
Editorial: redesigning the automakers-suppliers relationships in the automotive industry [1]

Yannick Lung

GERPISA Université d'Evry-Val d'Essonne and CRH-EHESS,
Paris, France
IFREDE-E3i Université Montesquieu, Bordeaux, France
E-mail: lung@montesquieu.u-bordeaux.fr

Giuseppe Volpato

GERPISA International Network, Università Ca' Foscari di Venezia,
E-mail: volpato@unive.it

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Biographical notes: Yannick Lung is Professor of Economics at Université Montesquieu, Bordeaux, France. He is director of the Institut Fédératif de Recherches sur les Dynamiques Economiques (IFREDE, Bordeaux) and co-director of the GERPISA international network (Université d'Evry, et CRH-EHESS, Paris). He co-ordinates the thematic network CoCKEAS/Co-ordinating Competencies and Knowledge in the European Automotive System (HPSE-CT-1999-00022), supported by the European Union (5th Framework). He currently teaches Microeconomics, Macroeconomics, Analysis of Economic Systems, Industrial Economics and Economy of Innovation. His main areas of research are the dynamics of technological and institutional changes, with a specific focus on their geographical impacts (dynamics of proximity, regional development policy) and on the automobile industry.

Giuseppe Volpato is the Dean of the Faculty of Economics at Ca' Foscari University. He is full professor of Management and Business Strategy. He is member of the Società Italiana degli Economisti and is also member of the Accademia Italiana di Economia Aziendale. He is a member of the European Business History Association and Senior Adviser for the ICDP (International Car Distribution Programme). He is also a research Fellow of the IMVP (International Motor Vehicle Program) of MIT and member of the GERPISA steering committee. His main interests of research include: Industrial Economics, Strategic Management, Management of Innovation and the Theory of the firm. His research activities include a worldwide network of research partners, both industrial and governmental, including all the leading car makers operating in Europe, dealer bodies, component and service suppliers. Most recently he has published seven books and over sixty essays and articles.

1 Innovation as a driving force

As is widely known, the automobile industry is undergoing a wide and profound process of reorganisation due to the fact that production capacity developed over time appears in excess with respect to demand which, albeit remaining at relatively high levels, cannot saturate the available plants. It is less well known, however, that the forms of competitive confrontation encompassing the main automakers do not involve just cost reduction and a different division of labour between more and less industrialised regions, but also a process of profound innovation, both in products and in manufacturing processes.

To the non-attentive eye, automobiles could appear the same as usual: four wheels, one body, one internal combustion engine, one transmission, etc. In reality as the richest and most industrialised countries feature an average density of one car for every two inhabitants, this implies that a sustained volume of demand derives from the capability to offer customers, who are more and more demanding, a wider range of diversified products [2] with a fast renovation cycle, which means a high rate of innovation. Consequently, albeit automobile functions appear the same, the rate of innovation has gained much speed over recent years, due both to the preference for novelty which consumers have shown, and also to the legislative measures directed at reducing the forms of pollution generated by road transport of people and goods.

On the whole in the automotive industry, intended as a 'supply chain of activities and competences' ranging from parts manufacturing to assembly of the final product and its distribution carried out by a network of dealers, we are facing a wide-ranging process of innovation, which encompasses all the main activities in the chain: new product design and development, purchasing, manufacturing technologies and organisation, logistics and product distribution.

Naturally such a massive and accelerated process of technological, manufacturing, organisational and commercial innovation cannot be carried out under the exclusive guidance of automakers. In the past the automaker designed all the main innovations, leaving the manufacturing of individual parts to suppliers (with very few exceptions), moving from designs defined by carmakers. But today such an approach cannot be carried out for a set of reasons.

Firstly, automakers would not have the financial resources required to open and develop all areas of research which are potentially promising. Secondly, they do not have the required competences to grasp the many opportunities which lie in highly differentiated technological domains. In fact, in the past, the automobile product was almost exclusively based upon metallurgic and mechanical technologies, that is those typical for any car automaker with a long tradition, which was then highly vertically integrated. But today the search for new goals aimed at energy saving, reduction of pollution, vehicle recycling, active and passive safety standards, has opened a range of innovations which start from the usage of new materials and move along a massive usage of electronic devices (ABS, ESP, drive-by-wire, etc.), with a reorganisation in manufacturing processes (e.g. replacement of solvents with water-based paints, use of metallurgic processes based on sinterisation and composite material, etc.), which falls outside the traditional competences of an automaker.

Perhaps many consumers do not even realise it, but the use of light alloys and plastics has replaced steel in a large number of cases, and one can believe that this is just the beginning. But even when one speaks about 'plastics' one must be aware that the generic term 'plastics' stands for a very wide range of different and heterogeneous materials. For

example, in a modern car it is common to use at least 50 different types of ‘plastics’, each with different ingredients and features. It is therefore evident that no automaker (and not even all automakers altogether) would be able to manage in an appropriate way the set of innovations being experimented with and used in industry.

The main outcome of such paramount transformation is that the relationship between automakers and their suppliers is radically changing.

2 Redistributing roles within the automotive *filière*

Automakers have understood for a long time the need to redesign their relationship with component suppliers. Such a transformation became urgent in the mid-1980s mainly for Western automakers, and for the European ones in particular, who in a first stage began to imitate what had been done by Japanese competitors (Toyota, Nissan and Honda) [3] in terms of concentration of purchasing over a limited number of suppliers, at least to simplify purchasing procedures and to validate the efficiency and effectiveness of their individual suppliers, through a complex procedure of examination of their potential, in the technological, organisational and financial domains. That was, however, just a first step. Very soon all automakers became aware of the need to delegate widely the process of parts design to suppliers, at least through co-design, that is through the sharing of competences between the supplier’s designers and those of the automaker. Hence it is always the supplier who, investing massively in research and development, has become the subject who proposes to the automaker the innovative solutions which are adequate to the functions of the vehicle which the automaker intends to develop. The supplier (and the first-tier supplier above all) is also expected to become, as a privileged partner of the automaker, the coordinator of the complex pyramid of sub-suppliers activated for the manufacturing of each complex component, which must not get to the automaker’s assembly line fragmented in its individual components, but must be assembled and tested before being sent to the assembly line of the automaker, which has become a station of final assembly of complex parts. The supplier is also asked to extend its production chain right into the factories and assembly lines of the automakers, to minimise the automaker’s risks and ease final quality control of the product. Such a solution makes possible also the payment of parts depending on the number of deliveries, but in proportion to the number of vehicles ‘accepted’ by the automaker after a final and comprehensive control.

Consequently a range of organisational forms is born (consortium, condominium, etc.), all aiming at gradually easing the role of the automaker in the activities which entail most risk and that are subject to market fluctuations. This allows automakers to focus on the activities that enhance innovation (both internal and external), through the development over time of the identity of the automaker, as a complex of values and potential sought after by consumers, and of the coordination of product design-manufacturing-distribution activities.

It becomes evident that this is a fundamental change. It involves not just the redesign of the whole management of the value chain in the *filière*, but also redefining the terms of division of surplus generated by the many subjects who interact in the chain through mechanisms no longer inspired by competition in a ‘everybody against everybody else’ logic, as it happened in the past. Rather the change involves new mechanisms which try

to enhance the competitiveness of an automaker compared to another, but are also capable of stimulating forms of cooperation, sharing and cross-fertilisation of experiences and competences, and of integration and complementarity in roles and initiatives of the car maker *vis-à-vis* its suppliers.

In the past, and for a long time, the problems of 'linkage' of the design and manufacturing activities in the chain were managed through two forms, conceptually opposite and clearly different in their respective implementation: the 'market' in all cases in which the division of roles and their remuneration was simple and could be defined *ex ante* in a clear way and the 'hierarchy' in all cases in which the coordination and the definition of roles inevitably had to be carried out through a long and interactive process. All this seemed easily identified in the split between 'make' and 'buy', between 'inside' and 'outside' the automaker. Today, however, the most effective and efficient organisational solution cannot but arise from a structural coexistence between market and hierarchical elements where 'make' and 'buy', 'inside' and 'outside' merge, and furthermore hold no meaning in leading the creation of value. In other words, this implies a move, by also taking advantage of the new potential offered in Information & Communication Technology (ICT), to what some prefer to label 'Extended Enterprise', and others 'Network-Enterprise'.

Considering the critical issue of the management of innovation in the new competitive environment to offer to the consumer a growing range of high quality vehicles at the right time (shortening lead time), firms have to develop technological and organisational capabilities in product development. The growing role of cooperative projects associating different automakers engaged in strategic or local alliances and suppliers integrated in a co-development process leads to the search for new organisational design to manage product development. Three papers illustrate such changes in this volume focusing on organisational learning processes.

Firstly, Christophe Midler, Patricio Neffa and Jean-Claude Monnet propose a conceptual framework to distinguish different trajectories associated with automakers' globalisation strategies and discusses the General Motors Europe and Renault cooperation in the development of a new light truck vehicle. Secondly, Blanche Segrestin, Philippe Lefebvre and Benoît Weil introduce the hypothesis of different design regimes to analyse the process of coordination of competencies and the conditions for automakers' and suppliers' cooperation. The previous papers focus on the bilateral horizontal and vertical relationships between firms. Finally, the third one (by Wendy Riemen and Jane Marceau) on the Australian automotive industry discusses a broader framework, the institutional environment in analysing the industrial policy aiming to improve the technological capabilities in non-core automobile countries to remain attractive places for design activities, not being limited to manufacturing and assembly [4].

3 The close interdependency of automakers and suppliers in the production process

The new relationships that automakers and suppliers have built up during the co-design phase are being extended into vehicle production itself. Module production and assembly responsibilities are being transferred in the same way as subsystems' development has been delegated.

One of the clearest manifestations of these new relationships is first-tier suppliers' localisation in the immediate vicinity of automakers' assembly plants. This spatial agglomeration (co-location) can assume different shapes and forms and involve varying degrees of integration. The most advanced form of integration is when a component maker is actually present on an automaker's site, with a remit of preparing modules and integrating them into the vehicles as they pass through the assembly line (i.e., the modular consortium system at VW's Resende complex in Brazil). A weaker form involves setting up operations in a supplier's park which is immediately adjacent to the automakers' premises, delivering components and sub-assemblies by means of shuttles or tunnels that connect the workshops with one another (Ford's Valencia plant in Spain or the Saarlouis plant in Germany). An intermediary situation is the industrial condominium, where modules are prepared by suppliers who are set up in an order that mirrors the assembly line's own sequence of operations (i.e., the MicroCompact Car plant in Hambach, France).

Brazil is undoubtedly the country where automakers conducted the greatest experimentation in modular production when building a new assembly plant during the 1990s (see Silvio Pires's article elsewhere in the present volume). The generalisation of supplier parks in Europe reflects a similar trend, even though each site features its own particularities [5].

This new production organisation offers three advantages:

- First of all, proximity between the assembly line and the suppliers' plants means that there is an improvement in logistical management – a function that has become more and more complex to manage ever since automakers began trying to offer a wider variety of products (hence of modules and components) and to orient their production systems around the orders that they receive from their end users.
- Secondly, inter-site proximity allows automaker and supplier employees to develop communities that are built around projects in gestation and to benefit from a more direct exchange of information, something that will allow them to carry out the adjustments that are necessary if they are to cope with the daily dysfunctions and problems that are inevitable in a production-related activity. This double challenge is highlighted in the article written by Antonio Brandao Moniz, Bettina-Johanna Krings, Geert van Hootegeem and Risk Huys, which can be found in the present volume. The authors analyse these organisational issues that will crop up whenever ICT dissemination cannot replace face-to-face encounters. Inversely, it should also be remembered that this proximity can engender a certain tension, wherever firms differ in terms of their workforce management policies (as regards income levels, career paths, etc.).
- Thirdly, the investment required to develop a new assembly site or to refurbish an existing one whenever a new model is launched will be split between automakers and suppliers. This reduces the automakers' need for funds and displaces an ever greater proportion of the risks associated with new vehicle production and marketing. The problems that the US rolling chassis supplier Dana ran into after the closure of the DaimlerChrysler Campo Largo plant – discussed by Silvio Pires in his article – show what can happen when a supplier makes this sort of commitment.

That component makers have become increasingly fragile appears particularly evident at the lower levels of the supply network. This is because of the reinforcement of the first-tier components makers' technological and organisational capabilities, something that they have had to do to satisfy the automakers' expectation of their participation in product development and production activities at a global level (following sourcing).

Automakers have been cutting the number of direct (first-tier) suppliers with whom they work, limiting themselves to a few multinational firms for each of the major components or technical systems they require. This concentration trend in the supplier industry has occurred on a global scale, leading to the disappearance of many medium-sized firms. The article that Mauro Zilbovicius, Roberto Marx and Mario Salerno have written for the present volume describes the thorough recompositions to which the Brazilian supplier industry has been subjected for the past ten years as part of this framework – to compare with the Australian automotive industry.

Due to a phenomenon that is just as related to the domino effect as it is to the notion of fractal production, first-tier suppliers have been taking responsibility for the coordination of lower-tier suppliers. Faced with increasingly stringent demands from the automakers, components makers have tended to displace these constraints (relating to inventory management, financial commitments, quality requirements, etc.) onto their suppliers (second and third tiers) – who have not always had the technological, organisational or financial capabilities to cope with them. The landscape of the supplier industry has been experiencing major upheavals for quite some time now, and these deep-seated changes are likely to continue for years to come.

This illustrates the great difficulty in redefining a relationship between suppliers and automakers, which is clearly influenced by the hardship of competitive confrontation and by the importance of the value at stake, but also by the different positioning of makes in the market, and by the different traditions matured in the relationship with suppliers. This also implies a constant use of the word 'partnership' which in reality hides, in many cases unresolved difficulties of collaboration, and even friction or conflicts between automakers and suppliers.

References and Notes

- 1 The articles in this *IJATM* special issue are the revised versions of papers presented and discussed at the *Ninth Gerpisa International Colloquium Reconfiguring The Auto Industry: Merger & Acquisition, Alliances, and Exit Paris*, 7-9 June (2001).
- 2 Cf. Lung, Y., Chanaron, J.J., Fujimoto, T. and Raff, D. (1999) (Eds.) *Coping with Variety. Flexible Productive System for Product Variety in the Auto Industry*, Aldershot: Ashgate.
- 3 Such presentation does not imply that the authors share the idea of a Japanese model which would have been the same of all Japanese firms. The discussion of the diversity of industrial models, even in the Japanese auto industry, has been at the core of the first GERPISA international research program. The results of this program, based on comparative analysis of automakers' trajectories have been synthesised in the book published by R. Boyer and M. Freyssenet: *Les modèles productifs* Paris: Editions La Découverte, (2000). (English translation: *Productive Models*, London: Palgrave, forthcoming). The detailed case studies of the 15 main world carmakers are presented in M. Freyssenet, A. Mair, K. Shimizu and G. Volpato (Eds.), (1998) *One Best Way? The Trajectories and Industrial Models of World's Automobile Producers*, Oxford: Oxford University Press.

- 4 On the emerging countries, see: Humphrey, J., Lecler, Y. and Salerno, M. (Eds.) (2000) *Global Strategies, Local Realities: The Auto Industry in Emerging Markets*, Macmillan, London and Basingstoke, New York.
- 5 See the special issue on '*Changing The Geography of The Automobile Production of the International Journal of Urban and Regional Research*, to be published on this topic during 2002.