Editorial

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The 2024 Gerpisa International Colloquium in Bordeaux focused on the so-called connected autonomous share electric (CASE) paradigm. Before the COVID-19 pandemic, the global automotive industry seemed on the verge of converging toward the CASE paradigm promoted by GAFAM, Silicon Valley and digital companies: four disruptive technological changes joining forces to radically transform the automotive sector.

The hegemony of OEMs over products, markets, value and technology appeared to be in danger. It was contested by digital companies entering the automotive sector and taking control of:

- the data generated by connected vehicles and connected machines and factories (Google and Amazon)

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- the software and technologies required to drive autonomous vehicles (Waymo, Uber, Tesla, and Apple)
- the platforms promoting and orchestrating shared mobility (Uber, Lyft, and Didi)
- the development of the electric vehicles (EVs) conceived as a new type of vehicle that would bring together all these technological changes (Tesla and Apple).

Five years later, the landscape of the global automotive industry has changed dramatically, but not along these lines.

Electrification has accelerated much more than it was expected, but it appears somehow disconnected from the other technological 'disruptions'. Many of the EVs sold in the market are clones of the internal combustion engine vehicles (ICEVs) and no longer carry the promise of an imminent mobility revolution. The autonomous vehicle in particular has faded away, even if by different degrees depending on countries' and companies' trajectories. If shared mobility and connectivity remain a growing reality, they are both struggling to fulfil the technological expectations raised by their initial possibilities. They also do no longer seem disruptive for traditional automotive business, but rather complementary – people do not stop owning and driving a car because they use Uber or Blablacar.

This also seems to be the case for digitalisation more generally. While there is no doubt that digitalisation keeps spreading in both products (ADAS, software updates) and processes (digital assistance, digital twin, big data analytics, artificial intelligence), it does not seem to represent a significant source of instability to OEMs. Rather than being incorporated or substituted by digital companies, OEMs are bringing these technologies within their perimeter, either through acquisitions, in-house development, traditional OEM-supplier relations, MoUs, R&D collaborations or joint ventures. So far, it does not seem that the different degrees of digital integration and development had important consequences on the relative cost and non-cost competitiveness of automotive companies.

Does this mean that "dinosaurs will keep ruling the auto industry" (MacDuffie and Fujimoto, 2010)?

Past forecast errors invite caution, also because 'dinosaurs' are now threatened by another, more familiar, type of foe: new entrant OEMs making better, cheaper and different cars. If Tesla has become the global market leader of BEVs it is not only because of its digital company status – though it has certainly helped in carrying losses for a long period of time – but because it has become a mass producer of cars with higher vertical integration in the battery electric value chain, higher economies of scale and more efficient manufacturing processes than its competitors. Tesla is now in the process of being supplanted at the top of the BEV industry by Chinese New Energy Vehicles makers (BYD, Geely, NIO, XPeng, Cherry, SAIC, etc.) who follow a similar pattern of development and have turned China into the main exporter of BEVs and of light-vehicles in general.

Furthermore, the CASE paradigm is not dead. If the 2010s scenarios that announced level 4–5 autonomous cars as mainstream by the late 2020s are now a thing of the past, yet the perspective of a later breakthrough remains possible. And if this is case, then its disruptive impacts on OEMs will be only delayed.

The contributions to this special number explore these possibilities from different angles, but also provide stimulating answers to why the CASE paradigm has not materialised yet.

A first important development analysed by Fabio Antonialli and Sylvie Mira-Bonnardel is the integration of the CASE paradigm in public transport via mobility as a service (MaaS). In his article 'Leveraging the CASE paradigm for inclusive and sustainable public transport: an economic evaluation of autonomous and on-demand services', Fabio Antonialli and Sylvie Mira-Bonnardel provides a general overview of both the drivers that push the deployment of autonomous shuttles in public transport systems and the barriers that prevent these pilot trials to scale up. If technological advancement, supportive policies and changing consumer behaviours are the drivers, the barriers are the technology reliability issues (particularly in adverse weather conditions), regulatory and liability challenges (who is responsible in case of malfunctions as well as the lack of a coherent regulatory framework to create safe environments for autonomous shuttles), high acquisition costs (due to the lack of volumes and economies of scale), and public perception hurdles (concerns over safety and data protection). The case study developed in the article the modelled substitution of a bus service in the Paris-Saclay peri-urban area with different types of autonomous and electrified shuttles illustrates how these drivers and barriers interact and why private actors alone cannot achieve the paradigm shift despite its environmental and social benefits. A much stronger and coordinated interaction between companies, policy makers, local and national transport authorities is still needed to overcome these obstacles.

The current difficulties in the autonomous shuttles sector in Europe are also due to the disengagement of OEMs (with few 'premium' exceptions). This however does not seem to be the case in China.

In their characterisation of the productive models of Chinese new energy carmakers, 'Understanding the emergence of Chinese new energy carmakers – the perspective of productive model', Hua Wang, Chuanjuan Wu, Jinquan Xu and Bin Li, convincingly argue that continuous technological change plays a crucial role. Strongly supported by State's policies and relentlessly implemented by NEV carmakers, both in the field of electrification (battery density and performance, fast charging, battery swapping, slow charging, etc.) and of software-defined-vehicles (over the air updates, advanced systems, intelligent cockpits, etc.), technological change appears to be embedded in the product policies and productive organisations of these new players.

The shift towards the CASE paradigm does not require here new dedicated and complex interactions between companies, policy makers, regulatory authorities and consumers/users, as in the case of Europe analysed by Antonialli, because the NEV industry itself is already the result of such a collaborative effort driven by the steady promotion (by State policies and regulations), implementation (by NEV companies all along the whole value chain) and adoption (by consumers) of technological change.

The article by Wei Zhao and Boy Luethje, 'Disintegration, core competency, and industry structure: Chinese automotive OEMs in electrification and digitalisation', further contributes to the characterisation of this extremely dynamic industry and its evolving complementary eco-systems. Zhao and Lüthje distinguish three blocks which form a new 'lane of Chinese EV sector': the already structured and complete industry of battery making; the fast evolving and growing sub-sector of intelligent and connected vehicles (ICV); and the NEV OEMs that still act as systems integrators. They argue that there is

currently a struggle between NEV OEMs such as BYD, XPENG, Geely, Saic, etc. and ICV companies such as Didi, Baidu, Pony.ai, WeRide, AutoX, Huawei, etc. to gain the position of highest system integrator in the sector. In the process, the three blocks form 'loosely structured strategic alliances' that both drive and are driven by the pervasive diffusion of digital technologies and new business models with the CASE paradigm acting as a sort of 'attractor'.

For legacy OEMs and their traditional vertically integrated organisations with pyramid-type hierarchical supply chains, the task of competing with these new Chinese OEMs and their vertically specialised production networks is a difficult one. Their market shares are declining rapidly in the highly competitive Chinese market, while exports from China of vehicles, intermediate and semi-finished goods for EVs and auto parts are increasingly flooding their domestic markets.

In a context of growing trade tensions and protectionist measures, the article by Michal Hrubý (the winner of the 2024 Gerpisa young author prise) and Stanislav Šaroch delves into the complex evolution of these international trade flows by using input and output tables. This methodology, well know in the global value chains literature, allows for a much more detailed assessment of these trade flows than simple customs' data. It makes visible the origin of the value added contained in each inputs that contribute to the automotive production in each country. The article shows that for both Czechia and Hungary the degree of exposure to Chinese imports has constantly increased since 1995 and has reached in 2020 a level of 5.1% in Czechia and 6.4% in Hungary; by comparison the exposure of these countries to imports from Germany (their most important trade partner) was of 9.5% and 13.8% respectively in 2020. One of the main reason of this fast increasing 'input exposure' to Chinese imports is the development of EVs production in both countries, as this production relies on a substantial amount of batteries (more than 50%) imported from China. For Czechia and Hungary, as for all the other European automotive countries, the question is how to develop such a production that is key to the future of the European automotive industry, without depleting their competitive advantage.

Against these dark prospects, the article by Stéphane Heim, Jaeho Lee and Kosuke Kakitani, reaches a more positive evaluation of the chances of Western OEMs to hold their own against the Chinese challenge. While the article recognises the upheavals brought by the advent of private manufacturers of EVs and batteries in China, it considers that the response of legacy OEMs has been so far very much consistent with their productive models. It results from this that the electrification promoted by active industrial policies in Western countries does not significantly alter either the product policies or the productive organisations of the manufacturers, including the spatial distribution of production. This seems particularly true in the case of Japan, which stays put in its specific and so far successful trajectory of decarbonation based on hybrid and hydrogen technology, and which currently aims at leapfrogging the lithium-Ion battery supply chain in order to leap to solid-state batteries before engaging the transition to battery EVs.

Finally, the article by Kristin Dziczek, 'How UAW and Ford, GM and Stellantis addressed US battery manufacturing work in 2023–2028 contracts', covers an often neglected side of the CASE paradigm: its employment and work related implications. The article follows the negotiations between the big three and the UAW on battery workers status, wages and working conditions in a context of fast growing EV production. Since almost all battery production in the US takes place in joint-venture

companies that are not covered by the contracts between the UAW and the carmakers (or in non-union companies like Tesla), this means that the UAW needs to organise these new workers in order to bargain better employment and working conditions for them. The article reconstructs in detail the two important victories obtained by the UAW in 2023 after a long and contentious strike:

1 the trade union brought battery workers under the same master agreement for auto workers, despite strong resistance from the companies

2) successfully organised the workforce of Ultium Cells plants (a JV between GM and the Korean LG).

The article highlights nevertheless the fragility of these achievements that very much depend on the success of the EV transition, but also on the concrete job losses that such a transition will ultimately imply.

All these questions, and many others, will be again on the table during our next international colloquium that will take place for the first time in China, at the School of Economics and Management of the Tongji University in Shanghai between the 24th and the 27th of June 2025. As we can see from the selection of papers from the 2024 international colloquium in Bordeaux, China is playing an increasing central role in the transformation of the global automotive industry. The 2025 Gerpisa colloquium will be the opportunity to further investigate the sources of Chinese competitive advantage, as well as its broader political and strategic consequences.