation which orients itself along abstract reduction targets, makes these absolute values the central orientation of politics and then seeks that social conditions be adjusted to it isolates these two dimensions of sustainability. IG Metall sees the socio-political dimensions of its task in shaping change in industrial production, transport and mobility as occurring naturally in alignment with those who have to live with the results of these conditions – and with a decidedly international perspective.

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All links were checked on 7 August 2019.