Editorial: Putting SMEs back at the heart of automotive supply chain analysis

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1 Introduction

The past 30 years have seen major changes in automotive supply chains. The aim of this special issue is to suggest a revisit of one aspect of this transformation, namely the rise of a core and periphery model (Chanaron, 2004) in which many researchers focus more on the former rather than the latter. Seen the other way around, this special *IJATM* issue will be devoted to the economic agents living on the edge of this world, namely the small and medium-sized enterprises (SMEs) who serve as sub-contractors or second-tier suppliers and also sometimes as first-tier suppliers. The reality is that these SMEs are often neglected despite having long been carmakers' principal counterparts.

Until the mid-1980s, supply chains could be described as flat hierarchies (Fujimoto, 1999). Clearly, this was not an accurate representation of Japanese carmakers but there is no doubt that this did constitute the dominant model, one where carmakers did little outsourcing, practiced multi-sourcing and called upon a wide range of subcontractors who were generally SMEs. Things have changed since then, however. Supply chains now have a pyramid shape and the parties that are in direct contact with carmakers are very different from what they used to be.

The steep rise in carmaker outsourcing since the mid-1980s caused three big changes: one where suppliers were asked to accompany carmakers abroad (follow sourcing); a second where they would be increasingly delegated design responsibilities; and lastly, a change in the nature of the actual items that carmakers purchase, with modules and

systems ultimately accounting for a greater share of total their procurement needs. Combining these three interdependent phenomena encouraged the emergence of mega-suppliers [a term first proposed by Donovan (1999)] – being the firms that play a key role in today's supply chain pyramids, whether in Europe, the US or Asia.

According to Automotive News data on original part sales to carmakers, during the period 1999 to 2010 cumulative sales by the world's 100 leading supplier rose by 76.2% from USD 330.648 million to USD 582.464 million. This upswing in sales was unsurprisingly accompanied by strong growth in the size of the companies involved, with median values reaching USD 3.581 million (versus USD 2.044 million in 1999, up 75.2%). The top 17 suppliers all had original sales to carmakers exceeding USD 10 billion – not to mention the revenues they generated from spare parts (or for some actors like Bosch, from non-automotive activities). All in all, there is little doubt that outsourcing was the main factor paving the way for the advent of mega-suppliers.

The development of mega-suppliers raises a number of scientific questions that have resonated widely within the *IJATM*, including how suppliers might develop the competencies they need, how firms will re-organise their design activities and what kinds of limitations or dangers carmakers will face as a result (plus the implications for vehicles' technical performance). These are complex questions and many require a renewed analysis of mega-suppliers and their relationships with carmakers.

Yet, despite the (ongoing) legitimacy of this focus, analysts tend to forget that mega-suppliers are not the only actors populating today's supply chains. SMEs are still here, sometimes even at the very top of the supply pyramid. In our 2010 study of French industry covering a sample of 750 SMEs, we demonstrate that between 26% and 35% of the SMEs in question (depending on the indicator being used) work directly with the carmakers (Frigant, 2011). Clearly, they do not account for the lion's share of all purchases but the fact is that they do exist. The questions then become why carmakers still call upon SMEs, what role the SMEs play and, why mega-suppliers do not occupy the entire tier-one? These questions can be developed upstream from the supply chain by ascertaining SMEs' role at the pyramid's second and third levels. Similarly, in a context characterised by supply chain transformations, it is worth exploring the kinds of problems they face – and conversely, whether the rise of new car types constitutes an opportunity for SMEs.

Insufficient attention has been paid to these questions up until now. In the past, *IJATM* have published regularly studies on SMEs (e.g., recently, Castelli et al., 2011). But with this special issue, we wish to open the black box and to suggest specific studies on the positioning and modus operandi adopted by the SMEs that inhabit the automotive supply chain. A few key aspects are worth emphasising, before summarising the literature on offer.

2 Why SMEs should not be forgotten?

The main reason is that the automotive industry constitutes a system, and like any system, the equilibrium of the whole relies on each of the constituent parts (Chanaron, 2004; Lung, 2004). SMEs, like other parts in the system (finance, distribution, mobility services), have a definite role to play. In their own way, they contribute to the solidity of the whole. The automotive industry is more than its core alone (carmakers and first-tier suppliers).

The role that SMEs play as employers must also be remembered. Clearly, each employs few people by definition. Having said that, their combined staffing numbers represent a significant share of total employment in the different national automotive industries. The geography of automotive employment shows that the main automotive clusters are partially rooted in a myriad of SMEs, be it in older producing regions or newer ones, starting with Eastern Europe (Pavlinek and Ženka, 2010; Domanski et al., 2013). The fact that these clusters have been able to survive/emerge shows that SMEs are useful and necessary to the functioning of the whole of the automotive system.

The carmakers at the top of the pyramid still need the SMEs. The automobile is not a perfectly modular product. Carmakers continue to sub-contract certain activities and call upon specialist SMEs for particular kinds of equipment and services (e.g., design). They also purchase small parts that are of very little interest to mega-suppliers who tend to focus more on complex systems. In addition, niche vehicles and special series rely on short run production that is also of little interest to the big equipment suppliers. Lastly, when carmakers internationalise they can sometimes struggle to persuade suppliers to follow them abroad, meaning that they have to rely on local SMEs (see Jullien et al., 2013). Towards the upstream side of the supply chain, SMEs offer their customers a modicum of productive flexibility. In a crisis context (or, to the contrary, in an era of strong growth), they help to mitigate the effects of volatile volumes. All in all, they constitute an indispensable tool for many supply chain companies' economic profitability.

SMEs also have an innovation role to play. Although mega-suppliers and carmakers apply a lot of patents, they are still absent from a number of technological fields, all the more if we consider the big changes that have affected the product in recent years: development of new (electric, hybrid, hydrogen) driving systems; changing regulations and standards; growing importance of embedded leisure equipment and connected vehicles. Many technological solutions come from SMEs. Moreover, carmakers are very aware of this, with several (including BMW, PSA, Ford and GM) having created venture capital vehicles aimed at funding innovative start-ups capable of providing original technological solutions to the questions being asked today. In a context of open innovation, SMEs still have a role to play, especially given the fact that carmakers increasingly mistrust mega-suppliers whom they suspect of wanting to achieve innovation monopolies. Obviously, not all SMEs are concerned at this level and the chosen ones are few and far between. But this does justify further studies to understand their strengths, weaknesses and modus operandi – yet another good reason of this special issue.

3 Brief presentation of articles

Conceiving this issue, we wish to address different questions translating the varied nature of problems that SMEs face today. Jean-Jacques Chanaron looks at how French SMEs working out of the Rhône-Alpes cluster have dealt with the crisis and envision their future. Based on in-depth interviews with enterprises and representatives from different institutions, he analyses the inter-firm relationships that have been at work since the 2008/2009 crisis and highlights carmakers' variable attitudes and the (ambiguous) role of state actions intended to save the branch. Far from the subcontractor model disappearing,

he shows that it has survived and that relations between carmakers and SMEs are still very contentious. His study scrutinises the kinds of pressure weighing on SMEs, along with the difficulties they face, while suggesting how they might exit the crisis through consolidation or technological innovation.

Stéphane Heim looks at Toyota's supply pyramid following a site visit and adopts an interview-based methodology similar to J-J. Chanaron to understand how SMEs from the Aichi prefecture have developed their competencies to either move up the supply chain pyramid or merely survive. Using an analytical grid that distinguishes between technological capabilities and degree of participation in collective decision-making processes, S. Heim identifies four different profiles representing SMEs in the Toyota network. After explaining the challenges and opportunities that each type of company faces, he shows that these SMEs fulfil different roles in the supply chain, with the flexibility that they provided probably constituting their greatest contribution.

The papers by J-J. Chanaron and S. Heim evoke innovation as a way for SMEs to survive/move up the pyramid. Thomas Fojcik adds to this debate with his study of how SMEs manage the classic dilemma exploration vs. exploitation. However, he uses another methodology based on an econometric model studying 126 German SMEs chosen because their products 'completely drop out after the transition to electric vehicles'. Here, the dilemma is formulated as revolving around the:

1 way in which current products will be managed during the expected long transition phase

2 new directions that are being explored to ensure that companies will be ready once electric vehicles start to dominate.

The solution involves ambidextrous forms of organisation. After presenting a variety of potential organisational solutions, T. Fojcik shows that variations in organisational size, pace of technological change and organisational complexity offer better explanations for ambidextrous design choices. Note that two alternative choices exist in conjunction with this: a temporal separation for small suppliers; and a structural separation for medium-sized suppliers.

The article by Liang-Hung Lin and Jian-Feng Lan share two points with T. Fojcik. The first relates to an issue that is studied much more often in relation to large companies than SMEs. Otherwise, the methodology is similar, involving a survey of SMEs and econometric tests of hypotheses. Here, however, the focus is on the extent to which SMEs from Taiwan have adopted green supply chain management (GSCM) practices. Findings are divided into two timeframes. L-H. Lin and J-F. Lan confirm that environmental performance is rooted in companies' commitment to GSCM, and that the smallest SMEs are more inclined than many would expect to adopt certain corporate social responsibility practices.

The article by Neena Sinha, Neelam Dhall and Ajay K. Garg takes us to India, where the authors have surveyed 120 SMEs to understand their commitment to quality management practices. The findings demonstrate firstly that the companies in question are relatively committed to quality initiatives (even if some are quite selective in terms of their priorities). Secondly, econometric regressions are used to assess whether a relationship exists between these commitments and companies' organisational cultures. Although a relationship is confirmed, the underlying connections are quite complex, or as N. Sinha, N. Dhall and A.K. Garg write, "The values of organizational culture and

principles of quality management are interrelated; however, each dimension of culture is related to seven quality management principles in different manner".

Reading these articles as a single text, they would seem to confirm the hypothesis that automotive SMEs have a special role to play in today's automotive supply chains, although their ability to survive individually in the future (or to move up the pyramid) will depend on how they face up to certain issues that have been heretofore reserved for large companies: ambidextrous organisations; commitment to CSR; and total quality management. As the five articles reveal from their different perspectives, there is a strong possibility that some SMEs still lack the requisite resources or awareness to succeed.

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