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## **The Challenges of the European Automotive Industry at the Beginning of the 21<sup>st</sup> Century**

### ***Summary of the main findings of the CoCKEAS project***<sup>\*</sup>

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## **1. Introduction**

### **1.1. The automobile industry in a regime of permanent innovation**

At the dawn of a new century, automobile firms again have to cope with major structural changes requiring them to reorganise their current production systems. This modification of the automobile industry's economic and social environment stems from three main factors:

- technological developments (specifically in microelectronics and ICT) in which reinforced innovation serves as a factor of competitive rivalry;
- the competitive process, marked by the double dimension of the new internationalisation phase and featuring an increasing number of mergers-acquisitions and alliances between the three automobile poles (Europe, United States, Japan) on one hand (Freyssenet, Shimizu, Volpato, 2003a and 2003b), and a reinforced regionalisation of the automobile system on the other (Freyssenet, Lung, 2000; Carrillo, Lung, van Tulder, 2004);
- the institutional context, in reference to the relationships between the different actors in the automobile system, notably the governance compromise underlying the implementation of corporate strategies (Jürgens; et alii, 2002). Greater shareholder power and institutional investors' increased influence on corporate executives' strategic decision-making are partial explanation for some of the changes in the

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<sup>\*</sup> This paper presents the main conclusions of the CoCKEAS project supported by the European Commission (FP5, Project n°: SETN-1999-00140), coordinated by the author. This project was at the core of the third GERPISA international research programme *Coordinating Competencies and Knowledge in Regional Automotive Systems* (2000-2002). The CoCKEAS final report (and its annexes) can be download at: <http://cockeas.montesquieu.u-bordeaux.fr/>.

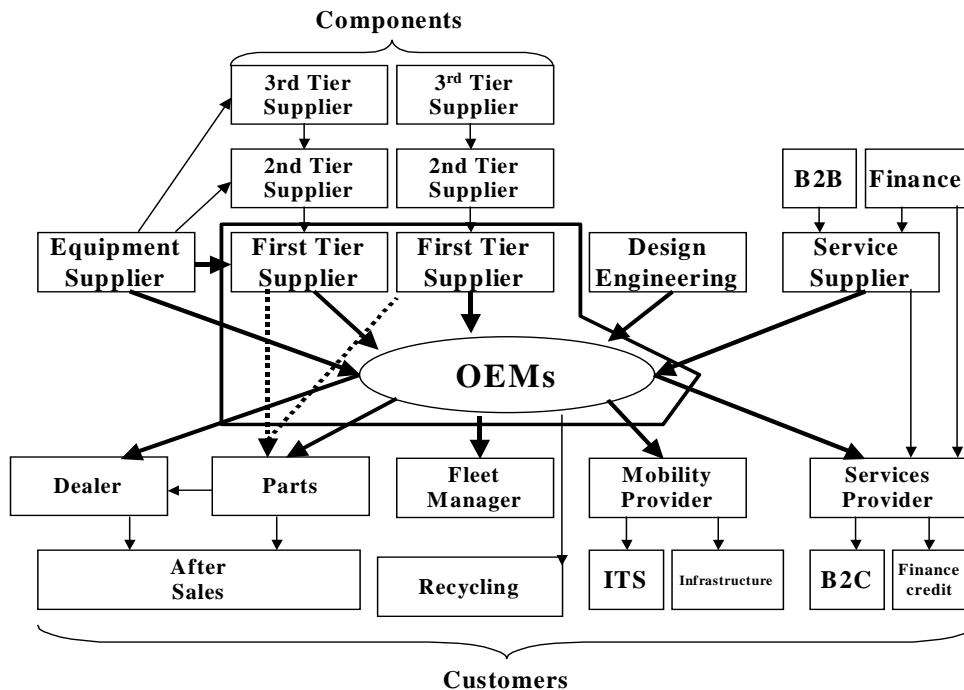
industrial system, and more specifically for the trends towards an increased externalisation of activities

To cope with these new technological, economic and institutional challenges, the organisational forms that had allowed the auto industry to develop over the past 100 years needed to be reconfigured. During the 20th century the automotive industry was a matrix for new productive models (Fordism, Sloanism, Toyotatism, etc.) that gave birth to many organisational innovations that would later spread to other sectors of economic activity (Boyer, Freyssenet, 2002). Today, the deep-seated and rapid developments that have taken place within this sector underline the need for reactive forms of productive organisation within a permanent innovation regime in which new knowledge necessarily derives from the mobilisation and combination of diversified competencies.

## 1.2. The methodology

The analytical framework we are suggesting is an all-encompassing one, the idea being that the automotive industry should be analysed at the system level as a whole. This means that analysis should not only cover carmakers but also components makers, who produce about 60% of a car's value. This is because the coordination of competencies and knowledge in design, manufacturing and assembly between carmakers and their suppliers has become a critical issue for the automotive system (Lung, 2001). In addition, we should also go beyond a purely manufacturing-oriented perspective focusing solely on tangible production and integrate all of the immaterial activities that make such a telling contribution to the dynamics of automobile production, including new car sales financing and services inferring the existence of new competencies to be mobilised and coordinated.

**Figure 1 – The European Automotive System**



The dynamics of a given system are basically determined by the way its activities have been co-ordinated. Co-ordination can be organised according to three basic economic principles: the market; the firm (hierarchy); and co-operation. In a permanent innovation regime, co-

operation tends to become the main method of automotive systems coordination. As such, analysis should no longer focus on the firms themselves (and particularly on car manufacturers) – instead, it should inspect the system’s overall inter-firm relationships.

### **1.3. The aims of the CoCKEAS project**

Respecting this methodological framework, the CoCKEAS research project studied ongoing structural changes in the European automotive system by emphasising five major dimensions thereof (each corresponding to a project work packages).

Firstly, a study was made of the changing relationships between carmakers (or Original Equipment Manufacturers [OEM]) and First Tier Suppliers (FTS), with the latter group having played an ever-greater role in designing and manufacturing motor vehicle subsystems. Coordination of OEM-FTS relationships, during both their design and production activity phases, is a key part of the on-going transformations in the European automotive system.

Secondly and above and beyond this one relationship, it is important to also account for the other actors (lower tier suppliers, engineering companies, distribution networks, etc.) that help to determine the European automotive system’s economic performance.

In addition to these productive transformations, analysis of the automotive industry’s immaterial dimensions (and notably the relationship between the world of finance and automobile manufacturing) paved the way for a new research agenda that could be particularly interesting in the light of the current debate on the financialisation of the world’s economies.

A fourth point focuses on the relationships between these structural changes in productive organisation, and on how they affect the geography of automobile production in Europe: expansion towards the countries of Central Europe and/or on a regional scale; and agglomeration/clustering dynamics.

Lastly, comparing current changes in Europe with automobile industry developments in other parts of the world helped us to identify the distinctiveness of the European automotive system, as well as the competitiveness advantages and handicaps that are associated with it.

## **2. Changes in the OEM-FTS relationship<sup>1</sup>**

### **2.1. Recent trends**

In the 1980s, belief in the Japanese automobile industry’s competitiveness led Western (North American and European) carmakers to wonder openly about what sort of relationships they should be maintaining with their suppliers. Supply relationship management seemed to be one of the foundations of Japanese competitiveness. Furthermore, the transition towards a permanent innovation regime caused the FTS to take on a new role in new vehicle design (Lung, Volpato, 2002; Calabrese, Lung, 2003). To enhance economic performance (costs, quality, delay) and innovation management, carmakers, inspired by Toyota, introduced new supply relationship management methods involving the development of forms of cooperation with fewer suppliers, each of whom was expected to possess strong technological and organisational innovation capabilities and be capable of undertaking ever-greater responsibilities (Clark, Fujimoto, 1991; Fujimoto, 1999).

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<sup>1</sup> This section is based on the detailed Work Package # 1 report by Giuseppe Volpato published in the annexes to the CoCKEAS final report.

The 1990s featured a new step in the automotive industry's long-term internationalisation drive, one that was associated with globalisation and with the reinforcement of inter-firm competitive rivalries all across the world (marked by a proliferation of mergers and acquisitions, both for the OEM and the FTS). This was also a time of strong internal growth, based on crossed external direct investments between automobile regions. A rationalisation drive that was already underway began to take on a new strategic dimension insofar as it was now guided by the search for a closer relationship to the market, something that involved setting up new relationships with end-users (*make-and-deliver-to-order* approach). This meant that all automotive system interactions had to be restructured, from whole vehicle design to final product manufacturing and distribution to drivers. Whereas up until this point re-organisations had mainly affected firms' internal management organisation, this new strategic rationalisation drive centred on inter-firm relationships and on coordinating activities within the automotive system. Besides from exacerbating competitive rivalries, due to pressure from institutional investors globalisation also entails a search for greater financial profitability. This caused firms to focus on their core businesses inasmuch as this constitutes the source of their competitive advantage. It also led them to externalise activities for which other parties, notably the FTS, had an advantage in competencies and scale economics. This is why carmakers/OEM delegated to the FTS the main systems and modules design, production, preparation and delivery, as well as the management of relationships with lower tier suppliers.

This trend translated into several significant developments:

- greater outsourcing, with activities being sold off to specialised suppliers (i.e., foundry or bearings operations) and even a spin-off of equipment making subsidiaries (Delphi for GM, Visteon for Ford, Magneti-Marelli asset sales for Fiat);
- FTS concentration as the OEM began to deal directly with fewer and fewer suppliers whilst delegating ever-increasing responsibilities to them;
- more co-design, with the FTS being associated in the first stages of a vehicle's design, helping to define its subsystems and main equipment by interacting closely with the OEM;
- platforms that were shared and designed to serve as a basis for several differentiated car models. With the OEM sharing the main components and a common product architecture, the product range could be broadened, due to economies of scope;
- system integration and modularisation, with FTS having to design functional systems capable of fitting in with the vehicle's modules (physical integration) or some of the elements thereof. The twinning of functional and physical integration created difficult interfacing problems that firms tried to anticipate within a general co-design framework;
- the advent of supplier parks and consortiums, with FTS agglomerating in the vicinity of assembly sites in order to prepare their modules at these locations;
- global sourcing. The search for improved value-for-money gave birth to a global sourcing of components that could be assembled into the modules in the immediate vicinity of assembly plants. North American components makers participated extensively in this trend, acquiring European firms or setting up green field plants in Eastern and Central Europe. Reciprocally, European components makers reinforced their presence in the United States, in emerging countries and even in Japan.

## **2.2. The impact of ICT**

These trends were given a second wind by the recent diffusion of ICT, which broadened the potential for informational and operational integration all throughout the supply chain (Volpato, Stochetti, 2002). The ability to exchange information amongst the system's various actors rose by a factor of 10, in terms of the mass, precision and speed of the information

being processed. The much-desired transition from a push to a pull logic found new relays, and the ability to coordinate an entire chain of actors efficiently became a major strategic issue. Network relationships started to replace previously hierarchical relationships, and the link to the final market (the client) came to be viewed as the driver behind the supply system. The existence of an integrated information flow (EDI) was assumed even before that of an integrated production process.

But the generalisation of e-commerce (B2B, B2E, B2D, B2C) raised a number of issues. The diffusion of these technologies clearly was catalyst for change in OEM-FTS relationships, but the effects thereof were ambiguous. In fact, a distinction should be made depending on the nature of the component in question. Whereas the outlook for B2B seemed to be quite promising for standard components that could be purchased via a catalogue, it was not nearly as good for specific components, notably for items being co-developed by a car manufacturer and a FTS - actors that continued to face an abundance of technical or economic obstacles, but who were nevertheless supposed to be the drivers behind the innovation capabilities that had become so key to modern competitiveness. In short, it became quite difficult to assess the potential cost savings from B2B (supposedly the result of greater price competition) and from the diffusion of these technologies, especially since a number of barriers remained in place. It is important to relativise the overly enthusiastic vision of some observers and not to underestimate the impediments blocking the dissemination of such tools. Building-to-order (BTO) kinds of approaches and the computerised manifestations thereof have all stumbled over big problems, relating to logistics and to the organisation of production. Because of all these hindrances, an approach of this sort seems nowadays to be more of a case of mobilising the sort of managerial concept one could use to improve some of the catalogues' availability indicators than a representation of future production systems.

Far from a generalised diffusion of such tools, what we should be predicting is a diversity of modalities that will vary depending on the nature of the component in question. Uncertainty raises firms' propensity to experiment. Moreover, rivalry between carmakers and suppliers (to see who can control these tools) is conducive to the proliferation of e-commerce platforms. Selectivity will probably mean the organisation of fewer experiments, but we can also expect a whole range of diverse configurations to materialise, especially since carmakers' strategic orientations are far from being homogeneous in this area.

### **3. Other EAS actors <sup>2</sup>**

Although OEM-FTS relationships do lie at the heart of current EAS restructurings, it is important to account for the new relationships that the OEM and FTS have developed with other actors in this system, both upstream and downstream.

#### **3.1. Upstream activities**

The supply chain's upstream restructuring has had a direct impact on suppliers operating at tiers below the FTS, who have passed their increasingly stringent OEM demands on to their own suppliers. The consequences of this restructuring included greater design and innovation capabilities and thus new competencies; internationalisation (hence investment) to keep up with one's customers; a permanent reduction in prices/cost; inclusion in a logistical chain, etc. Suppliers, often family-run companies, were facing very difficult adaptation problems even as FTS were choosing an increasingly limited number of companies to satisfy their demands.

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<sup>2</sup> This section is based on the detailed Work Package # 2 report by Jean-Jacques Chanaron published in the annexes to the CoCKEAS final report

On one hand, the SMEs found it difficult to develop their technological and organisation capabilities (Chanaron, Lung, 2002). They were given an incentive to develop forms of cooperation, creating regroupings so as to be able to offer their customers a global product range. This presupposed the emergence of new and doubly cooperative modes of coordination, both amongst the SME and also with their customers. On the other hand, this restructuring occurred in a context of great financial vulnerability for the SMEs. Capacity and productivity investments infer being able to access financial resources, but this is not always a straightforward proposition and due to their indebtedness SMEs will often suffer from cash flow problems whenever a carmaker postpones its model launches, something that occurs more and more often due to technological (i.e., electronics control), coordination or economic uncertainties. This delays their receipt of the funds that will allow them to pay for the investments they have made. In this sort of environment, rationalisation led to an intensive bout of mergers-acquisitions and alliances, deeply changing the landscape of the European automotive system, especially since American (and even Japanese) multinationals were taking advantage of these opportunities to consolidate their presence in Europe.

Other actors further upstream were hit by these restructuring efforts, notably capital equipment and materials suppliers with products that were delivered directly to car manufacturers and components makers. This group was also given an incentive to contribute to the innovation policy and work together with clients (on a cooperative basis) in defining new processes and products by coming up with technological solutions that could integrate the new functionalities (i.e., constraints like lighter and safer materials). This meant that they had not only to cut their prices but also to accept more risk, not only relating to their R&D efforts but also market risk. Note that multinational firms (robot producers like ABB or steel and glass companies) are often the only ones capable of coping with the new technological, economic and financial challenges.

The same cannot necessarily be said about the service providers that were trying to take advantage of the opportunities offered by the ever-greater externalisation of activities. The EAS is characterised by the very high density of its engineering and design (styling) firms. These companies have been taking responsibility for a growing proportion of the design activities that manufacturers have been subcontracting out due to the rise in the number of models they offer (hence in the number of projects to be organised). This industrial fabric, mostly comprised of medium-sized firms (like Pininfarina) and even micro-companies, has made a major contribution to the European automotive industry's increased competitiveness, thanks to its specialised technological competencies (i.e., in mechanics) and intensive interactions with the European market (i.e., styling firms). Some (like Matra Automobiles) also took on a manufacturing activity such as niche vehicle assembly and were tempted to expand their competencies in order to be able to cover a wider spread of activities. By so doing they almost achieved a car manufacturer status. The market's ever-greater segmentation offered niches where these actors could hope to position themselves.

The situation was more heterogeneous for the other commercial services to car companies, notably logistics and e-commerce. For example, the externalisation of logistics, which became a strategic factor in coordinating an automotive system's production activities, benefited those multinationals in this sector that were in a position to offer a global product range; and which wanted to take on new functions. Similar to an FTS in this respect, they relegated transporters to a lower tier subcontractor's role. The diffusion of ICT creates a confused situation marked by a proliferation of e-commerce firms (marketplace managers, Access Service Providers, suppliers of e-commerce software, etc.) due to the uncertainty in this area.

All in all, the main changes in the upstream system corresponded to (1) a reinforced competencies transfer trend, (2) the continuation of suppliers' concentration trend, notably via mergers and acquisitions, (3) a generalisation of modularisation and commonalisation

strategies, (4) the entry of new actors, and finally (5) diversified activities and actors and a significantly more complex system. At this level, we should be able to verify the transition from a hierarchical sort of industrial organisation to one based on networks and involving a more intensive type of integration, as well as generalised interdependency.

### **3.2. Downstream activities**

Restructuring efforts at a downstream level were just as intensive, whether this involved distribution, relational digitalisation, automobile repair or recycling. This was the result of three driving forces:

- strategies pursued by the automotive firms (manufacturers and components makers) and by new entrants (i.e., distributors and computer or telecommunications companies) trying to affirm their control and capture potential rents in these fields;
- technological change, with a greater role for electronics and the diffusion of ICT;
- European policy, notably automobile distribution and environmental regulations.

The changes introduced in 2002 in the regulatory framework for automobile distribution will accelerate the reconfiguration of a sector already prone to the effects of inter-agent interactions and economic and technological developments. Encouraging traditional actors (dealers) to concentrate meant affirming the role of the major multi-site and multi-brand diversified internationalised groups (like Jardine, Inchcape or D'Ieteren), with manufacturers trying to rationalise their networks and homogenise their practices. It was also with this in mind that from the late 1990s onwards many actors were persuaded to assume control of some of their outlets via a process of subsidiarisation. Observers over the past decade have frequently referred to new actors' entry into the automobile distribution (retail, e-commerce) market, but this was somewhat anecdotal in reality. Furthermore, the new regulations (and more specifically, the separation between sales and after-sales that has replaced the "natural link" which carmakers were once able to get the market to accept) mean that it is more crucial than ever for automakers to figure out how they are going to control their commercial outlets and defend their consumer brands. In a sense, renewed forms of association between a whole set of commercial services (sales financing, insurance, after-sales service, maintenance, vehicle recalls, used car repurchases, etc.) are forcing the manufacturers into a head-to-head competition with any other candidate desirous of supplying customers with a whole range of general services. Automakers were already struggling to keep up with (the slow) changes in user modes and were offering forms of long-term rentals as a substitute for vehicle purchases, or else adaptable arrangements (i.e., possibility of several vehicles being made available) varying according to people's mobility requirements. Manufacturers are not the only ones to be positioning themselves thusly at present – nor will they be the only ones to do so in the future.

As such, automakers have had to rationalise their retail networks, cutting their high distribution costs and finding other arguments to dissuade potential competitors from entering these lines of businesses. The rationalisation trend encouraged concentration in the retail sector and diffusion of ICT as companies tried to exploit their polyvalent networks in such a way as to be able to offer customers a whole menu of services - something their competition would find difficult to match. For example, one of the manufacturers' main advantages is that they can repurchase a used car as part of a new vehicle sale. Based on specific competencies instead of on (rapidly dissipating) regulatory protections, this type of advantage was supposed to drive a reconstruction of brand policies that would in any event have led to a diversification of commercial approaches and an acceptance of the idea that the customer interface role should be shared with other service providers. Note that under the new distribution regime,

the direct link to consumers could dissipate, causing leading OEM to lose some understanding of consumer needs, thus necessitating new competencies to avoid such problems.

With this in mind, vehicle customisation is seen as one way for manufacturers to leverage their advantage, thus reinforcing the pull logic that assumes that the production process first starts when the customer orders his/her vehicle. Instead of having to sell the vehicle products that the OEM were forcing on the market at just any price (a system based on offering discounts, thus further eroding already mediocre profit margins), the distribution network is supposed to intervene in a more active manner. It remains that the difficulties inherent to an ideal “built-to-order” system, on one hand, and the relatively standardised and foreseeable nature of most customer demand on the other, persuaded the carmakers to give up on their excessively ambitious earlier goals, like being able to deliver vehicles only 3 to 7 days after they were ordered. Where requested, vehicle specification (customisation) could become the responsibility of the distribution network, or even of the logistical firms in charge of ensuring the new vehicles’ transportation from assembly plant to dealer room.

With regards to maintenance and repairs, carmaker networks had to cope with the rise of specialised actors, and in particular with the rapid and cheap repair chains that they tried to counter through acquisitions (Midas Europe by Fiat via Magneti Marelli; Kwik-Fit by Ford before it was resold in 2002) or by building their own networks (Renault’s launch of the Car Life rapid repair chain). Recent modifications in European automobile distribution regulations are doing away with the two rents that the carmakers and their networks had been enjoying. On one hand, carmaker networks are losing their rents on spare parts, whose sales generated substantial profit margins. On the other hand, the regulatory modifications are also forcing carmakers to compete with independent repair shops on after-sales service and maintenance, despite the fact that vehicles’ ever-greater electronic content infers specific equipment and competencies and therefore constitutes an entry barrier.

Finally, at the other end of the product channel, the new European regulatory framework covering recycling end-of-life vehicles have introduced just as great an upheaval in this area, with new technological and organisational competencies being mobilised and encouraging the emergence of new actors (or at least a change in the status of existing ones) as well as new forms of coordination between these actors and manufacturers - one example being the local inter-manufacturer cooperation modalities that make it possible for this group to cope with the new constraints.

## **4. The intangible dimension<sup>3</sup>**

No study of the European automotive system should be limited to a productive system approach alone. As is the case with other sectors, the service dimension has become more and more important in the automobile branch, leading to a search for new competencies, and it appears essential that two other factors be taken into account when assessing current transformations; the financial system’s influence on this industry; and automobile usage systems.

### **4.1. The challenge of financialisation**

The 1990s were marked by the financial sphere’s rising imprint on firms’ industrial strategies. As such, it is legitimate that the effects of greater shareholder power (featuring the semi-

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<sup>3</sup> This section is based on the detailed Work Package # 3 report by Karel Williams published in the annexes to the CoCKEAS final report



ubiquitous presence of institutional investors and the diffusion of shareholder value principles) on European firms be studied by focusing on car manufacturers.

The first conclusion of the studies that our network carried out on this issue was that European carmakers did not hit the profitability targets the financial community had set for them (ROCI of 12%-15%), staying on average in a range between 3.7% and 7%. The intensity of the competitive pressures (and notably price-competition) forced manufacturers to keep tight margins. As a result, economic profitability stayed within the sector's customary norms.

The 1990s were characterised by increased pressure from financial markets and institutional investors, but this does not seem to have undermined the main compromises characterising this sector (Froud, Johal, Williams, 2002). On one hand, it would be tenuous to conclude that the relative weakening of the labour unions is what caused shareholder domination - after all, and even though the unions were unable to block carmakers' outsourcing and internationalisation drives, these were sometimes negotiated in an environment that remained generally favourable for employment. Indeed, an increased number of people working directly for OEM (except Fiat), a sustained rise in real wages and a whole series of social advances (like shorter working hours) could generally be observed. Whereas in some countries, like France, Italy or England there was a manifest weakening of union power in the 1980s, in others (i.e., Germany and Sweden) labour unions remained ubiquitous partners in defining corporate strategies. The relative stability of this compromise, which did not preclude occasionally significant changes, was to a certain extent the doing of the European carmakers' main shareholders.

The institutional investors were more frequently such firms' domestic industrial partners than ad hoc foreign investors. Foreign (notably North American) investors had only a small participation in carmakers' equity, always less than 10%, and domestic investors remained the dominant ones. This lesser presence of foreign investors reflected the fact that European carmakers' capital structure hinders hostile takeovers (thus rapid capital gains). This is because of the frequent presence of a "shareholder of reference": the State for Renault and Volkswagen, the founding families for PSA, Fiat and BMW and Deutsche Bank for DaimlerChrysler. The European carmakers' exposure to the financial (stock) market has therefore been a limited one.

Even though this helps us to understand why like other firms carmakers converted to the principles of shareholder value, improving their financial communications, introducing stock options or selecting investments that were more rigorously geared towards economic profitability criteria (thus reinforcing the externalisation trend), the real impact of these principles was hard to see in the short run. In any event, and whatever analysts have said, the automobile industry remains characterised by the need for a multitude of compromises that will help it to organise incentive-based coordination mechanisms for all of its actors: with employees and unions to ensure the regularity and quality of production; with retail networks and dealerships to consolidate the direct link to the customer base; with suppliers and components makers to maintain and consolidate their innovation capabilities and economic performances; and finally within the firms themselves, to resolve conflicts between their different departments. A configuration of this sort precludes the exclusive domination of financial criteria, especially if they are short-term oriented and even if certain institutional investors maintain a presence only in order to be able to take advantage of whatever profit opportunities may arise (i.e., Porsche).

It remains that carmakers have been seeking new profit opportunities for themselves and for those who invest in their distribution activities. New vehicle profit margins having been squeezed, manufacturers have had to build up a greater presence in customer services.

## 4.2. Services as a new source of profit: user systems

In actual fact, new car sales only represent a small share (less than 25% in France) of total household motoring expenditures. This has had a tendency to fall relative to other automotive spending items, those where customers are able to acquire supplies from sources differing from the ones carmakers and their networks might offer them. As such, for carmakers that want to develop the ability to capture this other type of spending (starting with credit financing or leasing), this is an interesting but problematic proposition. Note the jump in the activity levels of carmakers' captive credit companies, which nowadays finance from 25% to 40% of new car sales for PSA, VW, BMW and Fiat. This has generated new profits, but is also likely to increase such firms' vulnerability by adding to their dependency on the bond markets where they borrow the funds to finance these consumer credits and leasing deals. In other words, by acting thusly carmakers are increasing their exposure to interest rate volatility and to variations in their credit ratings (see Fiat's problems in summer 2002).

In addition to financing, carmakers have begun to offer packages that include financing, insurance and after-sales service provisions. This has evolved towards proposals that are tantamount to a "mobility service" offer. They have been forced to redo the range of services they offer in order to cope with recent changes in the automobile distribution exemption regime, which have destroyed the rents they used to enjoy (c.f., above). In the future they will have to learn how to extend their competitive watch capabilities, which have traditionally focused on their rival manufacturers, so as to keep an eye on other service suppliers coming out of areas like distribution, banking, insurance and rentals.

One of the main justifications for reforming the block exemption regime is the expectation that new car prices will fall as a result of greater competition, thus benefiting European consumers. This raises a few questions about distributive justice issues (Jullien, 2002). Analyses should focus specifically on people's motoring expenditures, notably those of the more underprivileged social classes that rarely entertain direct relationships with carmakers since they usually buy used and relatively old vehicles that they have acquired outside of a carmaker's dealer network and which they get repaired or maintained by an independent operator. Thus, if the structure of household spending on consumption is taken into account, what we get is an upside-down image, with wealthier households devoting a large part of their automotive budgets to new vehicles purchases whereas the other types of expenditures (fuel, maintenance and repairs) are more predominant for the least affluent households.

In the societies we live in, the dearth of public transportation, notably in the out-of-town neighbourhoods where the poorer households live, often force people to become car owners so that they can get to work and have some sort of social life (go shopping in hypermarkets, etc.). A symbol of freedom in individual travel, the automobile is also constrained by the need for social inclusion. Not owning an automobile is synonymous with exclusion. As such, cars generate an obligatory type of spending whose breakdown and structure can vary greatly. Analysis of such issues needs to be developed with respect to their social cohesion implications.

In actual fact, automobile firms and their networks have a higher profit margin on product utilisation items than on new vehicle sales. This suggests that in the current configuration, the "poor" are paying for the "rich". If this were to be confirmed by more in-depth studies (the present analysis only touches upon the French situation), this paradoxical result would tend to indicate that another effect of the distribution regime reform will be a lessening of the social inequalities that up until now have been compounded rather than mitigated by indirect taxation and the structure of property rights.

## 5. The new geography of the European auto industry<sup>4</sup>

Along with the enlargement of the European space, these rapid transformations in the automobile industry's productive organisation have affected the sector's geography in Europe (Layan, Lung, 2001). What we are witnessing in these new geographic configurations is a double extension (enlargement) and intensification (through the spatial agglomeration of activities) movement.

### 5.1. Enlargement towards new areas

The opening up of the automobile industry to Central and Eastern European Countries (CEEC) is one of the main developments of the past few years. Both vehicles manufacturers and suppliers have made major investments in this part of the world (notably in Poland, Hungary, the Czech Republic and Slovakia, as well as in Turkey) seeking new markets and production locations that offer a skilled and cheap workforce to produce vehicles and components featuring a level of technological complexity that is often relatively low (small cars, light commercial vehicles, generic components). However that these countries have moved very rapidly up the technological learning curve, thanks to their local workforce competencies and competitive domestic market rivalries, factors that have forced manufacturers to offer up-to-date models. Of course, the fact that these countries now produce models destined to be sold in the EU market plus the opening of OEM and components maker technical centres have raised fears that a number of automobile production activities will soon be delocalised away from Europe's Southern regions, and even from its very heartlands, to these new peripheries. Three arguments relativise this threat.

First of all, some regions' spectacular breakthrough (Germany's Eastern *Länder*, Hungary) should not make us forget that others (like ex-Yugoslavia or Romania) have regressed. Although current investments (i.e., Renault's stake in Dacia) make it seem like the automobile industry has been developing well in these markets, we should also consider the highly unstable and volatile nature of growth in these zones, regardless of the generally optimistic predictions (i.e., expected 2010 sales of 2 million vehicles vs. fewer than 1 million in 2001). In just a few months these markets can collapse by more than 40% (Poland, Romania) or even 60% (Turkey in 2001). Turkey's recurring difficulties in consolidating growth over the past few years should lead to lower growth rate predictions for this part in world.

Secondly, although this opening up to the East may have seemed like a threat to the automobile industry in the Southern European countries, notably the Iberian Peninsula, which has experienced strong growth ever since Spain and Portugal entered the EU; even though it is true that certain activities (notably ones relating to the production of generic components) have been delocalised towards the East, with a further enlargement towards the Mediterranean Basin (i.e., North Africa) remaining on the cards; and even if Spain and Portugal's price-competitiveness has diminished – it remains that the Iberian countries' ability to develop new competencies, notably in technological activities, has enabled them to put up a strong resistance against competition from CEEC. Iberian automobile output rose by more than 1 million vehicles between 1990 and 2000; Spain is now Europe's third largest producer of passenger cars and its leader for light commercial vehicles.

Thirdly, Europe's automobile industrial heartlands no longer seem under threat from CEEC. The "blue banana" continues to account for most high-tech activities in areas like styling and research, and is still in charge of producing most top-of-the-range vehicles and complex

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<sup>4</sup> This section is based on the detailed Work Package # 4 report by Yannick Lung published in the annexes to the CoCKEAS final report

components. Both Germany and North France have recently benefited from the establishment of new assembly sites, including for small cars. Times have been hard for British automobile industry (due in part to the fluctuations of the £ vs. the €), but this branch has been strengthened by the Japanese carmakers' arrival in the UK. In many countries and in a number of differentiated forms, automobile firms have been negotiating with employees or forcing them to accept new modes of work organisation that increase productive flexibility.

## **5.2. The location of automobile activities in Europe**

The location of automobile production activities in Europe has been affected by a double trend:

- specialisation, reflecting actors' desire to benefit from the opportunities offered by the markets' greater openness and by enlargement towards new zones;
- the spatial agglomeration of activities (clustering).

The regional automobile system's integration process has led to increased international and interregional trade within Europe by encouraging greater production specialisation. This latter factor is particularly apparent in analyses of car manufacturers' assembly plants, both because of the platform strategies being pursued, and also due to the way in which carmakers choose their locations in the light of a given host region's particular characteristics.

Globally we can observe the reproduction of a strong hierarchy between European regions. Technologically complex activities (design, production of top-of-the-range vehicles and sophisticated subsystems) are localised in the central core regions of Europe's industrial heartlands (the "blue banana") whereas more generic activities are spread across the Continent. We can also observe a specialisation of the peripheral countries, notably in Southern and Eastern Europe, which have moved towards the production of small cars and light commercial vehicles. Of course, the peripheral region's new functional hierarchy will be less stable than the preceding configuration had been wherever this only involved the assembly of obsolete models and simple products. The new regions have progressed rapidly on the learning curve and thus started to attract activities that can be quite complex (i.e., Audi in Hungary, Styling in Spain). This has marginally modified their overall positioning in the system. However, a permanent innovation regime also entails constant technological change and more specifically an integration of electronics, something that has tended to reproduce and consolidate dynamically the hierarchy of the spatial division of labour.

It remains that this permanent innovation regime has opened the door to a new phenomenon marked by a spatial agglomeration of activities within the automobile regions. The growing and renewed complexity of functions like design or automobile production has encouraged actors to regroup whatever activities are supposed to be coordinated, plus proximity has become a strong argument in favour of developing a multitude of modes for the coordination of competencies and knowledge amongst the different actors. Spatial concentration is also observed in both design activities (with a concentration of R&D in techno-centres located in major urban areas) and in the manufacturing activities themselves. The proliferation of suppliers' parks around the assembly plants, and even the installation and direct intervention of suppliers on carmakers' sites (i.e., MCC in Hambach) attests to this co-location, which has been associated with the development of a modular production system that allows actors to manage the variety of the models being assembled (Frigant, Lung, 2002; Sako, 2003). The effects of this trend should not be over-estimated, notably in employment terms, since they often involve subsystem (module) pre-assembly activities, and even inventory management.

## **6.The distinctiveness of the European automotive system<sup>5</sup>**

Whereas in the early 1990s some observers worried about the European automobile industry's competitiveness and about its ability to resist the rise of the new Japanese champions, it would appear that the structural changes which this branch has gone through over the past decade have enabled its firms, and notably its manufacturers, to consolidate their positions not only in their local regional market (stagnation of Japanese market share, financial losses by American subsidiaries) but also in other markets via alliances or mergers (in particular the Renault-Nissan alliance and the Daimler Chrysler merger). Is this re-found competitiveness based on some specificity of the European automotive system? We can study this question by looking at the market itself, and at its productive organisation.

### **6.1. The specificity of the European automobile market**

When we compare the European market to its main rivals, we see that its specificities are the mirror image of the limitations of globalisation, in the sense that certain segments that are important outside of Europe are marginal there: in the United States light trucks represent nearly one-half of automobile sales (vs. less than 5% in Europe); and mini-cars are very present in Japan (30%). The European consumer expects a model that is different both in terms of design and technical characteristics (with diesel motors being very important and accounting for 43% of the market). As a result, vehicles sold in Europe differ from the ones being sold in the other Triad markets. Moreover, as regards their design capabilities European carmakers continue to benefit from a strong competitive advantage.

This competitive advantage is not only limited to automakers. It pertains to all actors, including FTS, niche specialists or knowledge-intensive services. In fact, this is one of the singularities of the EAS, i.e., the presence of a fabric of medium-sized firms that offer highly developed technological competencies, not only in the luxury car/sports car/racing car niche (like Ferrari) but also in support of the major European carmakers' design and small series production activities. These engineering companies have played an ever-greater role in helping manufacturers to rapidly expand their vehicle product range. They have done this by mobilising external competencies, i.e., by externalising the aforementioned types of activity. Hence they have helped to strengthen design capabilities, something that seems to be one of the foundations of the European automobile industry's overall competitiveness.

### **6.2. An alternative European production system?**

In production system terms, many of the concepts that have attained a paradigmatic status in the automobile industry are non-European in origin. This is true for Fordism and for Toyotism and can be applied in all areas, ranging from production organisation to supplier relationships and product development. Even modular production, a domain ostensibly led by the European automobile industry, draws its inspiration from modes of productive organisation in other sectors (notably the computer industry) and is mostly experimented with in other locations (Brazil, Central and Eastern Europe). Even if the emergent productive model is not an original one, the specificities of the practices being implemented raise questions about the two possible foundations for a cooperation-based European model: work organisation; and supply relationship management.

Regarding the work organisation, Europe has been a place of experimentation in finding ways to overcome the limitations of Taylorism (Jürgens, 1993), even to eliminate the assembly line.

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<sup>5</sup> See This section is based on the detailed Work Package # 5 report by Ulrich Jürgens published in the annexes to the CoCKEAS final report

Sweden has played an important role in this area, specifically Volvo which since the 1970s and until its Uddevalla experience tried to enrich and redo its tasks in such a way as to humanise work by developing semi-autonomous groups and inventing forms of labour that were free from the constraints of production line rhythms and capable of galvanising operators' thinking power (Actes du GERPISA, 1994). There is little doubt that this path did not lead to an ostensibly original type of configuration, even though it did encourage the introduction of new practices like modularisation.

Regarding the supply relationships, note first of all the singularity of Europe's equipment making industry, with the presence of suppliers that are relatively independent from manufacturers and therefore oriented towards a number of different clients (unlike the historical link between Ford-Visteon and Toyota-Denso, for example). This is true for large FTS multinationals like Bosch and for medium-sized family companies and small firms. This being the case, the European automobile industry has gone through a marked change, moving towards a type of modularisation and specialisation which infers cooperation between firms. The delegation of design and module preparation activities to FTS seems to have been particularly advanced in Europe, due to labour union resistance in the United States and the general reluctance of the two main Japanese carmakers (Toyota and Honda), who wish to remain in control of their value chain. Although the US and Japan have changed somewhat, in particular under the impetus of more modularly oriented carmakers like Nissan, and even though not all European manufacturers have shown the same commitment towards this way of doing things, amongst the three Triad regions the European automotive system (both its OEM and FTS) has played a leading role in this field – despite the fact that the most advanced experiments were in fact run in emerging countries (especially Brazil).

Forms of cooperation developed in this context between OEM and FTS: both at an assembly level, with suppliers' parks and FTS presence on-site and on manufacturers' assembly lines (a trend that is less developed in the other two Triad regions); and also at the design level, with the advent of co-design practices that associate OEM with FTS or with engineering service firms. Japan did in fact accumulate prior experience in OEM-FTS co-development, but the modalities of European co-design were original in the sense that here FTS do not find themselves in a subordinate position or in a relationship where engineering companies have a particularly significant role to play. This bestows upon the different cooperation processes between the OEM and their partners (FTS or SMEs) a network configuration that is expressed both in an international dimension, in particular at a European scale, and also by the importance of the spatial agglomeration/clustering phenomena that extend inter-firm relationships in one case and intensify them in the other.

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