Editorial

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For more than a decade, the advent of novel, digital technologies in manufacturing have been heralded as the next industrial revolution. As one of the principal manufacturing industries, the automotive industry has frequently been regarded as the spearhead of digitalisation. It is noteworthy that much of the public and academic discussion has shifted from keywords such as Industry 4.0 to digital transformation (hereafter: DX). This shift in vocabulary highlights that it is becoming increasingly clear that the usage of novel digital technologies is not just a question of technology, its adoption, and its capabilities, but that these technologies also require different approaches to organisational management (Kane et al., 2019), employee (re-)qualification (Rangraz and Pareto, 2021), and inter-firm collaboration (Gebhardt et al., 2022) to realise their inherent potential. Further, recent research interrogates the complexities, inconsistencies, and non-simultaneity of DX processes (Pfeiffer et al., 2024). In other words, socio-technical aspects of technology adoption and technology usage have garnered more managerial and scholarly attention.

This special issue of the *International Journal of Automotive Technology and Management* collects papers which explore and examine variations and complexities of the DX in the automotive industry. All contributions highlight that despite continuing discussions on 'disruptive' and 'inevitable' change, implying that DX must be pursued 'urgently' by firms, real-world digital transformations are by no means uniform in speed, technologies used, objectives pursued, or strategies implemented. Rather, all contributions highlight factors specific to nations, regions, firms, industrial relations, or constellations of these and other factors that shape DX trajectories.

The first article in this special issue, 'Spurring monopolies and fettering automation? Determinants of variations of output, employment and productivity in OECD automotive industries following the financial crisis' is written by Benjamin Ferschli, Miriam Rehm and Stella Zilian. Their paper interrogates the 'productivity paradox' found in manufacturing, which is decelerating labour productivity growth in parallel to increasing automation. Their analysis investigates both manufacturing and the automotive sector. The authors argue that recent claims of labour-productivity growth stagnation depend on

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a ‘parallax view’, meaning they are contingent on the chosen indicator, time frame and analysed sector. The authors further investigate labour productivity and automation in ‘core’ and ‘periphery’ countries and observe different effects, with the latter broadly exhibiting the labour-replacing effects of robots often conjectured in the literature, but the former seeing negative value-added effects due to their use. Overall, their careful analysis highlights complexities rather than brushing over them, calling for more research into an undoubtably important topic.

The second article, ‘Variegated digitalisation? Comparing digital trajectories in two I4.0 manufactures in Northern Italy’ is written by Sara Caria, Francesco Garibaldo and Matteo Rinaldini. They analyse two case studies of German-owned firms in Northern Italy, namely luxury sports car producer Lamborghini and Rittal RCS, a manufacturer specialising in temperature control solutions. Their analysis highlights shared characteristics such as German ownership as well as differences, including not just products but also different location and more importantly, the different industrial relations practiced at these two Northern Italian locations. Their first contribution is to show that these German-owned firms rather utilise the digital shadow than the digital twin, indicating that studies which mainly focus on the country of origin of firms as meaningful differentiators and determinants for particular digitalisation approaches are overlooking diverse digitalisation approaches within firms from the same country of origin. Their second contribution is to demonstrate that even identical DX trajectories can be rooted in differing rationales and processes. Hence, their careful case studies highlight that national ideal types put forward by varieties of digitalisation/varieties of digital capitalism must be paired with more nuanced analyses which account for multi-scalar, uneven, and variegated DX processes.

The third article, ‘Digitalisation from logistics to assembly lines: applications in the Portuguese automotive sector’ is written by António B. Moniz, Marta Candeias and Nuno Boavida. They utilise a multiple case study design to investigate firms representing the automotive sector of Portugal. The case study covers four vehicle assemblers and one first-tier supplier, thereby exploring firms with different production volumes and different powertrain mixes in production which hails from different countries of origin. Their analysis of the cases demonstrates that firms indeed follow different digitalisation approaches, including differing focuses of digital technology deployment as well as different approaches towards employee involvement as represented by works council consultation. Regarding the hotly-debated question of skill-biased technological change and technology-induced unemployment, their cases show that current workers are not replaced by advanced digital technologies, while firms simultaneously hire fewer new workers. They also find that most firms are engaging digitalisation more proactively in logistics than in production. While this tendency has been observed by previous literature, they contribute an additional causal factor, namely that multinational subsidiaries (in Portugal) have more autonomy to make decisions on technologies used in logistics than in production. Hence, headquarters-subsidiary relations should be considered when explaining different implementation speeds and patterns across countries.

The fourth and final article in the hard version of this special issue, ‘Digital transformation within the Brazilian automotive industry’ is written by Jorge Muniz Jr., Timothy P. Munyon, Anderson S. Costa and Vagner B. Ribeiro. The authors first present the conceptual ‘Social system for future manufacturing’ framework, which emphasises that DX in the manufacturing industry requires transformations on different levels,

namely societal, organisational, and people level. Then, the authors report results from a survey conducted among automotive managers in Brazil. Among the interesting findings of this survey, the commonly held managerial view that suppliers, customers, and alliance partners influence the success of DX more than competitors and government policy is remarkable as it strongly suggests that organisational factors play a key role in this transformation, not just technological and policy factors.

Last but not least, the fifth article is an open access paper (Vol. 25, No. 5) and is written by Lea Schneidemesser and is titled 'Between geoeconomic competition and local embeddedness – how Chinese investors influence digitalisation in acquired German manufacturing companies' (https://doi.org/10.1504/IJATM.2025.146922). She investigates the questions how digitalisation is implemented in German firms acquired by Chinese investors, and more specifically what influence these Chinese investors exert on the digitalisation strategy of the acquired firms. The investigation is conducted through multiple case studies of Chinese-owned manufacturing firms in Germany. Schneidemesser shows that across the cases, digitalisation efforts vary significantly, especially concerning the question if firms mainly engage in process digitalisation or if efforts extend towards digital business model development. Further, she shows that digitalisation processes have the potential to change the relationship between the Chinese owners and German subsidiaries. Schneidemesser's contribution is twofold: first, her case studies demonstrate that it is useful for the study of DX to move beyond the focus on process digitalisation, towards the exploration of digital business models and their linkage to process digitalisation. Second, she identifies three distinct modes of digital business model development, characterised by different interaction patterns by Chinese owners and their newly-acquired German subsidiaries.

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