Energy Research & Social Science 115 (2024) 103649

Contents lists available at ScienceDirect

Energy Research & Social Science

journal homepage: www.elsevier.com/locate/erss

Original research article

# Driving towards a just transition? The case of the European car industry

John Szabó [a,b,c,*], Peter Newell [d]

[a] Centre for Economic and Regional Studies, HUN-REN, Tóth Kálmán street 4, 1097 Budapest, Hungary
[b] British Academy Visiting Scholar, Department of Social and Political Sciences, Brunel University London, Kingston Ln, London, Uxbridge UB8 3PH, UK
[c] Department of International Relations and European Studies, Faculty of Social Sciences, Eötvös Loránd University, Pázmány Péter sétány 1/A, 1117 Budapest, Hungary
[d] Department of International Relations, University of Sussex, Brighton BN1 9SN, UK

ARTICLE INFO

*Keywords:*
Just transition
Automotive industry
Value chains
World-systems theory
Semi-periphery
Electric vehicles

ABSTRACT

Actors within the European Union are seeking to pursue a just transition in their shift to a low carbon energy system, but their ability to do this often conflicts with relations of power embedded in the geographical distribution of global capitalist production. This paper explores the shift from manufacturing internal combustion engine vehicles to electric vehicles in Europe and highlights how, despite attempts to address justice issues in this transition, it reproduces regional and social inequalities. We seek to explain this by drawing on literature on global production networks and world-systems theory to show how pre-existing inequalities between key actors are often deepened, as high value added processes are retained in the so-called 'core' countries while the 'semi-periphery' states of Europe are forced to compete against one-another to maintain the economic growth and employment that underpins their legitimacy. Although a just transition implies attention to procedural, distributive, and restorative aspects of justice, this paper shows how difficult it is to address each of these dimensions in practice through the case of the European automotive sector and relations between manufacturers in Germany and Central and Eastern Europe in particular.

## 1. Introduction

Climate policies and market forces are driving technological change in the global automotive sector as manufacturers transition from producing vehicles with internal combustion engines (ICE) to electric vehicles (EVs). To support this transition, a host of European actors including the European Union (EU) [1] introduced decarbonisation policies to deliver a "just transition" [2] to address the labour-related implications of the transition in particular. The transition from ICE vehicles to EVs disrupts supply chains and forces all actors – including original equipment manufacturers (OEM), their suppliers, governments, and labour unions – to adapt. A change of such magnitude poses an immense challenge to the EU's automotive sector which employs 6.1 % of the workforce and whose turnover accounts for more than 7 % of GDP [3]. Policymakers face the challenge of maintaining the competitiveness of European firms and domestic employment levels, while corporations look to sustain or grow their accumulation of capital. Companies plan to retain more technologically complex processes in Western Europe – particularly Germany – while outsourcing lower value tasks to Eastern Central and Eastern Europe – including Hungary, Poland, and Slovakia. The labour-related implications of the transition, however, remain insufficiently understood [4].

In discussions about the need for just transitions, both implicit and explicit assumptions are often made that pathways can be found which leave no one behind. These are presumed to include and ultimately benefit short-term losers from the economic and technological restructuring necessary to decarbonise economies. Taking the case of the European car industry, we explore some of the contradictions and limits of this approach to just transitions where, in a context of a highly integrated global capitalist economy, transition risks alongside socio-economic and environmental costs tend to be passed on to the periphery and semi-periphery of the world economy in efforts to reduce costs and increase profits. Hence, through spatial fixes and practices of displacement, existing class and regional inequalities are entrenched rather than redressed, despite aspirations to ensure transitions are informed by justice principles. This challenges the notion that all actors benefit equally from 'just transitions' because winners and losers from transitions are structurally related since new accumulation strategies are premised upon the exploitation of existing social and economic inequalities. Recognising this has important implications for both academic and policy discussions on just transitions once gains and losses from transitions are understood as relational while questions of

* Corresponding author at: Centre for Economic and Regional Studies, HUN-REN, Tóth Kálmán street 4, 1097 Budapest, Hungary.
*E-mail addresses:* szabo.john@krtk.hu (J. Szabó), P.J.Newell@sussex.ac.uk (P. Newell).

https://doi.org/10.1016/j.erss.2024.103649
Received 5 December 2023; Received in revised form 29 May 2024; Accepted 13 June 2024
Available online 9 July 2024

proactive redistribution are placed more centrally.

At a policy [5,6] and theoretical level, what a just transition entails has been much discussed [7–9]. However, empirical work on the structural constraints encountered in the practical pursuit of such transitions is lacking. Here, we explore how the concept of justice relates to industrial transitions and changes in manufacturing that span national borders. The growing literature on just transitions focuses either on general conceptualisations of justice dimensions [10–12] or specific country and sectoral studies with a strong bias towards the energy sector and transitions away from coal in particular [13,14]. We contribute to these debates by offering a novel empirical case study of an attempted just transition in the automotive sector. A handful of studies have focussed on this area, but tend to be policy and action oriented and have not yet been embedded in explanatory frameworks [15–17]. We also explore the dynamics of a just transition within one advanced industrialised region (Europe) rather than exploring, as existing literature does, the production of such injustices in poorer countries by richer ones [18,19]. Conceptually, by focusing on the inter-regional political economy of transition, our analysis contributes to an emerging strand of work on the (global) political economy of transitions [20,21]. In so doing the paper underscores the importance of the international relations of transitions: their interplay across space and time between states and across supply-chains and the ways in which the dynamics of transitions are deeply woven into the broader social and political dynamics of contemporary capitalism [22].

To make sense of the political economy of just transitions in the European car industry, we situate our analysis in relation to work on just transitions and the broader body of work on the political economy socio-technical transitions [8]. To contribute to those literatures, we draw on world systems theory to make sense of regional dynamics between core and periphery in Europe's car industry transition [23], a strand of scholarship that has been neglected in transition studies to date. Rather than this being a strictly inter-state affair, however, we show it is affected by inequities and power dynamics in production networks, making use of literature on global production networks to understand their implications for the pursuit of just transitions [24–26]. This helps us show how the transition may perpetuate inequalities even within an advanced economic bloc such as the EU, and despite the proclaimed commitments to pursue a just transition.

The empirical case study draws on the findings of the Europäische Klimaschutzinitiative-backed (EUKI) Just Transition in the European Car Industry Project – executed between 2020 and 2022. This focused on Croatia, Czechia, Germany, Hungary, Poland, and Slovakia, countries that are extremely dependent on their respective automotive sectors and are deeply affected by the transition towards a new model of automobility. Data was gathered by analysing strategic documents published by relevant actors, followed by a set of interviews ranging from 5 to 15 per country, and concluded with a co-creation workshop with the participation of researchers and experts during the spring of 2022. The following analysis is informed by research on national contexts but focuses on relations between national markets: the interdependencies and inequalities which underpin new competitive strategies.

Following this brief introduction, the paper continues with a discussion on the concept of a just transition and its structural limitations. In Section 3, we then briefly sketch the global and European context of the transition in this sector after which Section 4 introduces the strategies of key stakeholder groups towards the unfolding transition: governments, private actors, and trade unions – to show the limitations of a just transition. We explore in turn: communication and dialogue as a proxy for procedural justice, reskilling as a means to address distributional justice, and diversification as a vehicle for delivering restorative justice. Based on this, Section 5 draws out key conclusions.

## 2. Understanding just transitions

Just transitions seek to ameliorate the social and economic impacts of the global transitions that are essential to building an equitable low-carbon economy in the coming decades. The concept of a just transition has gained widespread traction in political, policy and academic discourse [27], but originates from global trade unions in the 1980s which popularised the term to underscore that creating green jobs is central to phasing out fossil fuels and thereby the jobs they provide [28]. Fears about job losses that accompanied the phasing out of fossil fuels led many labour movements to obstruct attempts to shift to a greener economy, entrenching an environment-jobs binary [29,30]. Policy-makers seek to reconcile this by pursuing a transition to a low carbon economy in a just manner.

The International Panel on Climate Change's most recent Sixth Assessment Report notes that a "just transition framework refers to a set of principles, processes and practices aimed at ensuring that no people, workers, places sectors, countries or regions are left behind in the move from a high-carbon to a low-carbon economy" [31]. Political economy analysis of transitions points, however, to the ways in which relations of power and patterns of governance skew outcomes towards some actors over others and how the inequities and exclusions intrinsic to capitalist development get replayed through sustainability transitions complicating the aspiration to 'leave no one behind' [22,32]. This is clear, for example, in the approach adopted in the recent wave of Just Energy Transition Partnerships (JETPs) which the EU and others have signed with countries as diverse as South Africa, Indonesia, Vietnam, and Senegal. These have focused on de-risking private capital, weak consultation with labour unions and civil society organisations compared with business organisations, and placed an emphasis on neoliberal reforms (such as power sector reform and privatisation) at the expense of expanding sustainable energy access for all[1] [33].

The EU's approach to the green transition broadly [31], and the automotive sector's transition specifically, is ostensibly aimed at pursuing a "just transition" [34]. This dovetails on the Paris Agreement, which affirms "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities" [35]. It has also made its way into transition-related ambitions of the EU, ranging from the European Green Deal to the Fit-for-55 Package and REPower EU [36]. EU member states have incorporated this vague formulation into policy objectives and, accordingly, have called for a comprehensive cross-sectoral framework to ensure a just transition to a socio-ecologically sustainable society. Its imprecise definition, however, runs the risk of it being "hollowed-out and over-stretched" [14] as well as coopted by incumbent actors seeking to delay transitions. This suggests a gap between rhetorical commitments to a just transition and emergent practices in pursuit of those aims which we show below.

To understand the specific justice dimensions pertinent to our case study, we draw on McCauley and Heffron's [11], taxonomy of the pillars of a just transition to interpret the strategies actors deploy towards a just transition in Europe's automotive sector. In common with other scholars of just transition [7–9]_they suggest that a just transition is composed of distributional, procedural, and restorative justice. Distributional justice addresses how risks and responsibilities are distributed within and among societies. Climate change produces a "double inequality" [37], whereby those least responsible for the effects of climate change may face the most dire consequences. Blue collared workers with low wages susceptible to losing their jobs face this form of inequality and have less ability to retrain or move between sectors. Procedural justice focuses on the means by which impacted actors voice their concerns and articulate injustices affecting them. Often centering on particular sites and questions of social acceptance, it has come to include supply chains and entire systems that are affected by the transition, where the majority of the literature to date has focused on the energy sector [38–41]. Finally,

[1] Participation in a seminar on JETPS and their alternatives hosted by UNRISD 11th July 2023.

restorative justice focuses on compensating past extraction and mitigating harm that had already been caused [27,42]. We explore each of these dimensions in relation to the European car industry to show how a just transition materializes in practice and to identify what forms of spatial inequalities they reproduce or help overcome.

Hence while policy papers have begun to underscore the importance of addressing how injustices may be reproduced by the transition away from fossil fuels [43,44], there are few theory infused, empirically informed analyses of the production of those injustices in practice, less so still in the transport sector [45,46]. Hence despite normative proclamations of what a "spatially just" [47] transition might look like, actors are often confined by the context and underlying political economics in which they are situated. What is lacking from many discussions of just transitions is a deeper analysis on the way in which they are produced in uneven ways across spaces and scales in the global economy reflective of shifts in the global economy around outsourcing and offshoring of manufacturing and shifting divisions of international labour [48,49]. Scholarship focused on commodity chains and their governance, however, serves to highlight "the unequal distribution of rewards among the various activities that constitute the single overarching division of labor defining and bounding the world economy" [50], which has become the basis of closely related research on global value chains (GVC) (see: [51,52]) and global production networks (GPN) [53] that tackle the economic geography of production.

We suggest that questions of how, where and by whom value is captured in supply-chains – reflective of changing relations between capital, the state and labour amid processes of restructuring associated with transitions – might be usefully informed by scholarship on production networks and their governance. This shows how unequal power between buyers and suppliers distributes costs on terms governed centrally by "lead firms" [54], a key facet of which is their ability to wield various forms of power to shape labour relations between themselves and other actors in their favour [55]. Prompted by the ambition to more precisely define and account for multi-directional and multi-sited global production networks than is captured in the more linear notion of a chain, the GPN approach expands the scope of actors scrutinised to explore and theorise how "network configuration (and associated power relations) shape localised territorial outcomes" [53]. This helps expand the scope of actors taken into account when identifying causal relations in the reproduction of spatial inequalities [24].

Coe and Yeung propose that GPN 2.0 – a new iteration of the GPN that emerged at the turn of the millennium – provides causal explanations in global production network configurations and uneven territorial outcomes [56]. This research agenda is based on four pillars: (1) defining and delimiting global production networks, (2) theorising underlying political economic forces shaping global production networks, (3) a focus on actors' strategies, and (4) understanding the development and dependency outcomes that are included in producing networks [53]. This helps to expand the focus of GPN from corporate governance and lead firms to more thoroughly include other key actors, such as the state [57] and labour unions [58], and consider how these are embedded in a broader capitalist system. This helps to ground an understanding of transitions in the relative power of those governing the transition and the form global production networks take.

The GVC literature's five typologies of governance – market, modular, relational, captive, and hierarchy [25] – usefully conceptualise relations between key actors in such networks. Dependence on buyers deepens from market to hierarchical forms of governance, with the case of the automotive sector having been identified as moving towards relational forms of governance that rely on sharing uncodified knowledge [59]. Research also shows that lead firms in the automotive sector have moved towards captive forms of governance in GPNs, forming asymmetrical power relations with suppliers and "[t]o retain their competitiveness, lead firms can either establish inter-firm partnerships with strategic partners or externalize risk by outsourcing production to external suppliers to keep control of the production processes and the quality of the products/services through inter-firm control" [60].

We suggest that the analysis of the spatial and temporal dimensions of these production networks benefits from being placed in a context of a global economy characterised by relations between the core and periphery and the inequalities in exchange and relations of power that this implies. That is, conceptions and taxonomies of power in global production networks and their relation to a just transition are better explained when situating them within the workings of global capitalism [22,61]. For Wallerstein [62], it is the co-existence of a singular world economy and a political system divided into competing nation states which allows powerful actors, such as capital, to play states off against one another to benefit from uneven exchange between unequal regions. He notes, "[c]apitalists need a large market, but they also need a multiplicity of states so that they can gain the advantages of working with states but also can circumvent states hostile to their interests in favour of states friendly to their interests" [62]. This leads him to propose a taxonomy of states based on the transnational division a labour and identify core, semi-periphery, and periphery countries as constitutive of a world system. In this, core countries host high-skill, capital-intensive industries and production processes, while the periphery features low-skill, labour-intensive industries that heavily rely on the extraction of raw material supplied to the core. The semi-periphery is wedged between the two poles. Capital, in its pursuit of maximising accumulation, establishes production networks where specific countries and their respective industries have taken on roles which are premised on the asymmetric power of lead firms and their suppliers, typically in the core vis-à-vis other actors [63,64].

Shifts are taking place in the automotive sector as the decarbonisation-led technological transition unfolds and competition intensifies, particularly in the face of competition from China. Harvey's [65] idea of "spatial fixes" usefully accounts for the way in which leading capitalists pass on the costs of economic adjustment to poorer regions and classes within states in the face of such competitive pressures. Lead firms may undertake technologically-intensive production in their core countries (i.e. reshoring [66]), but simultaneously force actors lower down the value chain or more weakly located within global production networks to accommodate new technological requirements [67], forcing them to engage in a race-to-the-bottom to attract new investment, the benefits of which are not evenly shared along the supply chain. These dynamics are observable in the EU's automotive sector where the relative technological sophistication, bargaining positions, ability to innovate both within the core and the semi-periphery are in flux [68–71].

This is not to a static picture, therefore. The role of states is not fixed in a world-system or by global production networks [72,73], and the green transition offers an opening for actors to reposition themselves in global production networks [74]. Indeed, as critiques of the world-system theory have highlighted, "one of its principal weaknesses has been its relative inattention to the spatial dynamics of unequal surplus distribution beyond the macro-categories of core, semi-periphery and periphery" [75]. Thus, these categories are fluid rather than static as are the positions of states within them. A prime example is the wholesale reconfiguration of the automotive sector, where China, which had been classified as a periphery country, was able to establish firms and develop technologies that have enabled it to challenge what were understood to be core countries, such as Germany [76,77]. Hence global production networks present actors with the opportunity to reposition themselves and deploy strategies to maintain their ability to capture value reflecting dominant capitalist logics of competition and value concentration.

In the context of just transitions, such strategies help reconcile the tension between accumulation and legitimation [78] whereby social pressure builds to transform a sector (in this case cars) for environmental reasons and commercial survival means adapting production to new social expectations and regulatory requirements. But accumulation imperatives need to be satisfied by core economies, lead firms and their shareholders, mainly through passing on costs and securing labour gains

in semi-periphery regions of Central and Eastern Europe. Analysis such as this usefully highlights some of the limits of liberal 'win-win' understandings of the possibilities of just transitions in deeply unequal economies characterised by widespread social injustices. As Wallerstein puts it, "the framework of the capitalist world-system limits critically the possibilities of transformation of the reward system within it since the disparity of reward is the fundamental motivating force of the operation of the system as it is constructed. To be very concrete, it is not possible theoretically for all states to develop simultaneously. The so-called 'widening gap' is not an anomaly but a continuing basic mechanism of the operation of the world economy" [79]. The notion of a just transition holds out the promise of closing this "widening gap" in a way that benefits all actors, leaving no one behind, but we show here how difficult that is to achieve in practice based on the global automotive sector's decarbonisation and transition strategies to date.

## 3. The European car industry in a dynamic global economy

Western European capital in the automotive sector is enmeshed in a global web of competition. This has been the case historically as a number of automotive 'poles' formed worldwide. European, Japanese, South Korean, and US firms have dominated the sector until relatively recently when the rise of Chinese manufacturers began to reconfigure the way in which production networks are structured and oriented [80,81]. The importance of this sector to strategic state goals has effectively fused national and corporate interests. Such interlinkages are made explicit by governments (local or national) becoming shareholders (e.g. Volkswagen) or in decisions such as that of the Obama administration to bail-out General Motors in 2009. The state's involvement with the automotive sector is not only a reflection of capital's propensity to use the state to shape regulations and the broader political-legal framework according to its needs and preferences, but also the state's reliance on the sector to underpin its legitimacy by ensuring economic growth and jobs [82,83]. This equips automotive firms with tremendous power in shaping the state's actions through lobbying [84] and also structurally, while the state needs to closely monitor the labour policies of these firms and develop strategies that maintain employment to ensure its continued legitimacy.

Providing jobs hinges on the growth of these firms, and OEMs established supply chains that effectively span the globe to meet the demand for individualised internal combustion engine (ICE)-propelled cars [80]. Those headquartered in Europe came to heavily rely on assembly lines in former Eastern bloc countries ('economies in transition') that joined the EU during the Eastern Enlargement in the 2000s. OEMs initially took a "limited high road" [69] approach to expanding their value chains, through which Western companies shifted some low-skill work to the CEE that offered wage benefits while providing the technological know-how to execute outsourced production processes [85–87]. In this role, they reflect what world-systems theory scholars refer to as the semi-periphery [88]. Rather than providing the raw resources which the 'core' extracts from the 'periphery', they offer a space where more advanced processes – such as assembling vehicles or vehicle components – can be done at a lower cost than in core regions. In addition, the close proximity and these countries' access to the single EU market make them a convenient location from whence production can be sourced to boost output in a competitive manner. All-the-while, lead companies (overwhelmingly OEMs and top suppliers) continue to largely keep their highest value-added activities at 'home' i.e. the countries of their origin.

The global climate crisis and ensuing shifts of policy have reshaped markets and reconfigured the automotive sector, rupturing existing models of production [60]. This shift does not necessarily entail the wholesale reconfiguration of the automotive sector by rethinking transportation [89], but rather a technological shift through which capital seeks to align climate action and capital accumulation by introducing vehicles with zero tailpipe emissions. This is consistent with a 'plug and play' approach to transitions which emphasises incremental changes to production, technological change and shifts in energy sources, without attempts to disrupt systems of provisioning (in this case auto-mobility) or incumbent power relations [90]. In addition, it enhances the social legitimacy of both companies and the state by contributing to climate action.

Nevertheless, technological change of this magnitude has the potential to rupture the dominance of traditionally large ('lead') firms and enables new entrants to enter the market [91]. This allows for the emergence of new production networks where power relations are fundamentally reconfigured and governance restructured as with the transition to EVs. Chinese firms, for instance, responded to the market opportunity and were first movers [92]. The US followed with Tesla, which offered a niche luxury product [93], while other large manufacturers (e.g. Ford, GM, etc.) followed suit. European manufacturers' entry into this competition was delayed with the exception of some minor product lines (e.g. BMW's initial i-series) [94], and European states with a major stake, such as Germany, also failed to intervene and promote technological change in a timely manner [95]. The fundamental shift on global markets through control over forward looking technology has forced German companies to respond quickly to maintain their competitiveness by adapting to change while seeking to maintain employment levels.

## 4. A just transition in a changing automotive sector?

The emergence of a "niche" technology of electric vehicles has provided impetus for unprecedented change in the dominant "regime" [74,96], forcing all actors to realign their strategies. Global competition in the automotive sector, especially in China, is pushing European manufacturers to roll-out EVs, further supported by EU policy [1]. This not only affects OEMs, but a host of actors involved in the automotive production network spanning Europe and beyond. Our case is based on German OEMs, which established a strong presence in semi-peripheral countries such as Czechia, Hungary, Poland, Romania, and Slovakia [97]. This has led both foreign companies and domestic enterprises to embrace the opportunity and specialise in meeting the demands of the emerging production networks. The formation of such networks was enabled by generous subsidies and accommodating policy from governments that sought to attract investment. Finally, labour unions were established to represent the interests of workers, which alongside the private and state interests, formed part of a landscape of changing relations.

The shift to EVs will reconfigure the respective roles of OEMs, suppliers (domestic and foreign), the state, and labour unions. Interviewees were unanimous in anticipating change; albeit the pace at which this would occur was contested. An expert in Slovakia noted that "[i]n our view on what is happening in Europe, it is difficult for the car producers to adapt on the changes required. The fuel engine has been developing for 100 years and now we want to switch to electromobility in 9 years" [98]. This sentiment was echoed by a number of interviewees, many of which were affiliated with labour unions. However, policy, market forces, and expected trajectories speak to the contrary: EVs' role is booming and this is widely expected to continue going forward [99]. Opinions, however, diverge over whether this will unfold in a just manner, leading us to discuss whether and how the procedural, restorative, and distributional justice materialise in practice. Drawing on McCauley and Heffron's framework we show how (1) distributional, (2) procedural and (3) restorative justice are addressed in the automotive sector [11].

## 5. Procedural justice: dialogue driving change

The main pillar of procedural justice in the automotive sector's transition is communication. Actors leading the transition of the automotive sector – OEMs, suppliers, and governments – discussed the

transition, but information on long-term strategy and its implications does not trickle down from lead firms in a way which allows other firms to adapt. One underlying reason is that the companies' markets are squeezed by newly emerging and traditional competitors. There was evidence of dialogue between companies, German state officials, and unions on the transition in the automotive sector, but this was typically confined to the core country. German state initiatives were especially prominent in supporting communication with stakeholders overwhelmingly within their own borders. Policymakers supported the development of exchange forums, including strategic dialogues between policymakers, industry representatives from diverse backgrounds (not only large OEMs), and union leaders. The approach partially reflects a strong tradition of tripartite bargaining common to more coordinated market economies [100]. The stance of the state and unions were important, and formative in the governance of production networks, but their relative weight tended to be overshadowed by OEM executives.

Though, in principle, a just transition calls for inclusive dialogue, the representatives of the semi-periphery were limited or entirely absent from the discussions held in Germany. Most interviewees suggested that the chain-of-command is effectively unidirectional down the value chain – reflective of a captive form of GVC governance. One expert's remark captured this, when they commented that "entrepreneurial strategies evolve from the multi-national corporation strategies decided in the home country" [98], which then shapes the activities of those down the supply chain with little-to-no room for feedback. The subsidiaries of OEM's have the greatest oversight of their headquarters' strategies, which allows them to optimise manufacturing processes. However, their outlooks are quite limited. Audi's subsidiary, for example, in Győr, Hungary is only able to plan 1–3 years ahead, as noted by an executive [101]. The lack of communication has a destabilising effect on planning, as those further down the supply-chain are restricted in their ability to plan their activities to anticipate changes brought about by the transition. Thus, the interdependencies may be strong in both directions, but are clearly asymmetrical.

Executives of OEMs and their subsidiaries suggested that they communicate with their suppliers, governments, and labour unions in semi-periphery countries. Yet semi-periphery "[u]nion leaders and other executives all noted that to develop production and labour strategies they need sufficient insight into the technological trends and trajectories OEMs are pursuing" [101], to which they currently do not have access. Thus, even if OEM executives communicate, it does not offer adequate guidance to other actors to constitute a meaningful form of participation in the governance of production networks. The powers embedded in this structure do not allow for these actors to force OEMs to communicate in a better manner, as the influence of capital far overshadows the ability of labour and the state to force specific communication and action around transition planning. At best, as we show below, actors involved in production networks gain only a superficial understanding on how they should diversify their activities in the near term based on the discussions dominated by OEMs, turning what could be a dialogue into a monologue.

Where dialogue is ongoing between various stakeholders, such as Hungary or Slovakia, this tends to be limited to OEM headquarters and their home governments alongside OEM subsidiaries and their respective governments. The voices of suppliers and labour unions are largely ignored, limiting their ability to influence courses of action. Labour unions in the countries assessed tended to be understaffed and overwhelmingly focused on day-to-day issues, such as ensuring that their members receive fair(er) wages. But they had limited capacity to develop forward looking strategies and remarked that governments largely ignore their positions. Semi-periphery governments introduce policy after consulting OEMs, leading suppliers, and the core country's government, forcing other actors to pursue reactive strategies as opposed to their positions being reflected in the governance of the transition. Our findings suggest that even in cases where there is dialogue, the influence of this is quite limited, as these are continuously overruled by OEM's having to respond to a changing global market and forcing those involved in respective global production networks to pursue a "race to the bottom" to maintain their respective positions.

In some cases, dialogue effectively does not exist in either direction, for which the state tends to be blamed. In Poland, "[t]he most important problem […] is the lack of dialogue between the public administration and the automotive industry" [102]. External actors tend to be the drivers of change, while the government has been slow to respond and develop a platform for communication that could inform its strategy and underpin its involvement in the governance of the transition. Meanwhile, labour's relative influence has been quite limited, given its weak position. Similarly in Czechia, an expert noted that "[employers] care about the business, and unions care about people. Well, the third player [the government] in the tripartite dialogue is missing because he is asleep" [103]. Here too, the state has been wedged between its ambition to enable growing production pursued by capital while maintaining employment levels. But its lack of coherent strategy and the speed of change in international markets has curtailed its ability to take effective action. Although the Czech state is seemingly absent from governing change, involvement in pursuing procedural justice differs to other cases, because "Škoda still has more autonomy" [103]. The company's long-standing history as an automotive brand even when it was merged into the Volkswagen Group allows for a relatively more influential role in governing the transition which can also draw on the powers of the state given the longstanding entrenchment of the state-capital nexus. This historical lineage and the existence of its own-brand precipitates its participation in the governance of its respective production chain. But its ability to influence outcomes is still limited as it now shares technology, models and platforms with its parent company. Communication is heralded as necessary by all parties for a successful transition and a key aspect of procedural justice, but in practice, strong asymmetries along the private-public and the core-semi-periphery divides frustrate its realisation and entrenches prevalent inequalities.

### 5.1. *Distributional justice: re-skilling*

All major actors suggested that reskilling was central to the strategies with which they intend to respond to the imperatives of a just transition. Reskilling falls within the realm of distributional justice through its central role in paving a transition pathway that allocates goods and resources by decreasing the risk of job losses. Many employees will have to be reskilled as the requirements of building an EV versus an ICE-propelled vehicle are different, with the former often less labour but more capital- and technology-intensive. This not only poses a challenge for the employees at risk, but it also hinders the ability of enterprises to maintain output. Companies have adopted strategies to overcome the skills gap by developing educational programmes. These tend to focus on the current needs of companies (largely ICE vehicles), because the CEE's labour market was considered "tight" meaning that supply fell somewhat short of demand. Securing and retaining employees was a challenge in a number of regions, leading companies to cast a wide net when recruiting. Assisted by governments, they have all begun to attract labour from extra-EU territories, such as Ukraine and the Philippines where more surplus low-wage labour is available. Current shortages pit neighbouring countries against one-another, given their proximity and the mobility of labour within the EU, which, even if the number of available jobs declines due to the lower labour-intensity of EV manufacturing and automation, will continue for the highly-skilled, well-educated workers.

Companies, governments, and unions began to support re-skilling in anticipation of the change in technologies. Historically, states provided education, but their inability to run programmes that cater to the rapidly changing needs of industry has led companies to become increasingly involved with developing and running these. Major OEMs established working relations with local schools and universities, such as Audi's in Győr, Hungary or Škoda's in Mladá Boleslav, Czechia or VW in

Bratislava, Slovakia. Companies also began to support secondary educational programmes in Germany to ensure necessary labour supply in forthcoming years as a shortage of skilled labour is of increasing concern. There is a risk that if educational programmes do not adapt quickly enough, then tensions may arise between the core and semi-periphery countries, as the former may continue to lure educated employees from the CEE. Nonetheless, through the involvement of companies in education has substantially increased, this is not driven by their ambition to ensure distributional justice. It relates to their need for well-trained labour that can sustain production in the future. They may deploy rhetoric that underscores the importance of re-educating workers to ensure a just transition, but the driver of their involvement is competitiveness.

A divide between large and small corporations is apparent in their uneven ability to meet future labour demand. Discussions tend to emphasise that OEMs and all tiers of suppliers should be equally involved in developing the trajectory of the transition and their employees should be reskilled. But divides between foreign-owned OEMs and large suppliers (both foreign and domestic) vis-à-vis small, overwhelmingly domestically-owned suppliers are clear. Their respective roles in governing the transition deeply favour the former, despite many CEE companies playing focal roles in production processes. An interviewee from Slovakia illustrated this, when making the remark that OEMs have the resources to (re)educate those that they will absorb into their workforce, but those further down the value chain can not necessarily do so. And, even if they did have the resources, they do not entirely understand what expectations and demands of their largest buyers (i.e. lead firms) are for the future. SME executives have difficulty deciding where to invest to ensure their continued competitiveness and, thereby, their ability to reduce the risks of having to lay-off workers. Interviewees were unequivocal in their position that this segment was at greatest risk, reflecting the captive forms of governance emerging within the sector-at-large.

Labour unions are also involved in lobbying the government and companies to support re-skilling to maintain jobs while they have also launched their own programmes in an attempt to secure distributional justice. German unions have been deeply involved with questions of job losses and future employment requirements for years. Major unions, such as IG Metal, have pressured governments to develop long-term forward-looking strategies that emphasise re-skilling and education. Its push for a just transition is also much more pronounced, given its political influence and resources. Similarly, Czech, Hungarian, and Croatian unions supported the development of programmes that were tailored to the changing needs of industry, but their limited capacities and power led them to focus on day-to-day activities and expanding their base. An interviewee raised concerns that "[t]he EU will give the deadline […] And they [EU policy-makers] will launch it [the transition] quickly, and it [unions] will not be sufficiently prepared at all" [103], but some are looking to take pre-emptive and preparatory action. The same interviewee suggested that "[w]e need to proactively try to inspire the management in some way right now, so that the employees are already starting to educate, requalify and so on" [103]. Yet there are few illusions that these will emerge given the terms companies have set thus far.

Unions are also developing their own (re)education programmes to mitigate distributional risks. A leader in Croatia remarked that they were effectively becoming "learning organisations" where they undertake the "long-term education of the employees" [34]. Re-skilling was a clear priority in all countries investigated as part of this project. They emphasised the need for the state to play a more prominent role in this process, given the risks to which employees throughout production networks are exposed. Governments have increased their re-skilling activities in an attempt to underpin their legitimacy, but also in support of attracting further investments (see below). Preferred courses of action are, however, not always clear, leading to disputes over strategy (Poland) and over which actors should fund re-skilling (Slovakia). The distributional component is thus at the centre of the transition, and, while larger actors are better-positioned to provide employees with necessary skills, government and union leaders, all suggested that companies lower down the supply-chain and their employees are most at risk. Although, they are taking pre-emptive action, the scale and effect of these measures is generally not perceived to be proportionate to the disruption created by the transition.

### 5.2. *Restorative justice through diversification*

Most actors responded to the transition by diversifying their activities. With this, they seek to offset the distributional impacts of the transition to less labour-intensive EVs, which can allow core countries to re-shore technologically complex and highly automated production processes or for newly emerging production hubs – most prominently China – to establish new networks. CEE companies and governments continue to seek to increase the value added by their domestic industry, allowing for more dynamic growth and ensuring higher paying jobs. Governments have introduced a plethora of programmes to support innovation with some success, but the overwhelming majority of high value-added processes are retained in the core (Germany) or remain closely guarded in the case of new entrants which are largely Asian firms. Regional success stories, such as Rimac – a tiny company developing highly complex battery management technologies in addition to entire sports cars – in Croatia exist, but they are the exception to the rule. Most interviewees anticipated that the divide between countries' role in technology-intensive processes will deepen, as German companies re-shore and new entrants retain such processes in their home countries.

German OEMs and their largest suppliers are pressured by local and federal politics to maintain domestic employment in their pursuit of balancing their support for capital accumulation and legitimacy among voters. As an interviewee suggested and others confirmed, "German OEMs have three options: (1) increase output, (2) involvement in non-impacted areas, or (3) deepen production" [101]. The latter refers to OEMs including what were activities undertaken by suppliers into their own portfolio (i.e. diversify), allowing them to maintain employment but at the expense of SMEs whose employees and market share they will capture. This produces hierarchical governance as discussed by the GPN literature, where companies manage activities through direct ownership and control, leading to a hierarchical command structure [104]. SMEs are effectively powerless against lead companies in the trajectory of the transition and the newly emerging forms of governance this entails, which limits their ability to retain employees and maintain their role in the production network. The structural changes in production networks pits actors against one-another, undermining ambitions of distributional and restorative aspects of a just transition, as the burden asymmetrically falls on smaller, CEE actors.

Governments have sought to diversify domestic economic activity with products and processes closely related to the automotive sector. Officials in Hungary have taken to reviving bus manufacturing, which has been coupled with a number of large-scale programmes to expand the production base, including the Jedlik Ányos Plan (e-mobility), the Hungarian National Battery Strategy (battery production and use), and the Zalazone test track (autonomous vehicle development). These endeavours both support Hungarian and foreign actors, as the government seeks to attract foreign direct investment and increase output in ways beyond the means of local companies alone. Czechia has turned to support bus, truck, and streetcar output, noting that it is in the national interest to ensure the future of Škoda; however, it is yet to articulate a clear strategy. The German government has supported SMEs with a plethora of programmes to facilitate their research, development, and innovation activities. In this case, companies drive diversification for which they receive ample support from the government at a scale that the CEE simply cannot afford. The odd one out in the region is Poland, which lacks a strategy, despite the need to rethink heavy-duty transportation manufacturing, among other areas. Government intervention

is not strategic and the high reliance on coal and thereby the emission intensity of the coal-based energy system further reduces its competitiveness as carbon pricing in the EU makes production more costly. Labour unions assist in these processes through their support for re-educating the labour force, but remain excluded from decisions driving these developments.

The CEE region sees battery manufacturing as the 'silver bullet' that offsets the negative distributional impacts of the transition and leads to a form of ersatz restorative justice. Czechia, Germany, Hungary, Poland, and Slovakia all embrace the industry to maintain economic growth. Foreign and domestic companies alike have begun to invest in lithium-ion battery production – an important component of EVs. This is a highly automated process requiring limited labour, while the skills are different to ICE vehicle production. Thus, most new employees need to be trained. Moreover, companies that provide the technology – overwhelmingly Chinese and South Korean firms – have closely guarded their innovations and production processes, limiting the value added in CEE countries to a minimum and retaining complex processes in their home countries. Consequently, CEE states and local companies establish new forms of technology and capital dependencies that further entrench their positions in the semi-periphery of global capitalism. The assumption of states and capital is that they will be able to expand production in this sector, allowing for continued economic growth, even if this may not entail (much) higher technological sophistication in the activities that domestic actors control and from which they capture value. In parallel, it underpins the legitimacy of their actions by offering new jobs that pay relatively well, even if the environmental and health hazards remain unaddressed [105]. Moreover, the power of labour is further curtailed as Asian firms' anti-union practices further undermine the unionisation in CEE countries.

On the semi-periphery, Hungary leads the CEE in terms of projects, welcoming major investments from South Korean Samsung to Chinese CTAL. The state has provided them with ample support, despite a number of a lingering questions, including the availability of labour, energy, and water to ensure production [106]. Poland fast-tracked the development of the sector and exports now make up 2 % of the country's total exports [102], indicating that the state may be lacking a clear strategy to ensure the survival of the automotive sector, but it is looking to offset losses by facilitating battery production in-line with capital's interests and with little regard to labour's needs. The Czech government also provides subsidies to new market entrants, the utility ČEZ, and has supported plans to launch lithium mining in the country. Finally, the battery industry has some momentum in Slovakia, but much more limited than the other cases, while it has largely remained absent in the case of Croatia. Thus, to a varying degree, governments have supported the battery industry given their pre-existing dependencies within production networks and in hope of maintaining economic growth and offsetting some of the adverse distributional effects of the transition by effectively compensating those that will be adversely impacted. In doing so, both companies and governments seek to establish themselves in newly forming EV production networks by housing an essential component of the final product, the battery. However, their lack of access to the underlying technology and limited ability to influence the actions of the providers of battery production technology and the buyers of the technology (e.g. OEMs or their suppliers) inhibits their ability to reposition themselves in production networks and capture a greater slice of the value created.

State and corporate action often ignores the health and environmental impacts of their activities, suggesting the environmental justice and justice for nature aspect of the transition has been neglected so far. The production of batteries is toxic and communities are protesting the construction of manufacturing plants in their vicinity (see e.g. [107]). Politicians tend to emphasise that these endeavours create jobs and increase well-being, but this rings hollow as protests have erupted from Pilsen, Czechia to Debrecen, Hungary. As communities are displaced, one may ask why policymakers and company executives are only paying lip service to the distributional and restorative aspects of the just transition to the detriment of labour and society-at-large. To make matters worse, the inputs for battery production have resulted in environmental conflicts in peripheries of the world economy, such as Africa and Latin America [19,108], underscoring the potentially socially and environmentally destructive processes this new 'green' form of capital accumulation may entail as it relies on spatial fixes and global economic inequalities to reproduce itself.

## 6. Conclusions

The European automotive sector has begun its transition from manufacturing ICE vehicles to EVs. The shift is disrupting the technological status quo and brings dramatic change to labour relations as a niche technology moves to the mainstream. As this happens, it reconfigures global production networks and forces companies, governments, and labour unions, among others, to introduce strategies to cope with the ensuing disruption. Despite proclaimed ambitions to harness the opportunity presented by this structural rupture and pursue a just transition, dominant patterns of uneven exchange and regional inequalities persist, while in some cases they are deepened. Corporations are pushing for re-skilling and educational programmes in addition to diversifying their product portfolios which can absorb those workers that may be affected by job losses. Governments have supported education programmes and introduced industrial policy aimed at capturing markets that they deem essential to the automotive sector's future, in particular battery production. Unions are responding with their limited capacities and attempting to channel resources into pushing for re-skilling programmes to mitigate job losses and generally improve the working conditions of their members. Strategies are thus taking shape, but there is vast contingency in outlooks as global competition and the sustainability of individualised mobility may force those governing the transition to rethink their respective roles and strategies more radically.

The success of a just transition within the EU will depend on the ability of those involved in the governance of the transition to address some of the tensions and contradictions we have highlighted here between promotion (of production) and protection (of workers and their environment) and the reality that accumulation strategies in the automotive (and many other) sectors rests on the exploitation of labour and resources in ways the just transition ostensibly seeks to prevent, producing a crisis of legitimation. The case of the automotive sector in Central and Eastern Europe, therefore, highlights some of the contradictions that pursuing a just transition in the current political economic paradigm entails. The various facets of a just transition are all evident in the case we explored, as distributional, procedural, and restorative justice. Yet the political economy of capitalist production in the sector are set to deepen the divide between the core and semi-periphery countries, despite efforts to redress some of the disruption caused by the transition away from ICE cars.

Core countries, Germany in our case, are already equipped with higher technological sophistication and thereby able to undertake higher value-added processes. The higher technology- and capital-intensity of EVs allows for the substitution of labour with capital. This pits companies in the supply chain against one-another as well as deepens the core-periphery divide through re-shoring on the back of innovation concentrated in the core, frustrating the ambitions of a more just and inclusive transition. The rise of China's automotive sector and its key role in auxiliary technologies (e.g. battery production) further disrupts relations. It generates competition with Western companies, while also adding new and reorienting existing global production networks. Semi-periphery countries seek to diversify their geoeconomic alliances and in a race-to-the-bottom look to attract investment and integrate into both – frequently overlapping (e.g. through the use of batteries in both German and Chinese vehicles) – production networks to address the negative distributional effects of economic growth and employment that may emerge from the ICE-to-EV transition.

Companies and states have emphasised the need for communication to achieve procedural justice (see Table 1). Here, however, we find that what information is shared and with whom varies widely. Dialogue has been stronger within Germany, where the state, OEMs, suppliers, and labour unions have all engaged with one-another to set the path for the transition within the confines of global competition. Their relative influence over outcomes is dominated by OEMs, but state-ownership of companies and the entrenched role of labour unions somewhat balances this. This underpins the legitimacy of their dominant capital accumulation strategy, but it is confined to national borders. Actors in the semi-periphery generally respond to strategy issued by the former as opposed to being able to wield influence over key decisions. Governments compete, underbidding one-another for new investment to the detriment of distributional justice. SMEs and labour unions have access to even less information on forward looking corporate strategies, limiting their ability to adapt to a changing environment and incorporate new strategic goals into their planning activities allowing for captive forms of governance to materialise. Actors are engaging in a zero-sum game on an uneven competitive playing field.

Most actors framed re-skilling as the central force in ensuring a just transition, but our findings indicate that this will not compensate for the distributional effects of the shift. The core continues to seek to capture most of the highest value-added processes with the state being able to channel support into research and innovation, while automation allows the core to capture some formerly labour-intensive activities. The semi-periphery has had to tackle a tight labour market, where employees need to be retrained to meet current needs. This already pits the governments and companies based in various countries against one-another, as they must continuously attract employees to meet the demands of capital. Companies need greater labour supply to meet the demand of lead firms, but they must also introduce reskilling to prepare for a shift to EV manufacturing. OEMs pursue growth, but leave entities in the semi-periphery to deal with labour shortages and reskilling, while dealing with the political consequences of changes – allowing for a spatial fix to materialise.

The overwhelming response from the semi-periphery has been to diversify activities, which is largely framed as the tool that can help obtain distributional and restorative justice during the transition. Governments have (re)started industries closely related to the automotive sector, which may bear fruit in the future. In addition, they have sought to invest in research and development, although these programmes have brought limited results in the past. For many states, a prominent course of action was to establish a battery industry, which offers ersatz restorative justice to those adversely impacted by the shift. Employment at battery manufacturing plants can offset some negative impacts, but semi-periphery countries are pitted against one-another, here too nullifying the ambition of a just transition that would allow all EU members to prosper. Instead, government strategies in the CEE region have been similar as they have engaged in fierce competition to lure new investors, now not only including those from the core in the “West”, but also newly established global production networks oriented to the “East”. Meanwhile, environmental harm and the dispossession of local communities in the semi-periphery undermines distributional justice and underscores the need for effective restorative justice.

**Table 1**
Facets of a just transition in common discourse and practice.

| | In common discourse | In practice |
|---|---|---|
| Procedural | Communication and dialogue | Private-public-union & core-semi-periphery divides |
| Distributional | Re-skilling | Long- vs. short-term focus<br>Race to capture high value added processes and attract labour |
| Distributional/ (restorative) | Diversification and higher added value | Sliding down the value chain<br>Environmental cost of battery production |

Source: Authors' compilation.

Overall, this analysis sheds light on the ways in which just transition strategies can be subverted, distorted and overwhelmed by the accumulation imperatives of incumbent and newly emerging actors, as well as the ways in which those involved in production networks respond to these tendencies. This suggests the need to start to redress power imbalances between regions as well as between capital and labour in future transition strategies. What the analysis also points to is the reliance of states on corporate actors to realise the ambitions of just transition programmes through their everyday production and investment practices and through production networks over which states often have limited direct control. Hence the state is somewhat de-centred in this story, such that the realisation of justice outcomes is largely shifted to private actors, whereas in broader transition debates the state is assumed to be the key arbiter and mediator of competing justice claims and across dimensions of procedural, distributional, recognition and restorative justice [109].

Conceptually, our account supports efforts to adapt insights from (global) political economy to transition debates [21] by emphasising the intimate links between power, production and governance [110]. In particular, it highlights the international relations of transitions: how the costs and benefits of transitions are unevenly distributed within and between states and across supply-chains and global production networks. The case of the automotive sector shows how transition pathways are strongly shaped by competing social forces and diverse relationships between states, capital and labour reflecting distinct positions within global circuits of production. This underscores the need to embed analysis of transitions within the broader political economies of which they are a part, regionally and globally, which both shape the nature of those transitions and constrain the scope for more progressive and transformational outcomes. In other words, notwithstanding commitments on the part of many European actors (and others) to a just transition, we see transitions in the automobile sector in Europe reflecting familiar dynamics between core and (semi-)periphery countries, around exploitation of labour and the environment and the concentration of value by lead actors and states. In particular, we highlighted the value of connecting scholarship on global production networks and their governance to broader analytical accounts such as world systems analysis which help to place particular transitions in a world historical context by helping to understand how the losses and gains central to just transitions are dispersed unevenly across spaces of the global economy. Future analysis would do well, therefore, to deepen analysis of the interplay of regional and global competitive dynamics in transitions amid shifting geopolitical relations, including how the global role of actors like the EU impacts the conduct and possibilities of a just transition in other parts of the world.

## CRediT authorship contribution statement

**John Szabó:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Peter Newell:** Writing – review & editing, Writing – original draft, Validation, Supervision, Formal analysis, Conceptualization.

## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: John Szabo reports financial support was provided by Europäische Klimaschutzinitiative-backed (EUKI). If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

The authors do not have permission to share data.

## Acknowledgements

We would like to kindly thank the constructive and thorough input of the reviewers. We would like to acknowledge and thank the funding from the European Climate Initiative (EUKI), which is a project financing instrument of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and was implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Finally, and most importantly, we would like to thank all of those involved with the Exchange Group: Just Transition in the European Car Industry project, namely: Tanja Brumbauer, Piotr Chrzanowski, András Deák, Nora Demitry, Mladen Domazet, Joanna Fabiszewska-Solares, Patrik Gažo, Gloria Koepke, Krzysztof Krawiec, Lucca Maixner, Monika Martišková, Sarah Mewes, Lea Mohnen, Nikolina Rajković, Thomas Smith, Andrea Szalavetz, Gábor Túry, Daniel Weiss, and everyone else that made this project possible.

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