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## Editorial: The auto industry entering a post-pandemic world

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### Tommaso Pardi

Ecole Normale Supérieure de Paris-Saclay,  
Bât Laplace, 61, Avenue du Président Wilson,  
94235 Cachan Cedex, France  
Email: tpardi@ens-paris-saclay.fr

### Giuseppe Giulio Calabrese\*

CNR-IRCRES,  
Str. da delle Cacce 73, 10035 Moncalieri, Italy  
Email: giuseppe.giulio.calabrese@ircres.cnr.it  
\*Corresponding author

**Biographical notes:** Tommaso Pardi is a senior researcher at the CNRS (IDHES), France, and the Director of the Gerpisa Network of Research on the car industry. He is teaching economic sociology at the ENS Paris-Saclay. His main areas of research are economic sociology, sociology of markets, organisational studies and sociology of work with a particular focus on the automotive industry. His current projects concern Industry 4.0, the EV revolution and the reorganisation and internationalisation of automotive R&D.

Giuseppe Giulio Calabrese is a senior researcher at the CNR-Ircres (Research Institute on Sustainable Economic Growth of the National Research Council, former CNR-Ceris) of Moncalieri, Italy which he joined in 1988. He taught as a Visiting Professor in Managerial Economics at University of Turin and Polytechnic of Turin. He is the Editor-in-Chief of the *International Journal of Automotive Technology and Management* and member of the International Steering Committee of Gerpisa. His main areas of research are focused on industrial organisation, SMEs, technological innovation, industrial policy, balance sheets analysis and automotive industry.

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The 2022 International Colloquium of Gerpisa in Detroit was our first in person conference since Paris 2019. This three years gap gave us a measure of how much faster the automotive industry has been transforming during the last years. In 2019, there was no COVID crisis, no chip shortage or other supply chains disruptions; electrification was still lingering and was mainly concentrated in China; massive battery manufacturing related investments were not even in the radars of financial analysts or global consultants – digitalisation was, but in the current processes of restructuring and reorganisation driven by all these factors of change, it is further accelerating. If the conclusions of our previous international programme of research still hold – the old world of traditional automotive production is not disrupted (yet), but transformed by all these exogenous shocks and challenges – the pace at which these transformations are taking place and the scope of their short-term and long-term implications are unprecedented.

To keep track with them and make sense of their impacts and consequences we need as a research network to enlarge the perimeter of our enquiries, to investigate complete new objects of research, but also to renew old key research questions concerning the evolution of productive models and productive organisations from wider and more ambitious perspectives. The selection of papers for this special issue reflects both these needs. On the one hand, it develops an almost complete automotive value chain perspective: from suppliers in South Africa looking for functional upgrading (L. Monaco and T. Wuttke), through OEMs' factories spreading worldwide over more than a century long perspective (H. Rarou), to dealers in Japan struggling to accommodate a shrinking and changing domestic market (S. Kida, D.A. Heller, Y. Tamura, E. Motohashi, H. Sato and Y. Hattori). On the other hand, it also has a special focus on digitalisation of OEMs' productive models, via the integration of 'platform-based ecosystems (PBEs)' for connected cars (C. Buck and L. Watkowki), and more broadly, of transport systems in which cars are used with two case studies: one on the Global South mega-urban regions and their capacity of integrating shared autonomous vehicles (SAVs) into multimodal share mobility systems (K. Sirikhan); the other on young consumers in Germany and their willingness to pay (WtP) for mobility as a service (L. Kraus, H. Proff and C. Giesing).

The article of Hamza Rarou on 'Global trends and spatiotemporal shifts in the automotive assembly footprint' is a rare treat. It combines John Dunning's 'eclectic paradigm', to analyse the internationalisation strategies deployed by OEMs between 1899 and 2018, with Petr Pavlinek's 'core-periphery system theory', to make sense of their consequences at regional-country level, and all of this in just one article. It shows how the early global hegemony of US OEMs, has progressively given away since the 1960s to a multipolar automotive landscape structured around few major protected clusters in the USA, Europe, Japan and Korea. The Japanese challenge of the 1980s has produced some important reconfigurations, leading to the growth of factories in semi-peripheral countries and the structuring of regional value chains to reduce production costs. The globalisation of the 2000s and 2010s has accelerated the pace and amplified the scope of these transformations, with the fast emergence of new massive poles of production in emerging countries, and in particular, but not only, in China, while a further shift of the 'automotive assembly footprint' from old core countries to semi-peripheral countries in North America, Europe and Asia has been occurring. The article highlights both the resilience of core clusters of production, which keep attracting investments and production, but also the accelerated reconfiguration of regional and global value chains in which automotive assembly plants are embedded since the 2000s.

As we anticipated exactly ten years ago in this very journal (Jullien and Pardi, 2013), this simultaneous process of structuring new industries in emerging countries and restructuring of 'old' industries in core countries has brought forward a new type of competition: countries, including core countries, are now in competition to retain, develop, upgrade their own automotive industries, and this competition is now heating up with the transition towards electro-mobility.

The article by Lorenza Monaco and Tobias Wuttke delves into the supply chain of South Africa to explain why in this global struggle for automotive production and value added it has been very difficult for emerging countries, even successful ones as South Africa, to achieve upgrading. The article identifies a series of obstacles that prevent domestically owned suppliers to upgrade. The most important ones are institutional: on the one hand, the very policy tools that are used to attract automotive

assembly, and notably the rebate mechanism on the imports of components for OEMs that export their production, do not incentivise local production of parts; on the other hand, the purchasing rules of global OEMs only include companies that have already an international dimension, excluding *de facto* most of the local suppliers. Only a coordinated set of strong policies – raising local content requirements - could address these issues, but the difficulty is how to implement them without scaring off investors. The article speculates in the conclusion whether electrification could provide a window of opportunity: South Africa has important reserves of raw materials for battery manufacturing and can also act as a hub for refining and processing other African resources making more interesting for OMEs to shorten the supply chain and rely on local suppliers to manufacture cells and assemble batteries.

Besides electrification, another main driver in this accelerated process of transformation of the global automotive industry is digitalisation.

The article by Christoph Buck and Laura Watkowski analyses in particular how the digitalisation of cars, via both connectivity and advances driver assistant systems, creates a new competitive environment in which data management and digital services contribute more and more to the creation of value. OEMs are laggards in this market by comparison with pure digital players, but they could rely on the development of PBEs to catch up with competitors. PBEs allow integrating third parties in the development of complements and applications for core digital technologies, such as Apple iOS or Google Android operating systems for smartphones. The article highlights however how difficult is for companies used to closed product architectures (cars) to open-up their technologies and make their core resources strategically available to external actors in order to profit from knowledge spill-overs. The article relies on both a systematic literature review and expert interviews to discuss how OEMs could overcome these difficulties, notably by relying on ‘selective revealing’ in order to preserve the core (the kernel) from external access while making ‘boundary resources’ (IP rights, software code, data, access to sensor-driven products, ...) available to third parties.

Digitalisation is also at the core of the shared mobility revolution via the development of digital mobility services. On average, a car is parked 98% of the time. The combination of connected cars and ubiquitous smartphones has opened up in the 2010s the possibility of making unused cars easily available for other users to drive (carsharing) as well as sharing these cars with other people when they are used (ridesharing). However, both carsharing and ridesharing have progressed much slower than expected, in particular because it has been difficult to develop viable business models.

The article by Lisa Kraus, Heike Proff and Carla Giesing analyses one of the main problems often associated with these difficulties: the low WtP for the real cost of the mobility service. The article does not focus on carsharing or ridesharing specifically, but includes them as part of mobility as a service packages. It surveys a limited but very important group of users – undergraduate students in one of the biggest pole of German universities (the Ruhr Alliance). It found that the WtP is on average below the costs of the offer, but that it also varies significantly between different groups of users. More customised and modular offers could therefore overcome the obstacle of too low WtP. Another complementary key dimension to achieve a profitable offer of MaaS is the development of economies of scale, but these require a clear centralised orchestration of the MaaS platform possibly via its full integration into the governance of smart cities.

The article by Kulacha Sirikhan, the 2022 winner of the Gerpisa Young Author Prize, explores the possibility of such a scenario for the integration of autonomous vehicles in MaaS in two Southeast Asia mega-urban regions: Bangkok and Ho Chi Minh City. It relies on both bibliometric analysis (on AVsMeme) and on spatial analysis (of the studied regions) to reach three important conclusions for the development of MaaS and the integration of SAVs in the Global South:

- 1 The rapid growth of these mega-urban regions results in inadequate transportation networks and a lack of access to public transportation that fuels higher penetration rate of private transport resulting in urban congestion and pollution.
- 2 SAVs could play a crucial role in a multimodal shared mobility system by providing flexible access to public transportation in peri-urban areas (gated communities).
- 3 Strong government intervention and an integrated planning policy are required to assured that MaaS and SAVs do not develop as a private market oriented alternative to public transportation, while incorporating private mobility services in integrated mobility systems.

It is of course too early to say whether the future of smart cities will be made of SAVs taking care of most of our mobility needs, turning the personal car into a thing of the past. What is sure is that if such a scenario materialises one day, then the future of the automotive industry will be very different and difficult, in particular for car dealers that will not have anymore anything to sell. But in fact, in the fast transforming world of contemporary car production and consumption, dealers are already struggling. Even if their situation is very different depending on regional market dynamics (growth or stagnation) and structures (type of ownership, degree of competition), it is clear that fast electrification will reduce the volumes of new car sales as well as the need for servicing the cars, creating the need for new value streams but also the threaten of massive restructuring and reorganisation.

The article by Sekai Kida, Daniel Arturo Heller, Yusuke Tamura, Eiji Motohashi, Hidenori Sato and Yasuhiro Hattori presents the results of a large-scale questionnaire survey of about 500 car dealers in Tokyo and surrounding areas carried in 2021, at the time of the pandemic when sales declined sharply in the Japanese new vehicle market. The article shows that the level of sales was unsustainably low to preserve the current structure, which created pressure to increase sales at each dealer, as those that failed to perform would eventually be terminated. In this increasing competitive environment, survival appears to be connected with flexibility: formal organisations do not help to increase performance, while job role formalisation has a clear negative effect on it. The article also shows that the traditional strategies to increase sales based on attracting new customers, keeping the old ones, developing close cooperation with manufacturers and targeting specific customers either do not work, or even have a negative effect on performance. Eventually, the most important factor in determining the level of new car sales at each dealer was the brand or the segment of the cars sold.

These results tend therefore to confirm that dealers (at least in Japan) are indeed in a structural crisis: it is not just that they are competing in a shrinking market, but all their traditional weapons to close better deals do not seem to make the difference anymore. But it is probably not too far-fetched to say that such a conclusion also applies to the global automotive industry as a whole. Confronted with structural and fast transformations of their markets, core technologies and products, the traditional

automotive businesses need to reinvent themselves, breaking free from pre-existing rules and institutions to develop new, more sustainable productive and business models.

This is precisely the topic that we have put at the core of our call for papers for the next international colloquium of Gerpisa that will take place in Brussels from the 27th to the 30th of June 2023, with a special focus on electrification. We look forward to the contributions of all the members our international network of research to these new exciting debates!

## **References**

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